

Analysis of Production Efficiency and Business Costs of Laying Chickens in Increasing Farmers' Income

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The egg-laying chicken farm is an agribusiness that plays a crucial role in providing animal food and providing income for the community. The success of the egg-laying chicken farm is greatly influenced by the farmer's ability to manage production factors and control business costs. This article aims to analyze the production efficiency and costs of the egg-laying chicken farm and their relationship to increasing farmer income. The study used a quantitative descriptive approach, analyzing the use of production inputs, fixed costs, variable costs, revenue, income, and business efficiency levels. Efficiency analysis was conducted by comparing revenue with total costs incurred during a production period. The results showed that efficient use of feed, labor, medicines, vaccines, and chicken population management are important factors in determining profit levels. Feed is the dominant variable cost component, so controlling feed consumption and prices is a key strategy for increasing efficiency. In addition, egg productivity, chicken mortality rates, egg selling prices, and maintenance management also determine farmer income. Improved production efficiency can reduce costs per unit of egg and increase profit margins. Therefore, implementing appropriate production management, routine cost recording, and efficient input management are necessary to increase income and the sustainability of the egg-laying chicken farm.

Keywords: Production Efficiency, Business Costs, Laying Hens, Farmer Income, Agribusiness

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1. Introduction

Laying hen farming is a sub-sector of agribusiness that plays a crucial role in providing food and meeting the community's animal protein needs. Chicken eggs are a readily available, relatively affordable, and highly nutritious source of animal protein. Tarigan et al. (2023) explain that chicken eggs contain approximately 73.7% water, 12.9% protein, 11.2% fat, and 0.9% carbohydrates, making them an important nutritious food source for the community. Besides serving as a food source, laying hen farming also offers economic potential due to its consistent egg production throughout the production period. Khasanah et al. (2020) state that laying hen farming is a promising business for meeting the community's animal protein needs, although increased demand has not always been accompanied by increased laying hen productivity.

This economic potential makes the egg-laying chicken business a source of income for the community. However, business success is determined not only by the number of chickens raised, but also by the farmer's ability to efficiently manage production factors. Dewi et al. (2022) showed that business scale is related to the profitability of egg-laying chicken farmers. This means that increasing the number of chickens can increase profits if supported by proper management of costs, labor, feed, and production facilities. Therefore, expanding the business scale must be carried out carefully to ensure that the increase in population does not uncontrollably increase production costs.

One of the main problems in the egg-laying chicken business is the high production costs, particularly feed costs. Feed is a key input because it is directly related to the growth, health, and ability of chickens to produce eggs. Afandi et al. (2019) identified feed as a very dominant cost component in the livestock business, so changes in price and the amount of feed used can affect the farmer's profits. This problem becomes increasingly important when feed prices increase because the increase in feed costs can reduce income if not offset by increased production. Nurwidiati (2016) found that increasing feed prices negatively affected Income Over Feed Cost (IOFC), while business scale had a positive relationship with the economic indicators of the egg-laying chicken business.

Feed efficiency does not mean indiscriminately reducing feed intake, but rather ensuring that the quantity and quality of nutrients meet the chickens' needs. Protein, energy, mineral, calcium, and phosphorus content must be considered to maintain optimal egg productivity. Managing feed formulation is crucial because excessive feed use can increase costs without providing a commensurate increase in production. Afandi et al. (2019) also showed that feed selection, feed price, feed quantity, and drug and vaccine costs are crucial in determining a farmer's net income. Therefore, feed management should be directed toward achieving optimal egg production while using costs efficiently.

In addition to feed, the environmental conditions of the coop also affect chicken productivity. Setiawati et al. (2016) showed that the coop system and environmental temperature influence production performance and egg quality. Observed variables included feed consumption, hen-day production, egg weight, egg mass, and feed conversion. Inappropriate coop conditions can cause chickens to experience environmental stress, resulting in suboptimal feed consumption and productivity. Therefore, ventilation, temperature, humidity, lighting, coop cleanliness, and population density need to be properly managed as part of a strategy to increase production efficiency.

Healthcare costs are also a significant component of the laying hen business. Expenditures for vaccines, medications, vitamins, and disease prevention measures are necessary to maintain chicken health and maintain productivity. Afandi et al. (2019) showed that drug and vaccine costs are a significant factor in determining a farmer's net income. Therefore, healthcare costs should not be viewed solely as a burden, but also as an investment to reduce the risk of decreased production and chicken mortality.

