An Elaboration Of Broiler Chicken Productivity In Open And Closed House Systems: A Case Study At Abdul Aziz Jaba Farm, Luyo Sub-District

Sulfawati *[1], Asrandi [2], Resky Faradibah Suhab [3]

*[1] Institute of Technology and Business Muhammadiyah Polewali Mandar
[2] Institute of Technology and Business Muhammadiyah Polewali Mandar
[3] Institute of Technology and Business Muhammadiyah Polewali Mandar

ARTICLE INFO

Jurnal Economic Resources

ISSN: 2620-6196
Vol. 8 Issue 1 (2025)

Article history:
Received - July 12, 2025
Revised - July 20, 2025
Accepted - 02 Augst 2025

Email Correspondence:
sulfa.kwu21@itbmpolman.ac.id

Keywords:
broiler chicken, productivity, housing system, closed house, open house

ABSTRACT

Broiler chickens are a vital poultry commodity that plays a significant role in meeting the protein needs of the Indonesian population. The increasing demand for chicken meat has encouraged poultry farmers to improve efficiency and productivity. One strategy to achieve this is by selecting the appropriate housing system. This study aims to compare the productivity of broiler chickens raised in two different housing systems open house and closed house under different scales of partnership-based poultry businesses in Dusun Pepalang, Luyo District. The key indicators analyzed include body weight gain, feed conversion ratio (FCR), mortality rate, and performance index (IP). The research uses a descriptive quantitative method with a direct observation approach. Primary data were collected through interviews and field observations, while secondary data were obtained from literature and related documents. The results show that the closed house system offers better productivity and feed efficiency, with lower mortality rates and more uniform growth than the open house system. However, the closed house system requires higher capital investment. These findings can serve as a valuable reference for poultry farmers in choosing the most suitable housing system based on business scale and production goals.

INTRODUCTION

Broiler chickens are among the most popular poultry commodities in meeting the animal protein needs of the Indonesian population. The increasing demand for chicken meat encourages poultry business actors to optimize production efficiency and the quality of livestock products. One of the key factors that significantly influences this optimization is the chicken rearing method, particularly the choice of housing system. There are two main types of housing systems for broiler chickens: the open house and the closed house systems, each with its own characteristics and implications for livestock productivity.

The open house system is a traditional method still widely used by small- to medium-scale farmers. Its relatively low construction cost and ease of management are the primary reasons for its continued use. This system relies on natural ventilation, utilizing ambient air circulation and lighting. Other advantages include lower operational costs and the utilization of natural sunlight and wind (Riza et al., 2022). However, due to its dependence on environmental conditions, the system tends to be unstable. High temperatures, extreme humidity, and sudden weather changes pose a risk of stress in chickens, potentially decreasing their productivity.

In contrast, the closed house system is a modern approach designed to ensure environmental stability. It is equipped with mechanical ventilation, cooling systems, and artificial lighting to create optimal conditions for broiler rearing. Under such systems, chickens grow more comfortably, with reduced stress and lower disease risks. Although the initial investment cost is high, the closed house system is considered more efficient in feed usage and results in better uniformity among the chickens (Tamalludin, 2014). According to Sumarno (2022), closed house systems allow for higher stocking densities without compromising growth performance, while also providing protection from external temperatures and disease exposure.

In broiler production, the housing system serves not only as shelter but also as a vital component for feed and water management and livestock health monitoring. According to Ulfah (2011), cost is the primary consideration in choosing a housing system, followed by the availability of materials and equipment, and the system's durability. A well-built, comfortable house supports optimal chicken growth and facilitates overall farm management.

Broiler productivity is measured through several indicators, such as body weight, feed conversion ratio (FCR), mortality rate, and performance index (PI). In closed house systems, better control over temperature and humidity contributes to improved performance across these indicators. Research by Putri and Santoso (2019) revealed that the FCR in closed house systems is lower (1.2) compared to open house systems (1.5), indicating better feed efficiency. Additionally, Wibowo et al. (2020) reported that chickens in closed houses exhibited higher body weight gains and lower mortality rates.

Nevertheless, the open house system also has distinct advantages, especially in terms of cost savings and ease of construction. It allows maximum utilization of natural ventilation and sunlight and is more applicable to small-scale operations. However, Indonesia's tropical climate, characterized by unpredictable weather, presents challenges for this system, as chickens become more susceptible to stress and disease due to environmental fluctuations (Riza et al., 2022; Aziz, 2025). Chicken health is greatly influenced by housing conditions, including ventilation, sanitation, and stress management (Sudaryani, 2009; Ichwan, 2003).

