E-ISSN:2685-452 *Journal of Tropical Animal Science and Technology, Septemberi 2025:7 (3): 61-67*
*DOI: 10.32938/jtast.v7i3.9857*
*https://jurnal.unimor.ac.id/JTAST*

# SENSITIVITY ANALYSIS OF LIVE SALES PRICES AND BROILER FEED COSTS

***Analisis Sensitivitas terhadap Harga Jual Hidup dan Biaya Pakan Broiler***

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## ABSTRAK

Tujuan penelitian ini adalah untuk mengevaluasi sensitivitas pendapatan produsen ayam broiler terhadap fluktuasi harga jual ayam hidup dan biaya pakan di Kota Samarinda. Penelitian ini dilakukan menggunakan pendekatan simulasi dengan beberapa skenario penyesuaian harga dan biaya, berkisar antara -20% hingga +20% dari nilai dasar. Hasil penelitian menunjukkan bahwa perubahan harga jual memiliki pengaruh yang lebih linear terhadap pendapatan, dengan kenaikan harga ayam hidup sebesar 10% meningkatkan pendapatan sekitar 13%. Biaya pakan, di sisi lain, memiliki pengaruh yang lebih tidak merata terhadap pendapatan, terutama saat biaya meningkat, yang mengakibatkan penurunan margin keuntungan yang signifikan. Temuan ini menunjukkan bahwa pendapatan petani sangat rentan terhadap dinamika pasar eksternal, baik dalam hal pendapatan maupun biaya produksi. Studi ini mengonfirmasi temuan penelitian sebelumnya yang diterbitkan dalam jurnal internasional, menekankan pentingnya metode mitigasi risiko dan efisiensi biaya sebagai variabel kritis untuk kelangsungan jangka panjang usaha peternakan unggas skala kecil dan menengah. Oleh karena itu, diperlukan langkah-langkah pemerintah untuk melindungi petani dari volatilitas harga input dan produk.

Kata kunci: efisiensi, ekonomi, keuntungan, protein hewani.

## ABSTRACT

The purpose of this study is to assess the sensitivity of broiler chicken producers' income to fluctuations in live chicken selling prices and feed costs in Samarinda City. The research was conducted using a simulation approach under several scenarios of price and cost adjustments, ranging from - 20% to + 20% of the base value. The findings show that changes in selling prices had a more linear influence on income, with a 10% increase in live chicken prices increasing revenue by about 13%. Feed expenses, on the other hand, have a more unequal effect on revenue, particularly as costs grow, resulting in significant profit margin reduction. These findings imply that farmers' income is extremely vulnerable to external market dynamics, both in terms of income and production costs. This study validates earlier research findings published in international journals, emphasizing the necessity of risk mitigation methods and cost efficiency as critical variables for the long-term viability of small- and medium-sized poultry farming operations. As a result, governmental measures are required to safeguard farmers from volatility in both input and product prices.

Keywords : animal protein, economic, efficiency, profitability.

## INTRODUCTION

Indonesia contributes significantly to the population's requirement for animal protein by being one of Southeast Asia's top producers of broiler chickens. As broiler meat is more reasonably priced than beef, its per capita consumption is still rising (Fadhlurrohman et al., 2024). Between 60 and 70 percent of the overall production expenditures in broiler farming are related to feed (Mastuti et al., 2021). The profitability of broiler farms is thus significantly impacted by changes in feed prices and live broiler selling prices.

The sensitivity and financial viability of broiler farming in various geographical areas have been the subject of numerous research. The closed-house system is extremely vulnerable to rising feed costs and falling selling prices, as shown by Fadhlurrohman et al. (2024), where a 5.64% increase in feed costs or a 1.72% drop in selling price can jeopardize the viability of the firm. Furthermore, research on partnership-based farms shows that a 10% decrease in selling price or a 10% increase in input costs can still keep the company within manageable bounds (Ezra et al., 2025). Local studies conducted in regions like Tasikmalaya Regency, however, also attest to the broiler industry's tenacity in the face of sharp rises in feed prices (Oman et al., 2023).

According to Ezra et al. (2025), the greatest risk factor is feed price variability (coefficient of variation ≈21.94%), which only had a substantial impact prior to COVID-19. However, the growth of small-scale broiler firms was no longer impacted by the selling price other DOC pricing determinants after COVID-19. This research demonstrates how corporate resilience changed both before and after the pandemic.

