

# Broiler Performance on Different Housing Condition: A Case Study on Integration Company – Farm Broiler Farming in Kebumen Regency

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## ABSTRACT

This study aimed to examine the production performance of broiler farming in two different housing conditions. The study was conducted in company-farmer integration farming. Respondents were selected using the census method to all 92 broiler farmers with a minimum experience of one year in a company-farmers integration partnership. A total of 54 farmers have grade A housing, whereas 38 farmers have grade B housing. Grade A housing refers to a fully automated closed house, whereas grade B housing refers to a less-equipped closed-house without cooling pads. Data collected were liveability, mortality, harvested body weight, harvest age, feed conversion ratio (FCR), and productivity index (IP). Results confirmed that farmers with grade A housing have a better performance. Data were collected from the recording performance in the last 12 months. Grade A housing farmers have average liveability of 95.509%, mortality 4.491%, the body weight of 2.133 kg, harvest age 32.502 days, FCR 1.632, and IP 427.03. In contrast, farmers with grade B housing have average liveability of 95.259%, mortality 4.704%, the body weight of 2.034 kg, harvest age 32.502 days, FCR 1.614, and IP 372.057.

**Keywords:** Broiler liveability, Closed-house productivity, Feed conversion ratio, Semi-closed house productivity.

## 1. INTRODUCTION

Broiler chickens are the main supplier of the animal source protein needs of the community. In the last five years, broiler meat consumption in Indonesia has increased by an average of 1.96% with average production growth of 1.39% [1]. The high demand for broiler meat must be supported by high production to support food self-sufficiency.

Kebumen Regency in Central Java is a potential location for the development of broiler chicken farms, particularly in the southern part of Kebumen. Mostly, it has a relatively flat topography with reliable transportation access that supports broiler business activities. In addition, its population, broiler farming is a main animal farming commodity for the community. The population is steadily increased [2].

There are two broiler production systems in Indonesia; independent and partnership systems [3].

Independent farmers self-finance all of the production inputs and can independently sell their products. On the contrary, the partnership pattern is a broiler farm business where the farmers or the growers act as plasma that carries out operational activities, while the partner company as the core ensures the availability of inputs and product marketing. Partnership systems are designed to lessen the risk of the farmer for the volatility and the price uncertainty. Currently, this partnership system is more dominant than independent. Ensuring the supply of input, minimizing the risk from, high price volatility, and avoiding marketing problems are among reasons for farmers switching from independent to partnership systems.

The performance of each farmer under the partnership systems is generally evaluated by the company by assessing the performance of body weight achievement, depletion rate, feed conversion ratio, and age at harvest. All these indicators were then concluded

through an index known as a performance index (IP). This evaluation can improve broiler production performance more optimally than in the previous period [4]. This study aims to measure the production performance of broiler farms in different housing and management conditions in a partnership company in the Kebumen Regency, Central Java.

## 2. MATERIALS AND METHODS

This study was conducted using a survey method at one of the broiler chicken partnership companies in Kebumen Regency, Central Java. The study sample was determined by a census of 92 broiler farmers who are managed by the company. Participants were classified into two sub-classes; grade A and B. Grade A farmer fully automated closed house, whereas grade B have less equipped closed house without cooling pad. A total of 54 grade A farmers and 38 grade B farmers were selected as respondents in this study.

Data analysis in this study is mainly secondary data from the company recording. However, the data were cross-examined by participants' interviews. The analysis was focused on production performance which includes average body weight, viability, mortality, feed conversion ratio (FCR), harvest age, and performance index (PI) in each period of broiler farming. Data were collected for the period of one year of rearing. Consequently, a t-test was then performed to compare the production performance indicator based on farmer grade.

Production Performance is analyzed by the following formula:

$$\text{Body weight} = \frac{\text{weight}}{\text{number of birds}} \quad (1)$$

$$\text{Viability} = \frac{\text{chick in}}{\text{chick out}} \times 100\% \quad (2)$$

$$\text{Mortality} = 100 - \text{viability} \quad (3)$$

$$\text{FCR} = \frac{\text{feed consumption}}{\text{chicken weight gain}} \quad (4)$$

$$\text{Average harvest age} = \frac{\text{no of harvested birds} \times \text{harvest age}}{\text{total bird harvested}} \quad (5)$$

$$\text{Performance Index (PI)} = \frac{\text{viability} \times \text{mean body weight}}{\text{average age at harvest} \times \text{FCR}} \quad (6)$$

## 3. RESULTS AND DISCUSSION

Several components that need to be calculated in the production analysis include body weight, FCR, PI, and depletion [5]. This component is important to be analyzed because it has a significant effect on farmers' income [4]. The components measured in the study consisted of calculating the average production performance was presented in Table 1.

