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Income Analysis of Closed House Broiler Farm with Partnership Business Model

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ABSTRACT

This research aims to determine the performance and income of a closed-house broiler farm with partnership business model. The research was conducted in a closed broiler house owned by Faculty of Animal and Agricultural Sciences, Diponegoro University, Semarang, and in a partnership with Cemerlang Unggas Lestari Ltd. A total of 11,000 broilers were raised for each raising period in the closed broiler house. A case study method was used for this research. The data were collected using survey method; the primary data were collected directly through interviews with the farm operators and field observation. Secondary data were collected through data recording which includes production cost and obtained revenue in each raising period. The collected data were then analyzed through quantitative-descriptive study. A total 7 raising periods of production cost, revenue, and income in a year were analyzed. The results of this study showed that the average performances of closed-house broiler farm yield 0.37% depletion, 1.49 FCR, and 398.46 PI. The economic indicators showed that the average production cost was Rp292,668,800.00; which generated Rp327,300,779.00 revenue, Rp34,631,978.00 income, Rp183.055.535.00 NPV, and 1.24 BCR. The study concluded that the closed-house broiler farm generates higher income compared with the open house system.

Keywords: Broiler, Close house, Income, Partnership, Revenue

Introduction

Industrialization of poultry farms in Indonesia experienced a rapid development which can be seen from its sustained business from the farm to the plate. The development in this industry yields a tangible contribution to the people, whether as consumers or producers, in a reciprocal relationship to improve the animal farming sectors. The development in broiler industry is in line with the advance in science and technology. The increasing demand for poultry meat in Indonesia urges an industrial oriented farming system to achieve more efficient and optimal poultry meat production.

The core-plasma partnership business model is one of the triggers for the rapid growth in the industry. The business model helps farmers to increase their business scale with only required poultry house and raising equipments as their capitals. The obstacles often experienced by the farmers in developing their business in the core-plasma system are the limitation of land ownership and lacks poultry housing technology in the tropical area. Statistical data from the Direktorat Jenderal Peternakan dan Kesehatan Hewan (2017) showed an increase in broiler population, with 1,592 million of broilers were raised in 2016, which increased by 4.3% from 2015. The current increase of the broiler population is affected by the increase of farming scale, which was triggered by the general application of closed housing system by the plasma farmers to increase their income. Various research on the effect of feed quality to the chicken's growth has been done (Husvetha *et al*., 2015, Santoso *et al*., 2016; Sun *et al*., 2017; Wang *et al*., 2015).

The closed-house system has been introduced to the farmers around 20-23 years ago in America, and the system was spread to the South East Asia which most of the regions are tropical (Maliton *et al*., 2015). The closed-house system should be able to remove excess heat, water vapor, and other harming gasses like CO, CO_2, and NH_3, while also provides oxygen for the chickens. The closed-house system is believed to be able to minimize environmental risks so that the chicken productivity could be increased (Achmanu and Muharlien, 2011). The closed-house system is suitable to be applied in Indonesia regarding the current fluctuated climate condition so that an optimal growth and low mortality could be achieved. Research on broiler's growth in the closed-house system has been done by various researchers (Rojano *et al*., 2015).

The amount of closed-house poultry farm in Indonesia is not more than 30% of the chicken's population, while Malaysia and Thailand have reached 90% (Trobos, 2018). The closed-house system will yield more uniform chicken size compared to the open-house system. The open-house system is known to have low feed conversion ratio which will affect the income (Prawira *et al*., 2017). Broiler farm is a capital-intensive business, and the closed-house system offers high revenue and profitability in each raising period. The generated income is one factor to describe the farm's economic health so that it could be used as a basis for business expansion. This research aims to determine the performances and income of closed-house broiler chicken farm with partnership business model.

Materials and Methods

The research was done in closed poultry house owned by Faculty of Animal Science and Agriculture, Diponegoro University, and in a partnership with Cemerlang Unggas Lestari Ltd as the core partner. This research used case study method, while the data were collected through a direct survey in the farm, questionnaire interviews, and field observation. The primary data were obtained directly through interviews with the farm operators and direct observation in the field. The secondary data were collected through data recording, which includes production cost and generated income in each raising period.