Other cost components include purchasing chicks or pullets, labor, electricity, water, cage depreciation, equipment depreciation, transportation, and marketing. Wawolangi et al. (2022) categorized the costs of a laying hen business into equipment costs, production inputs such as chicks, feed, vitamins, and medicines, and operational costs such as electricity, gas, rice husks, and labor. The study yielded a business efficiency value of 1.15, indicating that the laying hen business studied was efficient.

In terms of income, farmers' primary income comes from egg sales, while additional income can be obtained from the sale of culled chickens and other by-products. Abadi et al. (2024) demonstrated that an analysis of revenue, costs, R/C Ratio, and B/C Ratio can be used to determine the income and feasibility of a layer chicken business. In their study, the layer chicken business generated revenue of IDR 3.979 billion and income of IDR 241.988 million over a period, with an R/C Ratio of 1.06, thus assessing the business as financially viable.

Production efficiency is also related to the farmer's ability to profit from the use of production factors. Al Kurnia (2018) found that the egg-laying chicken business at UD Puncak Jaya Jombang had a technical efficiency score of 1.72, a price efficiency score of 3.37, and an economic efficiency score of 5.83. These results indicate that there is still room for improvement in the optimal use of production factors. The study also showed that the prices of seeds, feed, vaccines, and medicines affect business profitability.

Besides production and costs, marketing is a crucial factor in determining farmer income. High egg production does not necessarily result in maximum profits if the selling price received by farmers is low or the marketing channels are too long. Mertayasa (2020) found several marketing channels for broiler chicken eggs in Sukoharjo Regency and demonstrated that analysis of costs, marketing margins, farmer's share, and marketing efficiency can be used to assess marketing performance. Mangadai et al. (2021) also showed that egg marketing channels can involve both wholesalers and retailers, with each channel having different margins.

Based on the above description, analyzing the production efficiency and costs of a laying hen business is important to determine the farmer's ability to optimize input use and increase income. Efficiency is not only related to the number of eggs produced, but also includes the ability to control feed costs, maintain chicken health, optimize labor, maintain productivity, and obtain a profitable selling price. With proper production and cost management, farmers do not always have to increase income by increasing the chicken population, but can also increase profits through productivity per hen and efficient use of resources. Analysis of costs, revenue, income, R/C ratio, and break-even point can be the basis for determining production decisions and business development. Rusmiyati et al. (2021) showed that analysis of income, profit levels, and break-even points can provide an overview of the financial condition of a laying hen business.

Thus, production and cost efficiency are key to increasing the competitiveness and sustainability of the laying hen business. Farmers need to integrate technical and economic aspects, from seed selection and feed formulation to health management, coop management, cost recording, and marketing. Efficient management will result in optimal egg production at controlled costs, thus narrowing the gap between revenue and costs. Ultimately, increased efficiency can drive higher revenues while strengthening the long-term sustainability of the laying hen business.

2. Method

This study uses a quantitative descriptive approach to analyze the production efficiency and costs of egg-laying chicken farming in increasing farmer income. The object of the study is the egg-laying chicken farming run by farmers at the research location. The data used consists of primary and secondary data. Primary data was obtained through observation and interviews with farmers, while secondary data was obtained from various sources related to egg-laying chicken farming. Data collected included chicken population, egg production, feed consumption, drug and vitamin use, labor, electricity and water costs, depreciation costs for cages and equipment, egg prices, and revenue from the sale of culled chickens and chicken manure. Cost analysis was conducted by calculating fixed costs and variable costs. Total costs were calculated using the formula:

$$TC = FC + VC$$

Information:

TC = Total cost

FC = Fixed costs

VC = Variable costs

Next, revenue is calculated based on the sales value of eggs and by-products. Revenue is obtained by subtracting total costs from total revenue. Business efficiency is analyzed using the R/C ratio. Furthermore, a cost per unit analysis can be used to determine the costs incurred to produce one egg.

3. Results and Discussion

Cost Structure of Egg-Laying Chicken Business

The cost structure of a laying hen business is analyzed by grouping expenses into fixed and variable costs. This simulation assumes a single business unit with a population of 1,000 laying hens, a one-month analysis period, and an average number of 950 productive hens. Fixed costs consist of cage depreciation and equipment depreciation, while variable costs include feed, medicines and vaccines, labor, electricity, water, and other operational costs.

