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Production Cost Analysis of Broiler Business with Semi Closed House System

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Abstract. *This study aims to analyze the production costs of the boriler chicken farming business with a semi-closed house system with a population of 1000 chickens. The case study approach is the methodology employed in this study. Two categories of data are utilized: primary and secondary. Recording pricing from owners is the primary source of data. Reading resources that are secondary data and are taken from government records and earlier studies. The following cost formulas were used to examine the data: depreciation costs, variable costs, total costs, total revenue, profit, R/C, and BEP. The components of cages are sufficiently advanced to reduce the negative environmental effects on broilers. Semi-closed house cages are more affordable than closed house cages, despite having technology-based component. The result shows that that feed expenses are the most expensive aspect of manufacturing. The total cost for one semi-closed house cage with a population of 1000 chickens is IDR 49,469,122. The total revenue in this study was IDR 51,045,000 and profit was IDR 1,575,878/periode. The value of R/C for semi-closed house system in this study was 1.03. A semi-closed house farm with 1000 broilers has a BEP price of IDR 49,469.12/Kg. It is possible to operate a broiler farm with 1000 chickens using a semi-closed system. In light of the semi-closed house system broiler business's production expenses, it is hoped that the study's findings will serve as a reference for readers.*

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Keywords: *BEP, Depreciation cost, Feed expenses, Poultry, Revenue*

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INTRODUCTION

One of the livestock industries that plays a crucial part in supplying the need for animal protein is the poultry business. Given that production cost efficiency has a significant impact on farmers' profitability and selling price, it is one of the primary problems in broiler production (Pakage et al., 2018). The housing system is one of the key elements that influences operating expenses and productivity in an attempt to increase efficiency.

Open house, closed house, and a hybrid known as semi-closed house are the three main types of broiler housing systems. Because it can regulate temperature, humidity, and air circulation to the best of its capacity, the closed house system has been shown to have higher production efficiency (Gobel et al., 2022). The hefty initial cost of this technology, however, is a barrier for small and medium-sized farmers. Conversely, open house systems are less expensive to install but are less effective in regulating the cage's microclimate, particularly in tropical areas. People currently find it challenging to completely convert their cages to a closed-house system. However, continuing to employ an open house system poses a risk to the growth and health of broilers. The semi-closed house concept is an effort to make broiler farms safer than open houses but less expensive than closed houses. Farmers can lower broiler mortality in this semi-closed house by as much as 5% per period.

By integrating the benefits of both systems, the semi-closed house system became an other option. Although this system requires less money than fully closed houses, it makes use of some closed house technology, such as cooling pads and mechanical ventilation (Sitorus et al., 2021). Nevertheless, there are still very few studies analyzing production costs in semi-closed house systems, particularly when comparing their effectiveness to other systems.

Prior research has tended to compare open and closed home systems, as seen in studies by Pakage et al. (2018) and Gobel et al. (2022). They discovered that the closed-house arrangement led to more effective management and increased productivity. However, there hasn't been any research done that focuses on the semi-closed housing systems' cost, efficiency, and profitability. Another study gap that needs to be addressed is the paucity of comprehensive empirical data on the potential effects of semi-closed home systems on the prices of important variables like feed, labor, and utilities.

LITERATURE REVIEW

Significant housing system developments have been made in the broiler business (Honig et al., 2024), most notably the switch from open to closed house systems. Improved environmental control provided by closed house systems can result in better broiler performance and possibly increased profitability. However, many farmers may find the high upfront expenditures of closed house systems to be unaffordable. In order to balance cost and efficiency, a compromise known as the semi-closed house system has developed, which combines aspects of both closed house and traditional systems (Hamiyanti et al., 2023).

Research indicates that broilers reared in closed house systems often exhibit superior performance metrics compared to those in traditional open houses. For instance, a study by Evadewi and Sukmaningsih (2018) found that broilers in closed house systems had better feed conversion ratios and average daily gains, contributing to higher overall productivity. Similarly, Sugito et al. (2021) reported that closed house systems resulted in higher production indices, indicating more efficient production processes. While specific studies on semi closed house systems are limited, it is anticipated that their performance metrics would fall between those of open and fully closed systems, offering a balanced approach to production efficiency.

