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An Analysis on Business Feasibility and Farmers Income in Semarang of Central Java

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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. The purpose of this research was to figure out the income earned by the farmers as well as farming feasibility. The research object included four agricultural sub-sectors: covering crops, horticultural plants, industrial raw material plants, and cattle breeding. This research employs a purposive sampling method. The research resulted that the average land areas owned by the farmers of crops, horticultural plants and industrial raw material plants was 3,098 square meters, while the average ownership of dairy cattle, beef cattle, broilers, and laying hens was respectively by 9 and 11 cows as well as 7,970 and 1,900 chickens. Moreover, the research showed that the average farmers' income of crops, industrial raw material plants, horticultural plants, and cattle breeders was respectively by Rp. 6,163,750/year, Rp. 10,886,610/year, Rp. 17,928,300/year, and Rp.71,346,250/year which were considered lower than those of formal sector workers with the Regional Minimum Wage of Rp. 2,315,000/month. However, different conditions were found for the breeders of laying hens and broilers whose monthly income were respectively by Rp. 2,773,878 per thousand broilers and Rp. 52,528,947 per thousand hens. To equally earn the income to meet the Regional Minimum Wage, the farmers of crops, industrial raw material plants, and horticultural plants should at least have the land areas around 14,500 m^2, 7.600 m^2, and 3,600 m^2.

Keywords: Income, Business Scale, Farmer, Semarang

1. Introduction

During 2010 to 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% [2]. It is concerned that most

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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.

Semarang, a city in Central Java, has Gross Regional Domestic Product (GRDP) supported by mostly agricultural sectors which contributions are still considered relatively small. The number population of Semarang working in agricultural sectors may be seen in Table 1.

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: Badan Pusat Statistik (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 developed. The increasing number of people working in agricultural sector should also increase their contribution to Gross Regional Domestic Product as the production also experienced an increase. In fact, it was 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.

In addition to its contributions to the decreasing of GRDP, agricultural sectors in Semarang still experienced various problems, those are covering farmers' low income due to the status of agricultural land ownership and non-economical business scale.

The purpose of this research was to examine cost, income, and profit obtained by the farmers and to analyze the farming feasibility in Semarang. This research was

TABLE 2: The Contribution of Gross Regional Domestic Product based on 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: Badan Pusat Statistik (2016)

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. MethodS

This research employed a purposive sampling method with Slovin Formula to decide the number of samples.

$$n = \frac{N}{1 + Ne^2} \tag{1}$$

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 were obtained by

$$n = \frac{27,141}{1 + 27,141(0.01)} = \frac{27,141}{272.41} = 99.63(100) \tag{2}$$

Research respondents were equally divided into categories 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
	Farming Type	Beef	Egg(s) / milk	
4	Poultry Farming	10	10	20
5	Ruminant Farming	10	10	20
Total				100

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

Table 4: Sample Stratification Based on Asset Ownership.

No	Farming Type	Farmer < 2,000 m^2	Farmer 2,000 – 4,000 m^2	Farmer > 4,000 m^2	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 was conducted using a quantitative approach. The data consists of primary and secondary data collected through observation, questionnaire, as well as interview which 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:

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

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

5. *R/C Ratio Analysis*

   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).

3. 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 had special characteristics in which not all businesses may generate regular monthly income. The researchers made 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 in Table 6.

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

Based on the analysis result, it showed that there was a large income disparity among farmers by the types of cultivated commodities. Based on the annual income, the highest to the lowest income was obtained by the farmers of poultry, ruminant, horticultural plants, industrial raw material plants and crops respectively reached Rp. 731,476,850, Rp. 71,346,250, Rp. 17,928,300, Rp. 10,886,610 and Rp. 6,163,750. This condition clearly reflected the unequal welfare levels among farmers and breeders.

When the numbers were converted to the monthly-based income, the farmers of poultry, ruminant, horticultural plants, and industrial raw material plants may

respectively reached 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 was generally considered as the lowest. Due to the facts, the agricultural crops become unattractive to farmers. Therefore, almost all paddy farmers did the agricultural activities as a side job. They usually worked in other sectors, such as trading, service and others to fulfill their life necessities, when the plants no longer required more intensive treatments.

The result also showed that the crop farmers' lowest monthly income was 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 influenced their physical ability and response to the new knowledge and skills in cultivating their farms. A research conducted by Damanik (2014) showed that land areas and production cost have positive and significant influence on paddy farmers' income too, while the availability of labor forces has an influence but not significant to their income.