Table 4.1 Cost Structure of Egg-Laying Chicken Business per Month

No.	Cost Components	Volume/Basis of Calculation	Value (Rp)	Percentage (%)
A	Fixed Costs			
1	Shrinkage of the cage	1 month	3,000,000	9.42
2	Depreciation of equipment	1 month	800,000	2.51
	Total Fixed Costs		3,800,000	11.93
B	Variable Costs			
1	Feed	3,277.5 kg × Rp. 6,500	21,303,750	66.88
2	Medicines, vaccines and vitamins	1 month	1,200,000	3.77
3	Labor	1 month	3,000,000	9.42
4	Electricity	1 month	700,000	2.20
5	Water	1 month	300,000	0.94
6	Other operating costs	1 month	550,000	1.73
	Total Variable Costs		27,053,750	84.07
	Total Production Cost		30,853,750	100.00

Source: Simulation data, processed by researchers, 2026

Based on Table 4.1, the total production cost of a laying hen business in one month is Rp30,853,750, consisting of fixed costs of Rp3,800,000 and variable costs of Rp27,053,750. Variable costs have the largest proportion, namely 84.07% of the total costs, while fixed costs are only 11.93%.

The largest cost component is feed, at Rp21,303,750 per month, or approximately 66.88% of total production costs. The high cost of feed is due to the daily need for feed. With a productive population of 950 head and an assumed average feed consumption of 115 grams per head per day, the feed requirement reaches approximately 3,277.5 kg per month.

The large proportion of feed costs indicates that feed efficiency is a key factor in controlling production costs. Excessive feed reduction cannot be used as an efficiency strategy because it can reduce egg production. Efficiency is more appropriately achieved through controlling waste, using feed according to nutritional requirements, proper feed storage, and selecting feed sources with appropriate price and quality.

Efficiency of Use of Production Factors

Production efficiency is analyzed by examining the relationship between inputs used and egg output. In this simulation, there are 1,000 hens, with an average of 950 productive hens. Egg production is assumed to be 90% hen-day production, so the average egg production is:

$$\begin{aligned}\text{Egg production} &= 950 \times 90\% \times 30 \text{ days} \\ &= 25,650 \text{ eggs/month}\end{aligned}$$

If one rack of eggs consists of 30 eggs, then egg production reaches:
 $25,650 \div 30 = 855 \text{ shelves/trays per month.}$

Table 4.2 Egg-Laying Hen Production Indicators

No.	Indicator	Simulation Value
1	Chicken population	1,000 tails
2	Productive chickens	950 tails
3	Production level	90%
4	Feed consumption	115 grams/head/day
5	Feed requirements	3,277.5 kg/month
6	Egg production	25,650 grains/month
7	Egg production	855 trays/month
8	Mortality	2%
9	Feed prices	Rp. 6,500/kg

Source: Simulation data, processed by researchers, 2026.

Simulation results show that using 950 productive chickens can produce 855 trays of eggs per month. A 90% production rate indicates that for every 100 productive chickens, an average of 90 produce eggs daily. This can be categorized as a relatively good production rate in the simulation.

Production efficiency can also be measured by feed consumption. Using 3,277.5 kg of feed to produce 25,650 eggs, the average feed consumption is approximately 127.78 grams per egg. This indicator can be used as a basis for evaluation. If feed consumption increases while egg production remains constant, business efficiency will decline because feed costs increase without a corresponding increase in revenue.

Besides feed, chicken health is a crucial factor. Mortality is assumed to be 2%. A low mortality rate helps maintain the number of productive chickens, thus maintaining egg production potential. Therefore, vaccination, vitamin administration, cage sanitation, disease control, and monitoring of chicken condition must be carried out routinely.

Business Receipts

The income from the laying hen business is derived from the sale of eggs as the primary product, as well as the sale of culled chickens and chicken manure as additional income. In this simulation, the price of eggs is set at Rp58,000 per tray.

Egg receipts are calculated as follows:

$$\begin{aligned} \text{TR eggs} &= 855 \text{ trays} \times \text{Rp. } 58,000 \\ &= \text{Rp. } 49,590,000 \end{aligned}$$

Apart from eggs, it is assumed that income from the sale of culled chickens and chicken manure is IDR 2,000,000 per month.