Economic considerations are crucial when evaluating different broiler housing systems. Evadewi and Sukmaningsih (2018) demonstrated that, despite higher operational costs, closed house systems yielded greater net incomes due to improved broiler performance. Respati et al. (2020) compared open and closed house systems, finding that while closed houses required higher initial investments, they offered better returns on investment over time. The semi closed house system, with its moderate investment and operational costs, presents a potentially cost-effective alternative, though comprehensive economic analyses specific to this system are sparse.

RESEARCH METHODS

The case study approach is the methodology employed in this study. A case study is when a researcher looks at just one thing (case) (Priya, 2021). Two categories of data are utilized: primary and secondary. Recording pricing from owners is the primary source of data. Reading resources that are secondary data and are taken from government records and earlier studies. The following cost formulas were used to

examine the data: depreciation costs, variable costs, total costs, total revenue, profit, R/C, and BEP. The following is a description of the formulas used:

$$TC = TFC + TVC$$

Description:

TC = Total cost of broiler livestock business broiler (IDR/Period)

TFC = Total fixed costs of livestock business broiler breeds (IDR/Period)

TVC = Total variable cost of business broiler livestock (IDR / Period)

The following formula was used to calculate the broiler's revenue (Soekartawi, 2003):

$$TR = Q + P$$

Description:

TR = Total Revenue or Revenue (IDR / Period)

Q = Total Production (Period)

P = Price (Rupiah)

R/C (Revenue Cost Ratio) is the ratio between total revenue with total costs with the formulationas follows (Suratiyah, 2015):

$$R/C = \frac{Revenue\ (IDR)}{Total\ Cost\ (IDR)}$$

The following formula is used to determine the income broiler breeders partnership arrangement (Soekartawi, 2003):

$$Profit = TR - TC$$

Description:

Profit = Total Income earned by farmers (IDR / period)

TR = Revenue earned by farmers (IDR / Period)

TC = Costs incurred by farmers (IDR / Period)

The business is not worthwhile to develop if the R/C Ratio is less than 1. R/C Ratio = 1 indicates that there is no profit or loss (break even). The business can be operated if the R/C ratio is greater than 1.

According to Amri et al. (2017), BEP price is the BEP computation stated in sales price (IDR). The formula for calculating BEP is as follows:

$$BEP = \frac{Total\ Cost\ (IDR)}{Production\ (Heads)}$$

RESULTS AND DISCUSSION

In the poultry industry, one of the key factors influencing profitability and competitiveness is the production cost of broiler farming. These expenses are mostly made up of feed, labor, housing, utilities, and day-old chicks (DOC). The largest of these, feed expenses frequently make up more than half of the overall production costs (Kurniati & Vaulina, 2022). Feed management and procurement techniques are therefore crucial for cost containment.

Table 1. Result of Depreciation Cost Analysis

Housing Component	Depreciation Cost (IDR)
Building	7,756,000
Ventilation	421,000
Water trough	85,600
Cooler	329,000
Water machine	100,500
Generator	211,000
Space heater	200,000
Outer curtain	433,900
Feed bin	615,000
Drinking Place	287,000
Bulkhead	89,700
TOTAL	10,528,700

Source: Processed data (2025)

Based on Table 1, it can be seen that there are several housing components in the semi-closed house system. The costs shown in table 1 are already in the form of depreciation costs so that they can be used to determine the total cost of semi-closed house cages. The cost of production and total profitability are also greatly influenced by housing systems. Respati et al. (2020), for example, examined the differences between open-house and closed-house systems in Surakarta, Indonesia. According to their findings, closed house systems had higher initial and ongoing expenses even if they provided benefits in terms of production efficiency and environmental control. The semi-closed house is still the most common cage type in the community. Semi-closed house cages are more affordable than closed house cages, despite having technology-based components, according to the data in Table 1. Furthermore, a variable cost analysis was carried out with the results listed in Table 2 below.

Table 2. Result of Variable Cost Analysis

Variable Component	Variable Cost (IDR)
DOC	8,820,000
Feed	26,250,000
Medicine and vaccines	720,422
Husk cost	650,000
DOC unloading	350,000
Feed unloading	350,000
Gasoline generator	100,000
Employee wages	1,200,000
Electricity	500,000
TOTAL	38,940,422

Source: Processed data (2025)

In the production of broilers, feed is usually the most important variable expense. As shown in table 2, feed costs amounted to IDR 26,250,000 for a population of 1000 chickens. For example, a study conducted in Pekanbaru City by Kurniati and Vaulina (2022) found that feed expenditures made up a significant amount of the overall production costs. Profitability and cost reduction depend heavily on efficient feed management.

