

INCOME ANALYSIS ON BROILER CHICKEN FARMING IN PARTNERSHIP SYSTEM DURING THE COVID-19 PANDEMIC IN TANRALILI DISTRICT, INDONESIA

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↳ Supporting Information

ABSTRACT: This study was aimed to determine the income of farmers who carry out a partnership system during the COVID-19 Pandemic in Lekopancing Village, Tanralili District, Maros Regency. The research was conducted on March to April 2021. The type of research used is descriptive quantitative. The sample in this study were farmers who partnered with the X's company were 2 farmers, the Y's company were 12 farmers and the Z's company were 8 breeder. Data was collected through interviews with the help of a questionnaire as the research instrument. The results showed that the COVID-19 pandemic impacted to the incomes of farmers who partnered with companies X, Y, and Z, other than that it influence price fluctuations. The income earned by farmers with partnership patterns on a business scale of 3000 tail is the highest breeder who partners with PT. Z was USD 1,564.63 and USD 0.52/tail/period. As for the business scale of 4000, the highest is PT. Y of USD 2,285.97 and USD 0.76/tail/period.

Keywords: Agricultural management, Broiler chicken, Income, Partnership system, Poultry farming.

INTRODUCTION

The development of the broiler chicken business in Indonesia is relatively more advanced than in other livestock businesses (Coyne et al., 2019, 2020). Broiler chicken is one of the poultry commodities that contributes significantly to meeting the protein needs of animal origin for the people of Indonesia (Coyne et al., 2020). Broiler chickens have fast meat growth in a relatively short time and the genetic advantages of broiler chickens and good feeding can display optimal production performance (Wahyono and Utami, 2018; Baxter et al., 2021).

Investment opportunities in broiler agribusiness are enough to attract people to open a business. This can be seen from the population of broiler chickens which continues to increase yearly, and its contribution is quite broad in expanding employment opportunities. A partnership pattern is a form of cooperation between entrepreneurs and farmers in terms of managing the livestock business for a certain period to achieve mutual benefits. Plasma farmers who follow the partnership pattern are sufficient to provide cages, labor, equipment, electricity, and water, while seeds (DOC), feed and medicines, technical guidance, and marketing are provided by the core company (Riwukore and Habaora, 2020).

The COVID-19 pandemic began in early 2020 with the implementation of Large-Scale Social Restrictions, impacted all economic industries, including the broiler farming business. The results of research by Sain et al. (2021) stated that this pandemic affected broiler chicken farmers, disrupting the supply chain of seeds, feed, and medicines. Other impacts that farmers also feel are a decrease in income, a decrease in the population of livestock kept, a decrease in consumers, and an increase in production costs. Therefore, the sustainability of the meat farming business can be threatened given the decline in business productivity and farmer income.

The broiler chicken business's sustainability indirectly impacts both the company (core) and farmers (plasma). The purpose of income analysis is to describe the current situation and measure a business's success (Budiraharjo and Handayani, 2008; Geo et al., 2020). Based on these facts, it has aroused interest in conducting further investigations on farmers' income with a partnership system during the COVID-19 pandemic in Lekopancing Village, Tanralili District, Maros Regency. The problem in this study is the income of farmers who carry out a partnership system during the COVID-19 Pandemic in Lekopancing Village, Tanralili District, Maros Regency.

This study aimed to determine the income of farmers who carried out a partnership system during the COVID-19 Pandemic in Lekopancing Village, Tanralili District, Maros Regency. The information from this research is expected to be useful as consideration for companies and farmers to increase income for companies and farmers, for farmers as information or consideration in running their business and as material for further research as well as reference material for researchers who will conduct the similar study at a later time.

MATERIALS AND METHODS

Time and place

Research on income analysis in a partnership system broiler farming business during the COVID-19 pandemic (a case study of Lekopancing Village, Tanralili District, Maros Regency) was carried out in March-April 2021. This research was conducted in this area because it is one of the areas where many farmers keep broiler chickens and are affected by COVID-19.

Types of research

This type of research was quantitative descriptive, namely research that describes the condition of the variable, namely the income of farmers who collaborate with companies in Lekopancing Village, Tanralili District, Maros Regency.