Viability is the percentage of live chickens during the maintenance period, while mortality is the

percentage of dead chickens in the rearing period. The higher the life force, the better the business productivity. The results showed that the average viability rate for grade A farmers was 95.509% and grade B farmers 95.296%. The average mortality was 4.491% and 4.704%, respectively. The results are categorized as good because the mortality is below 5%. The percentage of viability and mortality rate of broiler chickens are influenced by the management of maintenance and days old chick (DOC) seedlings [6]. DOC seeds with low quality that are not matched with proper maintenance management indirectly increase the number of deaths, especially during the brooder period. Health management includes disease prevention with biosecurity and disease management by administering drugs and vitamins that are carried out properly will

**Table 1.** Average production performance

No	Indicator	Average	
		Grade A	Grade B
1	Viability (%)	95.509	95.296
2	Mortality (%)	4.491	4.704
3	Body weight (kg)	2.133	2.034
4	Harvest age (days)	32.502	32.522
5	FCR	1.632	1.614
6	PI (Performance Index)	427.063	372.057

support the health condition of chickens to prevent the percentage of mortality in livestock.

The average body weight of broiler chickens based on the results of study, respectively, is 2.133 kg and 2.034 kg for grade A farmers and grade B farmers. Factors that affect broiler body weight include feed quality, environmental temperature, stress, livestock health, and housing systems. Body weight is also directly related to harvest age. The longer the harvest age, the greater the harvest body weight with a record until the age of 35-36 days because at that age broiler chicken weight loss begins to decline [7]. The results of discussions with core companies that the factors that affect harvest time are internal market demand and brokers as well as market price conditions. Each harvest weight has its market, for example, slaughter house requires chickens with a harvest weight of <2 kg.

Feed conversion ratio is defined as the number of kilograms of feed required to produce a unit of kg body weight of broiler chickens. The FCR value is influenced by the amount of ratio consumption and body weight gain [8]. FCR is also influenced by DOC quality, feed nutrition, maintenance management, and cage quality. The average FCR value for grade A farmers is 1.632 and grade B farmers are 1.614.

The success rate of broiler rearing is also seen from the PI. The performance index or production performance is a value that describes the performance of broiler chickens which is influenced by live weight, mortality, length of maintenance, and feed conversion value [9]. The PI obtained by grade A farmers is better than grade B farmers. A good PI standard is > 300, the higher the PI values the more successful the livestock business [10]. PI is divided into five, namely <300 (poor category), 301-325 (enough category), 326-350 (good category), 351-400 (very good category), and >400 (special category) [5]. The results showed the average PI grade A farmer was 427 (special category) while grade B farmer was 372 (very good category). The production index value based on the formula used is influenced by the components of age, body weight, vitality, and FCR. Several factors that cause differences in broiler productivity include DOC quality, feed quality, feeding method, number of feeding and drinking places, environmental temperature, and disease problems [7].

The results of the T-test show that farmer grade has a significant effect on production performance. The performance of broiler production is influenced by seeds, feed, and management or is called the production triangle. The perfect production triangle occurs when a livestock business has superior seeds, good management, [11] and provides comfort for livestock and their owners, as well as providing quality feed according to livestock needs so that livestock can produce optimally and efficiently.

Broiler farmers in partnership companies in the Kebumen Regency consist of grade A and B farmers who are distinguished by population size, cage quality, and farmer track record. Farmers are said to be grade A if the population is > 20.000, the cage system is closed and the average PI is > 400 for the last four periods. Meanwhile, farmers are categorized as grade B if the population is <20.000, the cage system is a semi-closed house, and the average PI value for the previous 4 periods is <400. A good cage will determine the success of broiler chicken rearing activities, considering that livestock health also depends on the comfort of the livestock in the cage [12, 13]. Cages with a low-density level of chickens will get a more optimal body weight gain. The addition of cage area and business volume resulted in increasing broiler business income.

#### 4. CONCLUSION

There are differences in the production performance of grade A farmers and grade B farmers. Grade A farmers produce better production performance than grade B farmers. The performance of broiler chicken production in grade A farmer is 95.509% viability, mortality 4.491%, BW 2.133 kg, harvest age 32.502 days, FCR 1.632, and PI 427.063; while the production performance of grade B farmers is 95.296% viability,

mortality 4.704%, BW 2,034 kg, harvest age 32.522 days, FCR 1.614, and PI 372.057.

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