However, there are still few thorough city-level studies that simultaneously analyze feed costs and live broiler selling prices, especially in Samarinda. Furthermore, a methodological vacuum exists in the local context of Samarinda due to the absence of segmented analysis spanning pre-, during-, and post-COVID-19 periods. Furthermore, sensitivity analysis of these two important factors has not yet been integrated into a single analytical framework in any local investigations. By using a dual-sensitivity approach to feed costs and live broiler selling prices in the city of Samarinda, this study seeks to close that difference.

## MATERIAL AND METHODS

This study uses a descriptive-analytical methodology and a quantitative research design. The goal is to examine how sensitive Samarinda City's broiler farm income is to changes in the live selling price of broiler chickens and feed prices. This method is used to determine how much price fluctuations affect revenue and to pinpoint the most effective and robust management techniques to withstand such fluctuations (Mukaila et al., 2023; Gocsik et al., 2016). Samarinda, East Kalimantan, a significant hub for chicken production in eastern Indonesia, was the site of the study. The investigation was conducted between January and May of 2025.

Secondary data from broiler farm income records from four distinct management treatments—designated T0, T1, T2, and T3—were used in this study. Every treatment reflects a distinct mix of feed techniques, operational efficiencies, and production management systems. These figures came from recorded performance reviews of partner farms that had previously been in operation in the region.

The cost of feed and the live selling price of broilers are the two primary factors that are the focus of the analysis. Each variable was varied over five levels in a sensitivity simulation: −20%, −10%, baseline (0%), +10%, and +20%. This allows for thorough sensitivity mapping by producing a total of 10 simulation scenarios, five for each variable (Safitri et al., 2024; Saragih et al., 2022). The net income (in IDR) produced by each treatment (T0 to T3) under the various price scenarios serves as the main performance metric in this sensitivity analysis (Haque et al., 2018).

There are multiple steps in the analytical procedure. In order to compare the income levels of each management approach under different live broiler prices and feed costs, a sensitivity simulation was first carried out. To facilitate easy comprehension, the simulation results are displayed in tabular form. Second, the treatment that consistently generated the most income across all scenarios was determined to be the best-performing treatment. Finally, a resilience interpretation was made: treatments were deemed more resilient to market risks if they were able to sustain high income levels even in the face of adverse price conditions, such as declining selling prices or rising feed costs.

## RESULT AND DISCUSSION

### Sensitivity of Prices for Live Chicken Sales

The sensitivity analysis's findings show that changes in the price at which live chickens are sold directly and significantly affect farmers' profits, especially over medium- ($T_2$) and long- ($T_3$) time horizons. While a 20% price reduction may result in a more than 25% drop in income, a 10% price rise can raise income by about 13%. With significant economic ramifications—farmers rely heavily on market pricing to maintain profitability—this pattern of gains and losses shows a linear relationship between selling price and income. The small- to medium-sized chicken farming industry in Indonesia, which still mostly depends on open marketplaces devoid of price protection systems, makes this linear model especially pertinent. Table 1 below shows more specific datas.

Table 1. The Result of Sensitivity Study of Prices for Live Chicken Sales

| Price Adjustment Factor | Income $T_0$ (IDR) | Income $T_1$ (IDR) | Income $T_2$ (IDR) | Income $T_3$ (IDR) |
|---|---|---|---|---|
| 0.8 (−20%) | 49,465 | 56,397 | 61,948 | 60,956 |
| 0.9 (−10%) | 60,465 | 67,397 | 72,948 | 71,956 |
| 1.0 (0%) | 71,465 | 78,397 | 83,948 | 82,956 |
| 1.1 (+10%) | 82,465 | 89,397 | 94,948 | 93,956 |
| 1.2 (+20%) | 93,465 | 100,397 | 105,948 | 104,956 |

Source: Data Processed (2025)

Broiler farming has a particularly high income sensitivity to changes in selling price, with a 10% price deviation potentially leading to a 15% difference in net profit (Afriani et al., 2024). Farmers are more likely to suffer losses during seasonal price drops if they do not have contract safeguards. According to Alam et al. (2025), variations in the price of live chickens and input costs like feed account for between 30% and 35% of the profit variability in poultry farming in Southeast

Asia. This emphasizes how urgently integrated dual-variable analytical models are needed in order to obtain a more thorough economic assessment, taking into account both price sensitivity and operating expenses (Mubarok et al., 2025).