Data types and sources

The type of data used in this study was quantitative data, namely data in the form of numbers that can be obtained based on the results of questionnaires from farmers or respondent information. The sources of data used in this study were as follows:

Primary data was obtained directly from the source without going through an intermediary. Primary data was data sourced from interviews with broiler farmers who have partnerships. This data includes data during the COVID-19 pandemic from May 2020-December 2020 (3 maintenance periods), respondent identities, and data on cost analysis used by farmers. Secondary data is obtained indirectly but through intermediaries (obtained and recorded by other parties). This data was in the form of records or archive reports that are published or not published. The data includes the general condition of the location, including a description of the location.

Method of collecting data

The process of collecting data in this study used field study techniques and literature studies. The field studies consisted of A) Observation was data collection which is done through direct observation of research locations and activities of broiler farmers with a partnership system in Lekopancing Village, Tanralili District, Maros Regency; B) Interviews were data collection which was conducted through direct interviews with broiler farmers with a partnership system in Lekopancing Village, Tanralili District, Maros Regency; C) Questionnaires or questionnaires were methods or techniques used by a researcher to collect data by distributing some sheets of paper containing questions that respondents must answer; E) Documentation is looking for data in the form of notes, reports, and tables, photos, and so on related to the object of research. In this study, the data obtained were photos with partnered farmers in Lekopancing Village, Tanralili District, Maros Regency.

Population and sample

The population was the farmers who have partnerships with the core company as many as 22 farmers are also the sample in this study (saturated sample). These 22 farmers were partnered with 3 core companies, namely X, Y, and Z companies. The distribution can be seen in Table 1.

Table 1 - Distribution of research samples

Scale enterprises	Company X	Company Y	Company Z	Amount
3,000 tails	1	4	4	9
4,000 tails	1	8	4	13

Data analysis

The data used in this research is a descriptive analysis to describe the production costs, revenues, and income obtained by broiler farmers in the partnership system in Lekopancing Village, Tanralili District, Maros Regency. The calculation of total costs, revenues, and income, according to Soekartaw (2002), are as follows:

Total Production Costs (TC) are composed of all expenses during the production process due to fixed and variable costs.

$$TC = TFC + TVC$$

Where

TC = Total Production Cost (*Total Cost*) (USD/Period); TFC = Total Fixed Cost (USD/Period); TVC = Total Variable Cost (USD/Period)

Revenue is the amount of revenue minus the total cost of production.

$$TR = Q \times P$$

TR = Total Revenue (Total Revenue) (USD/Period); ; Q = Number of Products (Kg); P = Price/ Unit of Product (USD/Kg)

Analysis of Revenue/Cost ratio (R/C)

$$\frac{R}{C} = \frac{Pq}{TFC - TVC}$$

R = Revenue; C = Cost; Pq = Price and Quantities; TVC = Total Variable Cost; TFC = Total Fixed Cost

RESULTS AND DISCUSSION

Income from broiler farming is the difference between revenue and total costs incurred. The income received by farmers is determined by the size of the costs used in the production process because production costs are one of the most important factors.

Production cost

Cost is the basis for determining prices because a price level that cannot cover costs will result in losses. Conversely, if a price level exceeds all costs, production, operating and non-operating costs will generate profits (Soekartawi, 2002). Production costs are classified into 2, namely fixed costs, which are types of costs incurred by farmers that do not depend on the size of the volume of production, for example, expenses of property tax, depreciation of cages, and depreciation of equipment. Meanwhile, variable costs vary according to the size of the production volume, such as DOC, feed, medicine, and operational costs (labor, electricity, husk, and LPG gas).

Fixed cost

Fixed costs are costs incurred for procuring components supporting the production process where these components can be used in several production processes (Joshua Olorunwa, 2018). For example, fixed costs on each farm of each company in Lekopancing Village, Tanralili District, can be seen in Table 2.