Table 7, Table 8, and Table 9 show the average income of crops farmers, horticultural plants farmers, and industrial raw material plants farmers 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 m^2	3,526,333	1,763,167	293,861
2	2,001-4,000 m^2	5,747,667	2,873,833	478,972
3	>4,000 m^2	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 m^2	7,596,000	633,000
2	2,001-4,000 m^2	20,800,000	1,733,333
3	>4,000 m^2	27,738,000	2,311,500
4	Intercropping	16,500,000	1,375,000

Table 7, 8, and 9 shows that the more the land areas were cultivated, the higher the income of farmers. This is in line with the research conducted by Gupito, R *et al.*, (2014) that sorghum farming only contributed 2% to the total farmers' income. Factors affecting the sorghum farmers' income level were positively the land areas and the seeds' price. Furthermore, Kusmantoro (2009) in his research related to the analysis on the

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 m^2	11,728,167	93,825,333	977,347
2	2,001-4,000 m^2	4,138,667	33,109,333	344,889
3	>4,000 m^2	17,429,600	139,436,800	1,452,467
4	Intercropping	11,794,400	94,355,200	982,867

diversity of household farming businesses stated that the income generated from *gogo* paddy farming provided the highest contributions to the household income generated from the farming activities (on farm), while the livestock income had 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 provided the highest contributions to the farmers' household income generated from the non-farming activities. Thus, the farmers were greatly required to be provided a wider access to the capital resources.

According to Rohma Dewi (2015), the period in which the farmers joined in group and farming land areas positively influence the farmers' micro-credit access. The farmer groups were in the form of semi-formal institutions, such as cooperatives or *gapoktan* (farmer groups association). Since the farmers are joined as the institutional members, the administrative requirements were easily facilitated with the lower interest rates. In Bogor areas, the amount of credits provided to the micro-credit ranged from Rp. 300,000 to Rp. 2,000,000. The payment system was made after the harvest period in which most credits were used to buy fertilizers and pay the workers' salary.

The results also indicated that the income of dairy and beef cattle breeder groups based on the number of cows ownership is presented in Table 10.

The dairy farmers with the ownership of less than 10 cows averagely earned only Rp. 373,500 which was greatly unequal with the dairy farmers' income with the ownership of 10-20 cows in which their average monthly income reached Rp. 3,568,750. Thus, it can be concluded that the number of livestock also influenced the farmers' income. However, the farmers with the livestock ownership of more than 20 cows, in facts, experienced losses since one time the price of milk dropped to the lowest level accompanied with the higher purchasing of the cattle seeds. This in 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 had the greatest influence.

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	12,778,500	4,482,000	373,500
	10-20		42,825,000	3,568,750
	>20		-11,550,000	-962,500
Beef cattle	<10	129,914,000	4,710,000	392,500
	10-20		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		-	-

Furthermore, Fajri (2016) stated that there was 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. In the other hand, 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 are highly possible to meet the Regional Minimum Wage.

In facts, chicken breeders earned the highest income compared with income earned by the farmers and cattle breeders. The annual income of laying-hen breeders was five times greater than that of broiler breeders due to several factors, including the price of chicken eggs which tended to be more stable than that of the broilers; laying-hen breeding had a higher investment value; most broiler breeders ran their breeding patterns in partnership scheme with large animal feed company that their bergainning position was poor. The factors which encourage breeders in partnership patterns were: 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* explained that chicken breeders with the core of partnership patterns had a direct access to the modern and conventional markets, while the independent breeders typically sold their cattle through the collecting middlemen.

To see the farmers' real income, the researchers compared it to the regional minimum wage (*UMR*) since the amount of salary was considered reflecting the average of people's daily needs and closely paying attention to the macro-economic assumptions. The calculation results showed that the income/month/1,000 m^2 of horticulture, industrial crop, and crop farmers was respectively 3.6, 7.6, and 14.5 times lower than the regional minimum wage of Semarang.

However, the income/month/cow of dairy cattle and beef cattle farmers was also respectively 18.3 and 2.1 times lower than the regional minimum wage of Semarang. The condition was slightly different from what experienced by the chicken farmers. The average income/ month/1,000 chicken of the broiler and lying hen breeders was respectively by Rp. 2,773,878 and Rp. 52,528,947 higher than the regional minimum wage of Semarang.

Moreover, Anggita (2013) stated that 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 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) using 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. In addition, Mosher believed that farmers' group action or co-operation is a factor to facilitate agricultural development.

4. Conclusion and Recomendation

The research resulted: (1) the average land ownership of paddy, horticultural plants and industrial plants was 3,098 m^2. The average ownership of dairy cattle was 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 was 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 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 m^2, 7.600 m^2 and 3,600 m^2. 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.

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