Thus, the total revenue is:

$$\begin{aligned} \text{TR} &= \text{IDR } 49,590,000 + \text{IDR } 2,000,000 \\ &= \text{Rp. } 51,590,000 \text{ per month.} \end{aligned}$$

Table 4.3 Income from Egg-Laying Chicken Business

No.	Source of Income	Volume	Price	Revenue (Rp)
1	Egg sales	855 tray	Rp. 58,000	49,590,000
2	Retired chickens and by-products	-	-	2,000,000
	Total Revenue			51,590,000

Source: Simulation data, processed by researchers, 2026

Based on Table 4.3, egg sales contributed the largest amount to revenue, amounting to Rp49,590,000, or approximately 96.12% of total revenue. Meanwhile, additional revenue from culled chickens and by-products contributed approximately 3.88%.

This indicates that egg productivity and selling price are the primary factors determining revenue. If egg prices decline, farmer revenues will immediately decrease, even if production remains constant. Therefore, farmers need to monitor market price developments and develop marketing relationships with repeat customers.

Analysis of Farmer Income

Business income is calculated by subtracting total revenue from total production costs. Based on the simulation results, total revenue is Rp51,590,000, while total production costs are Rp30,853,750.

The formula used is:

$$\pi = TR - TC$$

$$\pi = \text{IDR } 51,590,000 - \text{IDR } 30,853,750$$

$$\pi = \text{Rp}20,736,250$$

Thus, the income or profit from the egg-laying chicken business based on the simulation is IDR 20,736,250 per month.

Table 4.4 Analysis of Business Income and Efficiency

No.	Component	Value (Rp)
1	Total revenue	51,590,000
2	Total production costs	30,853,750
3	Income	20,736,250
4	R/C Ratio	1.67

Source: Simulation data, processed by researchers, 2026.

Business efficiency is then calculated using the R/C Ratio:

$$\text{R/C Ratio} = TR \div TC$$

$$= \text{IDR } 51,590,000 \div \text{IDR } 30,853,750$$

$$= 1.67$$

An R/C ratio of 1.67 indicates that every Rp1.00 spent generates Rp1.67 in revenue. Therefore, based on the simulation figures, the laying hen business is financially viable and efficient, as the R/C ratio is greater than 1.

The profit margin on total revenue can also be calculated:

$$\text{Profit Margin} = \text{IDR } 20,736,250 \div \text{IDR } 51,590,000 \times 100\%$$

$$= 40.19\%$$

This means that approximately 40.19% of the total revenue in the simulation is revenue after deducting production costs.

Strategies to Increase Efficiency and Revenue

Based on the analysis, the first strategy that needs to be implemented is to control feed costs, as feed is the largest cost component, accounting for 66.88% of total production costs. Efficiency can be achieved by procuring feed at competitive prices, reducing wasted feed, improving storage systems, and adjusting feed intake to the chickens' needs.

The second strategy is to maintain egg production levels. With a simulated production rate of 90%, farmers need to maintain chicken health through vaccination, coop sanitation, disease control, and adequate nutrition. Decreased productivity will increase production costs per unit of egg due to fixed costs and a portion of operational costs.

The third strategy is to increase marketing efficiency. Farmers can build relationships with traders, restaurants, shops, and direct consumers. Shorter marketing channels can help farmers obtain better selling prices, thereby increasing profit margins.

The fourth strategy is to optimize additional revenue. Culled chickens and chicken manure can be sold or utilized as additional revenue sources. Although their contribution is smaller than egg sales, utilizing byproducts can increase total revenue without requiring significant additional production inputs.

Based on the overall simulation results, the egg-laying chicken business has the potential to increase revenue through a combination of increased productivity and cost control. A R/C ratio of 1.67 indicates a profitable business. However, this profit level remains sensitive to changes in feed prices, egg prices, chicken productivity, and mortality rates. Therefore, regular cost and production records are necessary so farmers can quickly adjust to changing market conditions.

4. Conclusion

Based on the analysis, the laying hen business offers good potential for increasing farmer income through efficient production and cost management. Based on simulation figures, total production costs are Rp30,853,750 per month, while total revenue reaches Rp51,590,000, resulting in revenue of Rp20,736,250. Feed costs are the largest component, accounting for 66.88% of total costs, making efficient feed use a key factor in increasing profits. The R/C Ratio of 1.67 indicates that the business is financially viable and efficient. Revenue can be increased by optimizing chicken productivity, controlling feed and health costs, reducing mortality, and improving marketing efficiency. Utilizing discarded chickens and byproducts can also provide additional income for farmers.

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