Table 2 - Fixed costs of broiler chicken business in Lekopancing village per period (USD)

No	Fixed Cost	Business Scale 3000			Business Scale 4000		
		PT.X	PT.Y	PT.Z	PT.X	PT.Y	PT.Z
1	Cage Shrinking	100.20	137.06	127.45	234.01	178.23	221.48
2	Equipment Depreciation	40.04	44.62	37.09	40.99	51.62	48.98
3	Land and Building Tax Cost	0.05	0.21	0.19	0.47	0.34	0.40
	Sub Total	140.29	181.89	164.73	275.47	230.19	270.86

Cage shrinking

The difference in the shrinkage of the cage in each scale is the difference in the area of the cage. For example, the average cage area on a scale of 3000 tails for X's company is 600 m², Y's company is 420 m² and Z's company is 340 m² while the average cage area is on a scale of 4000 tails for X's company is 720 m², Y's company is 710 m² and Z's company is 805 m². The number of depreciation costs of the cage depends on the costs incurred to make the cage. The wider or better the cage, the more costs incurred to make the cage. This is following the opinion of Kalangi et al. (2021), that the coops of partner farmers who cooperate with the company must meet company standards so that the chickens do not experience stress. The size of the cage area depends on the density of the kept livestock population.

The broiler chicken coop has the ideal size cage. There is even an ideal standard for broiler chicken coop sizes that will be kept in the tropics so that chicken growth remains good. In determining the size of the ideal broiler chicken coop, one must pay attention to the level of broiler population density based on age, namely one day - one week 40-50 birds per m², Age 2 weeks 20-25 birds per m², and Age more than 2 weeks 8-12 birds per m². More than this number, the temperature of the cage quickly increases, especially during the day at adult age which causes feed consumption to decrease, chickens tend to drink a lot, stress, stunted growth, and are susceptible to disease (Nadzir et al., 2015; Rahman et al., 2020).

The amount of equipment depreciation costs incurred by 3000 business-scale farmers are the highest at Y's company of USD 44,62 and the lowest is at Z's company USD 37,09 while the cost of equipment depreciation incurred by business-scale farmers of 4000 tails is the highest at Y's company USD 51,62 and the lowest is at X's company amounting to USD 40,99. The equipment used by farmers includes feeders, drinking containers, heaters, shovels, water dynamos, machetes, buckets, basins, and ropes. Equipment depreciation costs incurred by each breeder vary greatly, this is following the scale of the farmer's business, the price, and the number of tools used. This follows the opinion of Naradhupa et al. (2020) which states that the need for a place to feed and drink depends on the number of chickens kept and the age of the chickens. Tube-shaped feed container (diameter 38 cm) or a capacity of 5 kg, one tube feed content can be used for 30-35 chickens. The cost of depreciation of cage equipment is the same as the cost of depreciation of cages, the size of the depreciation cost of cage equipment that is borne each period is influenced by the scale of business.

Variable cost

Variable costs, referred to as variable costs, are costs incurred for the procurement of supporting components during the production period, the size of which is influenced by the scale or amount of production used up in one production process (Kamruzzaman et al., 2021). The variables included in the costs incurred by farmers include DOC, feed, labor, medicine, electricity, gas, and husks. Variable costs on each company's farm in Lekopancing Village, Tanralili District can be seen in Table 3.

Table 3 - Average variable costs per period of business scale 3000 and 4000 tails (USD).

No.	Description	PT.X		PT.Y		PT.Z	
		Business Scale 3000	Business Scale 4000	Business Scale 3000	Business Scale 4000	Business Scale 3000	Business Scale 4000
1	Seeds	1,534.26	2,045.68	1,599.27	2,132.36	1,492.00	1,989.34
2	Feed	4,720.83	5,853.22	4,761.14	5,997.03	4,944.27	6,928.47
3	Labor	137.82	179.86	141.51	173.85	140.56	173.42
4	OVK	103.57	113.21	108.16	119.56	106.29	94.5
5	Electricity	23.84	19.50	24.11	24.24	20.37	29.6
6	Gas	56.34	49.84	42.26	73.35	47.95	75.85
7	Husk	18.64	31.96	25.46	53.88	26.82	40.74
	Sub Total	6,595.30	8,293.27	6,701.91	8,574.27	6,778.26	9,331.92

Seeds

The average cost of seeds for business scale 3000 the highest is at Y's company of USD 1,599.27 and the lowest at Z's company is USD 1,492.00. For Expenditures of the cost of seeds, the highest X's company occurred in the third period, was USD 1,560.27, for Y's company in the second period was USD 1,638.28, while for Z's company in the third period was USD 1,536.86. Likewise, for a business scale of 4000, the highest average cost of seeds is also at Y's company was USD 2,132.36 and the lowest at Z's company was USD 1,989.34. The difference in the cost of seeds is due to the difference in the price of seeds for each company and the cost of seeds incurred by the breeder and each company following the contract previously agreed by both parties. The cost of seeds (DOC) is a fairly large production cost in a broiler farming business with a portion between 10-16% of the total production cost (Sani et al., 2015; Kalangi et al., 2021). The size of the business scale can determine the level of income and profits of the actors involved in running it.