In this context, there has been limited research conducted in the Luyo Sub-district, particularly in Pepalang Hamlet, to quantitatively compare these two housing systems. Therefore, this study aims to analyze the differences in broiler productivity between open and closed house systems at Farm Abdul Aziz, operating under a partnership model with PT Pokphand BSB. The study will evaluate broiler performance based on productivity indicators such as body weight, FCR, mortality rate, and PI, as well as assess income and profitability aspects of farms utilizing these two different systems.

This research employs direct observation by collecting data through on-site monitoring and measurement. The data collected consist of both primary and secondary sources. Primary data are obtained through field observations and interviews with farmers, while secondary data are drawn from relevant literature, books, and previous research. According to Arikunto (2006), primary data refer to information obtained directly from the object of study, whereas secondary data are sourced from pre-existing documents used as supporting materials.

Based on the problem formulation, this study seeks to answer three main questions: (1) What are the differences in operational systems between closed house and open house environments? (2) Do housing systems affect broiler productivity? and (3) What are the advantages and disadvantages of each housing system? By addressing these questions, the study is expected to provide a meaningful contribution toward developing more efficient and productive broiler farming systems, particularly in Luyo and similar regions.

Overall, chicken housing is not merely a physical structure, but a critical component of the broiler production system that determines rearing success. A well-maintained housing environment supports chicken health and productivity. Therefore, this research emphasizes the importance of comprehensively understanding the relationship between housing systems and broiler performance. High-quality feed will not yield optimal results if not supported by conducive housing conditions. Thus, this comparative study between open and closed house systems is vital in striving for a more sustainable and economically viable poultry industry.

RESEARCH METHOD

This research uses a quantitative approach aimed at comparing broiler productivity under two housing systems: open house and closed house. The study involves analyzing several performance indicators such as body weight, average daily gain (ADG), feed conversion ratio (FCR), mortality rate, and performance index (PI). Additionally, economic aspects such as production costs, revenue, profit, and break-even point (BEP) are also examined (DwiSusanti, 2016). The research was conducted through direct observation, documentation, interviews with farmers and technical staff, as well as measurements using tools such as digital scales. Data validity was tested using triangulation techniques involving sources, methods, and theories, as explained by Siyoto (2015) and Suwartono (2014), to ensure the accuracy and consistency of information obtained from multiple techniques and perspectives. This triangulation method

was carried out by comparing data from interviews, field observations, and internal documentation from the farm.

The study was conducted from May to July 2025 at the Abdul Aziz Jaba Broiler Farm, located in Mambu Village, Pepalang Hamlet, Luyo Sub-district. This location was selected due to its unique application of both housing systems (open and closed) within the same operational area, allowing for a direct comparison under similar geographical and managerial conditions. Sampling was carried out using purposive sampling, a method of selecting samples based on specific criteria (Helwig, 2021). The subject of the research was Mr. Abd. Aziz, the farm owner, whose operation has frequently received high performance ratings from the core company, particularly in indicators such as FCR and PI. These considerations make the location highly representative for evaluating productivity and efficiency across both housing systems in a partnership-scale farm setup.

Data were collected through four primary methods: (1) direct observation of housing conditions, maintenance management, and chicken behavior; (2) documentation of production data, feed usage, and mortality records; (3) structured interviews with farmers and technical staff (Technical Service/TS); and (4) direct measurement of variables such as body weight, ADG, FCR, and PI. Data analysis employed parametric statistical techniques, as outlined by Suwartono (2014), which are appropriate for quantitative data and used to test differences in population parameters. In this study, a T-test was used to identify significant differences in broiler productivity between open and closed house systems, a method also applied by Enny and Andi (2002). Through this approach, the study aims to provide empirical and objective information regarding the most efficient and productive housing system for broiler farming in tropical regions like Indonesia.

RESULTS AND DISCUSSION

RESEARCH FINDINGS

Broiler Chicken Productivity Data

This study was conducted through observations and interviews with the owner and four workers at Farm Abd. Aziz, a partner farm of PT. Pokphand BSB located in Mambu Village, Pepalang Hamlet, Luyo Sub-district. The objective was to identify differences in broiler productivity between open house and closed house systems in terms of body weight gain, feed conversion, health, mortality, and other related factors.

Body Weight

Maintaining daily body weight gain is essential in the poultry industry to ensure stable and expected harvest outcomes. According to Sudaryani (2009), routine weekly weighing is necessary as a monitoring measure to achieve optimal production. If the chickens' body weight falls below the standard, the feed portions must be adjusted accordingly. Conversely, if the body weight meets the expected standard, the feed provision remains unchanged.