A year data consisted a total of 7 raising periods of broiler raising were used in this research, starting from January 20th until December 12th, 2017 with 11,000 broilers were raised in each period. The collected data were then analyzed through quantitative-descriptive study. The analyzed data include production cost, generated revenue and income in each raising period for a year. The production cost and revenue were calculated with the following formula (Soekartawi, 2003):

TC = TVC + TFC

TC = Total Cost (Rp)

TVC = Total Variable Cost (Rp)

TFC = Total Fixed Cost (Rp)

The income was calculated with:

$$\pi = TR - TC$$

TR = Q x Pq

TR = (Pa.Qa) + B. FCR + B. Mortality + B. Price

Where:

π = Income (Rp)

TR = Total revenue (Rp)

TC = Total cost (Rp)

Q = Total harvested chickens

Pq = Chicken selling price/kg (Rp)

Pa = Broiler chicken harvesting price (Rp/kg)

Qa = Broiler chicken harvesting weight (kg)

B. Mortality = Mortality bonus (Rp)

B. FCR = FCR bonus (Rp)

B. Harga = Harvesting price bonus (Rp)

The Net Present Value (NPV) dan Benefit Cost Ratio (BCR) calculations were done following Saragih *et al.* (2005) as follows:

NPV = ∑ PV Proceeds-∑PV Investment

BCR = $\frac{\sum \text{PV Proceeds}}{\sum \text{PV Investment}}$

Result and Discussion

Broiler performances

The broiler farming management could be reflected through an evaluation based on certain indicators such as depletion, feed conversion ratio (FCR) and performance index (PI) to determine the incentive money which will be received by the farmers. The closed-house system was able to control the surrounding environments such as humidity, air temperature, and even ammonia concentration inside the broiler house. In this research, the temperature at the FPP Undip poultry closed house was set at 31,5ºC with 62% relative humidity.

It can be seen from Table 1 that the closed-house system yield 0.37% in depletion percentage. The low depletion percentage showed that the poultry house was not easily contaminated with the outside environment which could cause stress and death. The mortality rate of the broilers could affect the generated revenue as it will reduce the total population of the broilers and the selling volume. Majid and Hassan (2016) stated that there is a significant correlation

Table 1. Broiler performances indicator in the closed-house system

Raising Period	Performance Indicator		
	Depletion	FCR	PI
	...%...		
Period I	-0.40	1.77	436.20
Period II	1.01	1.40	434.60
Period III	0.01	1.42	412.00
Period IV	0.58	1.50	351.30
Period V	-0.38	1.39	410.60
Period VI	1.47	1.47	375.50
Period VII	0.32	1.51	369.00
Average	0.37	1.49	398.46

Source: Research Data, 2018.

between mortality rate with the farmers' economic condition which reflected in the obtained revenue for each broiler.

The feed conversion ratio (FCR) in the closed-house system for 7 raising periods was 1,49 on the average. According to the research done by Sujana *et al*. (2011), the average FCR for broilers raised in the semi closed-house was 1,56. Furthermore, Dharmawan *et al*. (2017) showed that broiler raised in the stilt-house system has 1,83 FCR for broilers raised in the first floor and 1,77 for broilers raised in the third floor. The FCR score for broilers raised in the closed-house system was lower than in the semi closed-house or in the stilt-house. The low FCR score showed feed conversion efficiency. The result is in accordance with Amrizal *et al*. (2011), which stated that broilers raised in a closed-house system would yield better income compared to the open-house system. The condition is regarding the environmental conditions which will affect feed consumption and final broilers' weight described in FCR, where the closed-house system has better environmental condition compared to the other two systems. Majid and Hassan (2013) stated that FCR has a significant effect on the selling price of the broilers, thus affecting plasma farmers' income.

The measurement of performances index (PI) is aimed to understand the farm's productivity. On average, the differences in broilers' PI on each period were affected by the farm condition and management. The average PI for closed-house broiler farm for 7 raising periods was 398.46. The result is better compared to other research which used different housing system. Research by Susanti *et al.* (2017) showed that the average broilers' PI raised in the open-house system was 263.05. Furthermore, Sujana *et al.* (2011) showed 359.78 PI for broilers raised in semi closed-house. The standard PI for broilers raised in good farm management is 300, where higher PI indicates better farm management.

Production cost

The production cost in closed-house broiler farm was divided into fixed cost and variable cost, the detail of production cost is provided in Table 2. The average total production cost for raising 11,000 broilers was Rp292,668,800.00 for each raising period, which consisted of day old chicken (DOC) purchasing, feed cost, meds and vaccines cost, payment for workers, litter cost, and operation costs like gas and electricity. The average fixed cost for each period was Rp2,000,000.00 for the housing and equipment depreciation.

The highest cost was in the feed cost which claimed 69.69% of total production cost. Sutawi (2007) stated that feed cost is the biggest component of the total production cost in the poultry industry. Rasyaf (2003) added that 60-80% of total production cost in poultry business came from the feed cost.

Revenue

The revenue in closed-house broiler farm was generated from the selling of alive broilers, mortality incentive, FCR incentive, and price bonus which can be seen in Table 3.

The given incentives were based on the achieved performance as appreciation for the success of broilers raising. The generated revenues from selling alive broilers were varied on each raising period and affected by the broilers' performances.