The availability of DOC is also one of the factors in determining the number of chickens to be produced. This is following the opinion of Ningsih and Prabowo (2017) which states that the availability and price of day-old chick (DOC) affect the broiler production process. The availability of DOC at the farmer level, there is no decrease in the number of populations being kept during the COVID-19 pandemic, but resulted in a delay in the distribution of DOC to farmers. This is due to the implementation of Large-Scale Social Restrictions which have been implemented in every region in Indonesia.

The average cost of feed on a business scale of 3000 is the highest at Z's company was USD 4,944.27 and the lowest at X's company was amounting to USD 4,720.83. Expenditures for the cost of feed at X's company and the highest in Y's company was occurred in the second period, was USD 5,217.62 and USD 4,868.68, and for the cost highest in Z's company in the third period was USD 5,356.49. On a business scale of 4000, the highest average cost of feed is also at Z's company was USD 6,928.47 and the lowest at X's company is amount to USD 5,853.22. This difference is because each company's feed cost is different and each period will change. This is following the opinion of Sani et al. (2015) which states that the cost of feed has a portion of 70-80% of the total production cost. Thus, feed greatly affects the success of a broiler farming business.

During COVID-19 the availability of feed at the farmer level in Lekopancing Village, Tanralili Subdistrict is sufficient, however, the maintenance period for broiler chickens during the COVID-19 pandemic is longer than before, resulting in more total feed requirements. There is no impact from the implementation of Large-Scale Social Restrictions on the availability of animal feed. It's just that the transportation/distribution of feed is slightly disrupted due to inspections at the border area because all areas are on lockdown. This condition directly affects expedition drivers who do not want to travel and prefer to rest or stay at home.

The average amount of labor costs incurred by farmers on a business scale of 3000 at X's company was USD 137.82, Y's company was USD 141.51 and Z's company was USD 140.56 while the labor costs for business scale farmers are 4000 X's company as much as USD 179.86, Y's company was USD 173.85 and for Z's company was USD 173.42. The workforce is divided into 2, namely production workers who work when the chickens come in until harvest, and daily labor is needed only at harvest. This is following the opinion of Yusuf et al. (2016) which states that the labor used by farmers is grouped into two major groups, namely production workers and external (wage) workers. The salary distribution system for production workers is in the form of money with a nominal value of USD 130.02 for a population of 3000 individuals and USD 0.16.

Revenue

Revenue is the sum of the components of production revenue expressed in rupiahs, namely sales of chickens and sales of the production process for one period. The income obtained by farmers is then used to cover the total costs that have been incurred (Iskayani et al., 2016). Revenue from each farm of each company in Lekopancing Village, Tanralili District can be seen in Table 4.

The income of plasma farmers fluctuates every period. This fluctuation in revenue is due to the mortality rate, FCR rate, average weight of the harvested chickens, and the contract price of chickens. The income fluctuates every period as a result of the high risk of weather and disease risk in the livestock business. The largest total revenue on a business scale of 3000 and 4000 tails were Z's company was USD 8,503.06 and USD 11,641.80 and the lowest at X's company was USD 8,136.50, and USD 10,755.42. Livestock business revenue is the result of efforts to sell the main livestock business carried out, while the capital used for the business is not included in it. The selling price determined in the market multiplied by the amount of business production is the gross revenue obtained through the livestock business. This is following the opinion of (Geo et al., 2020; Yusuf et al., 2016) which states that the number of chicken sales will depend on body weight gain and the price per kilogram of chicken. The price is determined based on the live weight of the chicken. The price continues to fluctuate in line with market demand and supply. The amount of a farmer's income can be analyzed using a predetermined product price multiplied by the amount of business production.

Total Revenue at companies X, Y, and X fluctuated during the COVID-19 pandemic. This was due to the unstable selling price of live chicken due to weak market demand the rest of the price decline was also due to Large-Scale Social Restrictions due to the COVID-19 pandemic so that there is a buildup of live chickens at the farmer level. This resulted in the condition of the average weight of chickens and different levels of mortality. Mortality affects the number of healthy chickens ready to harvest in the coop.