Utilities have significant variable costs, especially fuel for heating and electricity. Nearly 60% of the yearly variable operational costs for broiler growers in Georgia, USA, are related to utility prices (Cunningham & Fairchild, 2009). These costs can be considerably decreased by putting energy-efficient measures into place.

Another important variable expense is labor costs, which include the pay for farmworkers who perform everyday tasks. Labor is listed as a major variable cost in the University of Maryland Extension's broiler production enterprise budget, emphasizing its influence on total production costs. For cost management, worker efficiency must be maximized.

Bed linens, medicine, and other consumables required for broiler health and dwelling upkeep are examples of additional variable expenditures. Even though each of these charges is lower on its own, taken as a whole, they add up to the overall variable costs and need to be well handled. The financial viability of broiler farming operations depends on an understanding of and capacity to control these variable expenses. Without sacrificing animal welfare or production efficiency, producers should routinely examine these costs to find areas for improvement and put cost-cutting measures in place.

Table 3. Result of Cost Analysis

Cost Analysis	
Total Cost	IDR 49,469,122
Total Revenue	IDR 51,045,000
Profit	IDR 1,575,878
R/C	1.03
Break-Even Point (Price)	IDR 49,469.12

Source: Processed data (2025)

From table 3 the total cost for one semi-closed house cage with a population of 1000 chickens is IDR 49,469,122. According to Kurniati and Vaulina (2022), the highest portion of the broiler farming production expenses in Pekanbaru City were variable costs, specifically DOC procurement, which came to IDR 80,431,995. There is a 2-fold difference in production costs from this study. This is due to differences in cage area, chicken population, and other factors. This emphasizes how effective resource management and allocation are necessary to optimize profitability.

Table 3 shown that the total revenue in this study was IDR 51,045,000 and profit was IDR 1,575,878/periode. The sum of money made from the selling of chickens during a single production period is known as total revenue in the broiler industry. The quantity of chickens harvested, the average weight per head, and the selling price per kilogram all have a significant impact on this revenue. According to a different study conducted in North Minahasa Regency by Gobel et al. (2022), 30 broiler farmers produced 57,031 heads of chicken within a certain period, bringing their total earnings to IDR 2,053,116,000. The net income was IDR 412,766,414, with an average of IDR 31,751,262 per farmer every month, after the entire production costs of IDR 1,640,349,586 were paid.

The size of output, the effectiveness of management, and the state of the market all affect total income in the broiler industry. Farmers' overall revenue and net income will rise with the implementation of effective resource management and efficiency.

The resultant R/C value, as indicated in Table 3, was 1.03. The ratio of revenue to production costs is measured by the R/C ratio. Since revenues surpass production costs, a business is considered profitable if its R/C value is greater than 1. On the other hand, a loss is indicated by an R/C value below 1. Therefore, semi-closed house broiler farming yields IDR 1.03 in revenue for every IDR 1 production expense. Thus, it is possible to operate this farm. According to research done in Pekanbaru City by Kurniati and Vaulina (2022), broiler farming's R/C Ratio value was 2.56. This indicates that the firm is viable

and profitable to continue, as every IDR 1 of manufacturing costs results in IDR 2.56 in revenue.

A semi-closed house farm with 1000 broilers has a BEP price of IDR 49,469.12/Kg, according to Table 3. Price BEP is the lowest selling price per unit that must be met in order to prevent losses for the company. Prices over BEP will result in profits, while prices below BEP will result in losses. The BEP analysis of broiler farming in a study by Yoga Prasetya (2018) revealed that in order to break even, the selling price of chicken must reach IDR 18,171.93 per kilogram. Farmers will lose money if the selling price is less than this amount.

Numerous factors, including regional variations, the quantity of chickens raised, and the amount of production expenses expended, might affect the BEP price differential. Whether using an open house, semi-closed house, or closed house method, the more effectively the broiler business is managed, the higher the profit. However, a semi-closed house system or a more advanced closed house should be used for chicken production in order to reduce interference from ambient influences.

CONCLUSION

It is clear from the discussion above that feed expenses are the most expensive aspect of manufacturing. The components of cages are sufficiently advanced to reduce the negative environmental effects on broilers. It is possible to operate a broiler farm with 1000 chickens using a semi-closed system. Given the identified limitations or gaps in the study, propose potential future research directions or areas that deserve further exploration to enhance the current findings.

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