The highest revenue was generated from selling the broilers, which could be calculated by multiplying the total harvest weight with the agreed price with core partner. Thus the weight will affect the income. The faster target weight is reached with an efficient feeding; the higher revenue will be generated. The volume of harvested broilers will affect the income, as 97.89% of total income generated from selling the broilers (Maliton *et al*., 2015). The incentives given by core partner were in the form of mortality incentive, FCR incentive, and market prices surplus or price bonus. The calculation of FCR and mortality incentives were based on the differences between the achieved FCR and mortality compared with the standard determined by core partner. The lower FCR and mortality rate will yield higher incentives. The bonus price incentive will be given if there is a surplus from the agreed price and the market price. Prawira *et al*. (2017) stated that the bonus prize would be given by the core partner if there is a surplus from the agreed price with the market price, the amount of the bonus price incentive will be around 15%-30%.

Income

The income was calculated by reducing generated revenue with production cost. The generated income in this research can be seen in Table 4.

The income from broiler farm was from a surplus of the total generated revenue as business outputs over total production cost as inputs. The average income for closed-house broiler farm with the capacity of 11,000 broilers is Rp34,631,978.00 for each period. Research by Santoso *et al*. (2005) showed that plasma partner (farmers) would yield a profit by selling around 8,000-128,000 broilers for each harvesting period. The obtained profit in the closed-house system has positive value, even though it fluctuates. The generated income in this research is higher than previous research done by Prawira *et al*. (2017) which generated Rp20,391,337.00 for 11,000 broilers raised in the closed-house system. The utilization of closed-house system has its benefit, which generates higher profit compared to the open-house system.

Table 2. Production cost in closed-house broiler farm with partnership business model

Production cost	Raising period							Average	Percentage
	I	II	III	IV	V	VI	VII		
	...Rp/period...								
Variable costs									
DOC	66,000,000	66,000,000	64,900,000	70,800,000	59,950,000	59,950,000	59,950,000	63,935,714	21.85
Feed	196,925,000	216,527,500	214,545,000	221,062,500	183,620,000	201,110,000	193,876,000	203,952,286	69.69
Meds and vaccines	8,374,700	7,693,950	6,365,700	7,970,310	7,842,928	13,963,295	13,943,740	9,450,660	3.23
Payment and incentive for workers	4,765,700	4,800,000	4,596,000	4,914,052	4,821,792	4,516,718	6,516,718	4,990,140	1.71
Litters	4,800,000	4,800,000	3,600,000	3,600,000	1,800,000	1,800,000	1,800,000	3,171,429	1.08
Gas and electricity	5,040,000	5,040,000	5,220,000	5,220,000	5,220,000	5,220,000	5,220,000	5,168,571	1.77
Total variable cost	**285,905,400**	**304,861,450**	**299,226,700**	**313,566,862**	**263,254,720**	**286,560,013**	**281,306,458**	**290,668,800**	
Fixed cost									
Poultry house and equipments depreciation	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	1.00
Total production cost	**287,905,400**	**306,861,450**	**301,226,700**	**315,566,862**	**265,254,720**	**288,560,013**	**283,306,458**	**292,668,800**	**100.00**

Source: Research data, 2018

Table 3. Generated revenue from the closed-house broiler farm with partnership business model

Revenue	Raising Period						
	1	2	3	4	5	6	7
				...Rp/period...			
Selling of alive broilers	336,771,744	355,556,353	343,053,574	337,193,054	294,835,036	305,356,378	287,824,518
Mortality incentive	585,306	622,131	599,475	586,308	546,768	566,022	0
FCR incentive	3,511,836	3,732,786	3,596,850	3,517,848	3,280,608	3,396,132	2,481,080
Price bonus	0	0	0	1,367,099	2,068,568	0	55,978
Total revenue	340,868,886	359,911,270	347,249,899	342,664,309	300,730,980	309,318,532	290,361.576

Source: Research data, 2018.

Table 4. Generated income from closed-house broiler farm with partnership business model

Raising period	Revenue	Production cost	Income
		...Rp/period...	
I	340,868,886	287,905,400	52,963,486
II	359,911,270	306,861,450	53,049,820
III	347,249,899	301,226,700	46,023,199
IV	342,664,309	315,566,862	27,097,447
V	300,730,980	265,254,720	35,476,260
VI	309,318,532	288,560,013	20,758,519
VII	290,361,576	283,306,458	7,055,118
Average	327,300,779	292,668,800	34,631,978

Source: Research data, 2018.

NPV and BCR

Based on the analysis, the obtained NPV was Rp183,055,535 while the BC ratio was 1.24. This showed that the closed-house system generates better income compared to the open-house system which BCR was around 1.04-1.1. The depletion rate in the closed-house system was 0.34, thus resulting in high harvest yield and high net income, thus resulting in high NPV and BCR compared to the open-house system.

Conclusion

The research concluded that the closed-house broiler farm with partnership business model had 0.37% average deletion, 1.49 FCR, and 398.46 PI, while in the economic perspective, the system generates average income as much as Rp34,631,978.00 with the average revenue Rp327,300,779.00, and the average production cost was Rp292,668,800.00. The generated NPV was Rp. 183.055.535 with 1.24 BCR.

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