Table 4 - Average revenue per period of business scale 3000 and 4000 Tails (USD)

Description	Business Scale 3000			Business Scale 4000		
	PT.X	PT.Y	PT.Z	PT.X	PT.Y	PT.Z
Chicken	8,086.22	8,163.68	8,472.35	10,695.61	11,046.00	11,608.04
Phase	50.28	35.11	30.71	59.81	38.13	33.76
Total Receipt	8,136.50	8,198.79	8,503.06	10,755.42	11,084.13	11,641.80

Income Analysis

Income is the goal of every type of business. Income can be achieved if the amount of revenue obtained from the results of the operation is greater than the total expenditure. The higher the difference, the higher the profit that can be obtained. The income of farmers in Lekopancing Village, Tanralili District can be seen in Table 5.

The income earned by broiler farmers in partnership pattern in Lekopancing Village on a business scale of 3000 tails, the highest is farmers who partner with Z's company with a total was USD 1,564.63 and USD 0.52/tail/period. As for the business scale of 4000, the highest was Y's company was USD 2,285.97 and USD 0.76/tail/period. The difference in income earned by farmers who partner with X and Y companies and farmers who partner with Z's company with a business scale of 3000 and 4000 tails is caused by differences in production costs incurred, for example, the cost of seeds and feed costs. In addition to differences in production costs, differences in income earned by farmers in partnership with X and Y companies and farmers who partner with Z's company is also due to the different selling prices of chicken meat.

The COVID-19 pandemic has resulted in the income of farmers who partner with companies of X, Y, and X experiencing fluctuations in input-output prices every period. This is due to the implementation of social distancing, so it becomes an obstacle for brokers to take live chickens from farmers. This again becomes a production burden, namely increasing harvest age and then automatically followed by an increase in production or maintenance and of course increasing production costs, in this case following the very popular farm production triangle law, namely breed, feed and management where it is said that 70 % production costs are feed costs.

The results showed that the broiler farming business was profitable during the COVID-19 pandemic, although at the beginning of the COVID-19 pandemic there was a decline in income but did not cause losses for farmers. This is not following the opinion of Sain et al. (2021) stating that the losses from the COVID19 pandemic include supply chain disruptions due to disruption of DOC distribution, feed, and medicines as well as operational activities. Therefore, the sustainability of the meat farming business can be threatened given the decline in business productivity and livestock income. The distribution of sales profits in pandemic has not changed much, still according to the contract between farmers (plasma) and companies (core). However, there was a change in the amount of income in a year due to the reduced number of maintenance periods due to the constraints faced during the pandemic, namely movement restrictions, resulting in hampered feed distribution and decreased sales. This causes some companies (core) to slow down or delay the collection of chicken from farmers even though it is ready to be marketed.

Table 5 - Average income per period of business scale 3000 and 4000 Tails (USD)

Description	Business Scale 3000			Business Scale 4000		
	PT.X	PT. Y	PT. Z	PT.X	PT. Y	PT. Z
Reception	8,136.49	8,198.78	8,503.07	10,755.42	11,084.06	11,504.45
Production Cost	6,732.20	6,878.78	6,938.44	8,561.13	8,798.09	9,595.28
Total Income	1,404.29	1,320.01	1,564.63	2,194.29	2,285.97	1,909.18
Average/Tail	0.47	0.44	0.52	0.73	0.76	0.64

CONCLUSION

The results of research that have been carried out in Lekopancing Village Tanralili Subdistrict, Maros Regency, it can be concluded that the COVID-19 pandemic has resulted in the income of farmers who partner with companies X, Y, and Z experiencing production price fluctuations. The income earned by broiler farmers with partnership patterns on a business scale of 3000 heads is the highest breeder who partners with Z's company was USD 1,564.63 and USD 0.52/tail/period. As for the business scale of 4000, the highest of Y's company was USD 2,285.97 and USD 0.76/tail/period.

DECLARATIONS

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Authors' contribution

S.Nurlaelah led and fully managed the research project and was responsible for data collection and script writing; H.Husbnar contributed to data processing and interpreting field data; A.Asnawi contributed to the data processing and provision of library resources; and Dr S.Nurani Sirajuddin contributed to the article writing process, publication process and translation process

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Conflict of Interest

None

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