Table 1. Body Weight Growth Comparison

Week	Open House (g/bird)	Closed House (g/bird)
1	145 – 160	145 – 166
2	506 – 545	551 – 660
3	765 – 830	884 – 980
4	1,203 – 1,300	1,569 – 1,902
5	1,825 – 1,901	2,210 – 2,357

As seen in Table 1, chickens raised in the closed house system had a higher average body weight than those in the open house system. The average body weight in the open house was 1,825–1,901 g/bird,

while in the closed house it was 2,210–2,357 g/bird—an increase of 385–532 g. Based on the standards of PT. Bintang Sejahtera Bersama, both values exceeded the standard broiler weight.

These findings indicate that the closed house system supports more optimal weight gain due to a controlled environment shielded from external factors such as weather changes, air pollution, and disease exposure. Birds in closed houses also exhibited better growth uniformity and higher feed efficiency, while those in open houses were more affected by environmental variables such as heat, humidity, and wind.

Body weight growth is closely linked to feed consumption. Optimal feed intake results in better weight gain, aligning with Abidin's (2003) assertion that feed consumption is a key factor in supporting broiler growth. Ichwan (2003) also emphasized that weight gain is generally determined by both the quantity and nutritional content of feed consumed. T-test results showed a significant difference in body weight gain between chickens raised in closed and open house systems.

According to the farm owner, the feed used was of high quality and adjusted based on the chickens' age. On day one, they were fed SB 10 SUPER; from day 8 to 21, SB 11 SUPER rich in essential nutrients; and from day 21 until slaughter, SB 12 SUPER. Additionally, Neobro vitamins containing amino acids and multivitamins were administered to meet nutritional needs optimally.

Closed House Body Weight Calculation

- Chicken Population: 9,000
- Mortality: 201
- Harvested Chickens: 8,799
- Total weight: 19,759.50 kg
- Sample weight (100 birds): 224.52 kg
- Average weight: 2.245 kg/bird

Open House Body Weight Calculation

- Chicken Population: 5,000
- Mortality: 400
- Harvested Chickens: 4,600
- Total weight: 8,395.00 kg
- Sample weight (100 birds): 182.50 kg
- Average weight: 1.825 kg/bird

During the May–June 2025 production period, the average body weight of broilers raised in the closed house system was 2.25 kg/bird, while in the open house system it was 1.85 kg/bird. These results reinforce the conclusion that chickens in closed house systems gain more weight due to a better-controlled and comfortable environment, which enhances feed efficiency and reduces disease risks.

Mortality Rate

Interviews revealed that mortality control in open house systems is more challenging due to the need for manual temperature monitoring and adjustment. During high temperatures, chickens must be sprayed with water to reduce heat stress. In contrast, the closed house system features automated temperature control and water-inlet systems that provide cooler air, increasing bird comfort and minimizing mortality risks.

Closed House Mortality:

- Deaths: 201

- Population: 9,000
- Mortality rate = (201/9,000) × 100 = **2.23%**

Open House Mortality:

- Deaths: 400
- Population: 5,000
- Mortality rate = (400/5,000) × 100 = **8%**

The data showed a mortality rate of 2.23% in closed houses and 8% in open houses during May–June 2025. Higher mortality in open houses was attributed to inadequate ventilation, inconsistent temperature control, and extreme weather. Poor sanitation and the absence of cooling equipment like fans or blowers further exacerbated mortality risk.

Feed Conversion Ratio (FCR)

FCR is a key measure of broiler production efficiency. FCR tends to increase as birds age. According to the farm owner, FCR in open houses was 1.527, while in closed houses it reached a lower value of 1.159, indicating superior performance. A lower FCR suggests greater efficiency, as less feed is needed to produce body weight gain.

Closed House FCR:

- Population: 9,000
- Deaths: 201
- Harvested: 8,799
- Total Feed: 21,150 kg
- Total Final Weight: 19,759.50 kg
- Sample Final Weight (100 birds): 24.52 kg
- FCR = 24.52 / 21.15 = **1.159 kg**

Open House FCR:

- Population: 5,000
- Deaths: 400
- Harvested: 4,600
- Total Feed: 13,000 kg
- Total Final Weight: 8,510 kg
- FCR = 13,000 / 8,510 = **1.527 kg**

Thus, the closed house system showed a lower FCR, indicating higher efficiency. Since FCR is directly related to economic outcomes, a lower FCR means higher profitability.