However, it should be noted that the existence of crucial thresholds in market dynamics may not be adequately captured by the linear sensitivity model employed in this investigation. According to Safitri et al. (2024), small-scale producers sometimes incur irreparable losses and leave the market when live chicken prices drop by more than 15%. They emphasized how crucial it is to create scenario-based, nonlinear models in order to pinpoint these crucial tipping points.

These findings highlight the necessity of institution-based risk mitigation techniques from a practical and policy standpoint. A temporary fix may be to use forward contracts between farmers and large purchasers, including integrators or facilities that process chicken. Governments might also create cattle price insurance programs that pay out when market prices drop below production costs. The results of Hasmon et al. (2024) who promote supply chain cooperation and vertical integration as ways to stabilize prices and increase distribution efficiency, lend support to these tactics.

**Sensitivity of Broiler Chicken Feed Expenses**

According to a sensitivity analysis of Samarinda City's broiler chicken feed expenses, feed ingredients significantly affect farmers' profits. Every increase in feed costs is inversely proportional to farmers' revenue, according to data assessed in scenarios $T_0$ through $T_3$. For instance, revenue reached Rp 89,158 in the $T_2$ scenario when feed costs were lowered by 20% (adjustment factor 0.8), while income dropped to Rp 83,948 under normal circumstances (factor 1.0). When feed prices rise by 10%, income falls to Rp 81,343 once more. This suggests that income elasticity in relation to feed costs is between moderate and high, with changes in income being affected by approximately 9–10% for every 10% change in feed costs. Table 2 below shows more specific datas.

Table 2. The Result of Sensitivity of Broiler Feed Price Expenses

| Price Adjustment Factor | Income $T_0$ (IDR) | Income $T_1$ (IDR) | Income $T_2$ (IDR) | Income $T_3$ (IDR) |
|---|---|---|---|---|
| 0.8 (−20%) | 79,172 | 84,718 | 89,158 | 88,365 |
| 0.9 (−10%) | 75,319 | 81,558 | 86,553 | 85,660 |
| 1.0 (0%) | 71,465 | 78,397 | 83,948 | 82,956 |
| 1.1 (+10%) | 67,612 | 75,237 | 81,343 | 80,251 |
| 1.2 (+20%) | 63,758 | 72,077 | 78,738 | 77,547 |

Source: Data Processed (2025)

These findings are consistent with those of Kamruzzaman et al. (2021), who discovered that feed costs account for more than 70% of total broiler chicken production expenses, making them the most sensitive component in determining profit margins. The study also found that rising costs of feed raw materials like corn and soybean meal had a direct influence on agricultural profitability, particularly in developing countries. A comparable study conducted in the context of smallholder broiler farming by Kanu et al. (2020) reveals that small-scale farmers are extremely vulnerable to feed price variations, particularly when there are no efficient local feed replacements.

Furthermore, this sensitivity data reveals a consistent pattern of income decline in each scenario from $T_0$ to $T_3$,

demonstrating negative income elasticity in relation to feed costs. However, the decline, which remains below 20%, demonstrates that Samarinda's manufacturing system has moderate economic resilience. Febrianto et al. (2021) classified elasticity to input costs as high (>10%), moderate (5-10%), and low (<5%). The Samarinda data show an average elasticity of 7-9%, which is characterized as moderate elasticity, demonstrating that economic adaptation is still possible in the face of cost constraints.

Local governments and poultry stakeholders should pay close attention to the economic consequences of these findings. The strong reliance on commercial feed makes production costs extremely subject to global market volatility, particularly maize and soybean prices. In this context, diversifying feed sources using local materials (such as rice bran, agro-industrial waste, and fermented tofu residue) is an essential cost-cutting method. Policy interventions should also include incentives like as feed subsidies or the promotion of independent feed processing technology. Qamara et al. (2025) and Javadi et al. (2024) underline that without fiscal and technological policy support, the poultry business will lose competitiveness, particularly during feed price crises.

This discussion demonstrates that feed price fluctuations have a significant impact on the sustainability of broiler chicken enterprises in Samarinda City. This sensitivity study not only indicates the level of production efficiency, but also demonstrates the farming system's ability to adjust to economic changes (Khan et al., 2022). This study adds to the global literature that feed efficiency is an important aspect in preserving profitability and sustainability in the chicken farming business.

## CONCLUSIONS

The results of the sensitivity analysis indicate that the dynamics of live chicken selling prices and feed costs have a significant impact on the sustainability of broiler chicken farming in Samarinda City. An increase in selling prices directly benefits farmers' revenue, whereas an increase in feed expenses dramatically affects earnings, even in cases where selling prices are high.

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