Performance Index (PI)

The Performance Index (PI) is a commonly used formula to measure broiler production efficiency. Higher PI values indicate better feed efficiency and overall performance (Fadilah, 2007). Interviews confirmed that the closed house system achieved a high PI, while open houses reached a satisfactory level at a PI of 300.

Closed House PI:

- Mortality: 201 birds (2.23%)
- Average Body Weight: 2.25 kg
- FCR: 1.159
- Age: 33.55 days

PI = ((100 - 2.01) × 2.25) / (1.159 × 33.55) × 100
PI = (97.99 × 2.25) / 38.88 × 100
PI = 220.47 / 38.88 × 100
PI = **567.05**

Open House PI:

- Mortality: 400 birds (8%)
- Average Body Weight: 1.85 kg
- FCR: 1.527
- Age: 32.12 days

PI = ((100 - 8) × 1.85) / (1.527 × 32.12) × 100
PI = (92 × 1.85) / 49.04 × 100
PI = 170.2 / 49.04 × 100
PI = **347.06**

During the July 2025 production cycle, the closed house system achieved a PI of 567.05, while the open house system recorded 347.06. The lower PI in the open house system is likely due to higher mortality, lower body weight, and a higher FCR. Higher PI values, such as those found in the closed house, suggest potential for greater profitability and bonus eligibility from partner companies.

The Performance Index reflects the productivity level achieved in broiler farming. A higher PI not only signals better livestock performance but also aligns with increased economic returns.

DISCUSSION

This study compared the productivity of broiler chickens raised in two different housing systems—*open house* and *closed house*—at Farm Abdul Aziz, located in Mambu Village, Luyo Sub-district. Observations and data analysis revealed significant differences in performance indicators between the two housing systems.

Firstly, in terms of **body weight gain**, broiler chickens raised in the *closed house* system demonstrated more optimal growth. This is attributed to the stable environmental conditions inside the closed house, where temperature, humidity, and lighting are well controlled. In contrast, chickens raised in the *open house* system were more exposed to tropical climate fluctuations, which caused heat stress and negatively affected growth rates. These findings are consistent with Wibowo et al. (2020), who stated that closed housing can improve growth efficiency due to reduced environmental stress.

Secondly, regarding the **Feed Conversion Ratio (FCR)**, chickens in the closed house system exhibited a lower FCR compared to those in the open house system. A lower FCR indicates better feed efficiency, meaning that less feed is required to produce one kilogram of body weight. This is crucial for cost efficiency, considering that feed constitutes the largest component of production costs in broiler farming. Similar findings were reported by Putri and Santoso (2019), where the FCR in closed houses was recorded at 1.2, while in open houses it reached 1.5.

In addition, the **mortality rate** of broilers also showed a stark contrast. Broilers raised in closed house systems experienced significantly lower mortality compared to those raised in open house systems. This is likely due to better environmental control and biosecurity in closed houses, which helps prevent disease transmission and reduces stress. On the other hand, open house systems are more vulnerable to

disease risks due to natural ventilation, which cannot fully block external vectors from entering the housing environment.

From the perspective of **Performance Index (PI)**, broilers in the closed house system generally achieved higher PI values. This reflects a more efficient integration of various performance indicators. Although closed housing requires higher initial investment, the results indicate that this system is more profitable and efficient in the long term, especially in large-scale partnership farms such as those affiliated with PT Pokphand BSB.

Nevertheless, the *open house* system also offers advantages, particularly in terms of **lower initial construction costs** and ease of implementation, especially for small- and medium-scale farmers. This system is more flexible and relies on natural environmental conditions, making it a viable option when accompanied by proper management. In some cases, open house systems can still yield satisfactory performance, albeit not as high as the closed house system. Other benefits of open houses include ease of maintenance and repair of housing structures, as well as lower operational costs, particularly in rural areas with abundant natural resources such as wind and sunlight.

Overall, this study indicates that the *closed house* system delivers superior productivity performance compared to the *open house* system, particularly in tropical climates such as Indonesia's. However, the choice of housing system must still consider economic factors, scale of operation, and the farmer's management capacity. The study recommends that the *closed house* system is more suitable for large-scale operations aimed at achieving maximum efficiency and productivity, while the *open house* system remains relevant for small- to medium-scale farms with appropriate management adjustments.

CONCLUSION

Based on the findings of the study conducted at Farm Abdul Aziz, it can be concluded that there are significant differences in broiler productivity between the *open house* and *closed house* systems. Broilers raised in the *closed house* system demonstrated superior performance in terms of body weight gain, Feed Conversion Ratio (FCR), mortality rate, and Performance Index (PI). This is due to the more controlled environment provided by the closed house, which reduces stress and enhances growth efficiency and livestock health.

The *closed house* system is proven to be more effective in supporting overall broiler productivity and is suitable for large-scale operations with proper management. Meanwhile, the *open house* system remains a viable option for small- to medium-scale farmers, particularly when cost efficiency and appropriate management practices are considered to mitigate productivity risks. Therefore, the choice of housing system should align with the scale of the operation, available resources, and the farmer's production goals.

REFERENCES

Abidin, Z. (2003). *Meningkatkan produktivitas ayam pedaging*. Jakarta: Agromedia Pustaka.

Amin, N., Studi, P., Universitas, P., Parepare, M., & House, C. (2018). Perbandingan performa ayam broiler dengan sistem kandang terbuka (*open house*) dan sistem kandang tertutup (*closed house*).

Anwar, M. B., Novaela, S. I., & Esti, R. N. (2025). Perbedaan sistem kandang *close house* dan *open house* terhadap performan ayam broiler di PT Brantas Abadi Sentosa Unit Madiun. *Jurnal Ilmu Peternakan dan Produksi*, 9(1).

Arikunto, S. (2006). *Prosedur penelitian*. Jakarta: PT Rineka Cipta.

Aziz, A. (2025). *Manajemen kandang ayam modern*. Makassar: Peternakan Nusantara Press.

Dwi Eka, S., et al. (2017). Perbandingan produktivitas ayam broiler terhadap sistem kandang terbuka (*open house*) dan kandang tertutup (*closed house*) di UD Sumber Makmur Kecamatan Sumberrejo Kabupaten Bojonegoro. *Jurnal Peternakan*, 7(1).

Fadillah, R. (2007). *Sukses beternak ayam broiler*. Ciganjur: PT Agromedia Pustaka.

Helwig, N. E., Hong, S., & Hsiao-Wecksler, E. T. (2021). *Metode penelitian kualitatif dan metode penelitian kuantitatif*.

Ichwan. (2003). *Membuat pakan ayam ras pedaging*. Jakarta: PT Agromedia Pustaka Utama.

Kementerian Pertanian. (2019). *Buletin konsumsi pangan*, 10(1).

Murtidjo, B. A. (1987). *Pedoman beternak ayam broiler*. Yogyakarta: Kanisius.

Nugroho, B. (2016). *Produksi ayam ras pedaging*. Yogyakarta: Gadjah Mada University Press.

Nuryati. (2019). Analisis performans ayam broiler pada kandang tertutup dan kandang terbuka. *Jurnal Peternakan Nusantara*, 5(2).

Qodariya, N. (2022). Komparasi sistem kandang *closed house* dan *open house* terhadap keberhasilan usaha peternakan ayam broiler (Studi kasus Dusun Adiluwih, Desa Adiwarno, Kecamatan Batanghari, Kabupaten Lampung Timur). No. 8.5.2017.Rasyaf, M. (1992). *Pengelolaan peternakan unggas pedaging*. Yogyakarta: Kanisius.

Riza, M., & Risna, Y. K. (2022). Evaluasi manajemen perkandangan pada usaha ayam broiler milik Bapak Rizki Maulana di Desa Lueng Daneun Kecamatan Peusangan Siblah Krueng Kabupaten Bireuen. *Jurnal Ilmiah Peternakan*, 10(2).

Santoso, H., & Sudaryani, T. (2009). *Pembesaran ayam pedaging di kandang panggung terbuka*. Jakarta: Penebar Swadaya.

Santoso, H., & Sudaryani, T. (2011). *Pembesaran ayam pedaging di kandang panggung* (Cet. 4). Jakarta: Penebar Swadaya.

Sumarno. (2022). Kajian performa produksi ayam pedaging pada sistem kandang *closed house* dan *open house*. Program Studi Peternakan Universitas Tribhuwana Tunggadewi Malang, Juli.

Suwartono. (2014). *Dasar-dasar metodologi penelitian*. Yogyakarta: Penerbit Andi.

Siyoto, S., & Sodik, M. A. (2015). *Dasar metodologi penelitian* (p. 142).

Tamalludin, F. (2012). *Ayam broiler 22 hari panen lebih untung* (Cet. 1). Jakarta: Penebar Swadaya. Retrieved from https://books.google.co.id/books?id=UJtNCgAAQBAJ

Ulfah, M., & Joko, D. S. (2011). *7 jurus menjadi peternak ayam ras pedaging*. Jakarta: Penerbit Swadaya.

R. Enny & Jam'am, A. (2017). *Metodologi penelitian bisnis*. Makassar: Universitas Muhammadiyah Makassar.