

DOI: <https://doi.org/10.38035/dijefa.v7i4><https://creativecommons.org/licenses/by/4.0/>

Received: 10 September 2026 | Revised: 16 September 2026 | Accepted: 23 September 2026

Existing Condition, Production Performance, and Business Feasibility of a Closed-House Broiler Plasma Farming Business: A Case Study of Tridaya Farm in Karawang, West Java

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Abstract: This study is motivated by the limited control that broiler plasma farmers have over selling and feed prices under core-plasma partnership schemes, combined with a cost structure heavily dominated by feed expenses, conditions which together threaten the financial sustainability of plasma farming businesses. This study intends to analyse the current business condition of Tridaya Farm, a closed-house broiler plasma farming business in Karawang, West Java, with a population of 40,000 birds per cycle, partnered with PT Charoen Pokphand Indonesia, centering on its production performance and business feasibility. This research used a descriptive-analytical case study design and production data from 21 rearing cycles, with the baseline for current conditions drawn from the last four cycles, analysed through technical and monetary performance calculations, dominant risk analysis, and profit sensitivity analysis. The results show that Tridaya Farm's technical performance is generally good, with an average Feed Conversion Ratio (FCR) of 1.475 consistently below the core partner's standard and a Performance Index (IP) that increased from 390 to 444. However, depletion fluctuated considerably (3.91%-10.13%), resulting in a thin average profit margin of 4.12% of total revenue and an average profit of IDR 62,661,900 per cycle. Depletion and the live-chicken selling price were identified as the two dominant risk variables. At the same time, profit was highly sensitive to declines in selling price and increases in FCR, with only a 5% price decline sufficient to push the business into a loss. The study determines that despite good technical performance, the business feasibility of a plasma farming enterprise remains highly vulnerable to small fluctuations in production and price variables because of its thin profit margin. Practically, plasma farmers should strengthen depletion control through improved biosecurity and cage management, and use uniform performance track records as a bargaining tool with core partners to obtain better pricing incentives.

Keywords: Broiler Chicken, Business Feasibility, Closed House, Core-Plasma Partnership, Production Performance.

INTRODUCTION

Meeting animal protein needs is a strategic issue in national development, since food is a basic human requirement and food security is a precondition for a healthy and productive society (Rachman & Ariani, 2002; Azahari, 2008). However, animal protein consumption among Indonesians remains relatively low, at about 18.24 grams per capita per day, compared with total protein consumption of 64.54 grams per capita per day in 2022 (BPS, 2022). In this context, broiler chicken has become a strategic commodity because of its relatively affordable price, with household consumption almost doubling over the past decade, from 3.96 kg/capita/year in 2014 to 7.46 kg/capita/year in 2023 (Kementan, 2024).

An even distribution of production has not fully matched this growing demand. National broiler production remains concentrated in Java, which contributes around 60% of total national output (Kementan, 2024), and regional supply gaps still occur, such as a shortage of approximately 1,460 tons per year in Madiun Regency in 2021 (Fadhlurrohman et al., 2024). In practice, most smallholder farmers operate through a core-plasma partnership scheme, in which the core company supplies day-old chicks (DOC), feed, medicine, and vaccines, while plasma farmers provide the cage and labour. This scheme helps overcome capital and input-access limitations, but simultaneously creates dependency, as plasma farmers have no control over either the selling price or the feed price (Amam, 2022; Fadhlurrohman et al., 2024). This condition is critical because variable costs in broiler farming can reach nearly 80% of total production costs, and about 82% of these variable costs come from feed alone (Puspita, 2019), making the cost structure highly sensitive to feed price changes or production shortfalls.

Beyond price risk, production risk is also a major challenge in broiler farming. Mortality (depletion) can reach 8-10% of the population (Puspita, 2019), and several cases report Feed Conversion Ratio (FCR) and Performance Index (IP) below optimal levels (Amam, 2022). One strategy to improve productivity is investing in closed-house cage technology, which has been reported as more financially more viable than the open-house system, despite requiring up to 2.8 times greater investment (Fadhlurrohman et al., 2024). Nevertheless, better cage technology does not automatically guarantee strong business feasibility if plasma farmers continue to face limited price control and unstable production risk.

Tridaya Farm is a closed-house broiler plasma farming business with a population of 40,000 birds per cycle in Karawang, West Java, partnered with PT Charoen Pokphand Indonesia since the end of 2022. Having completed more than 20 production cycles, Tridaya Farm has sufficient historical data for an extensive review. However, no study has analysed the business's current condition in an integrated manner, combining technical performance, monetary performance, dominant risk, and profit sensitivity to support a more objective, data-driven feasibility assessment. Previous studies on broiler partnerships generally examine income, technical efficiency, or contract implementation separately (Bahari et al., 2012; Ulfa et al., 2021; Amam, 2024), with relatively few combining a production-financial performance baseline with dominant risk and profit sensitivity analysis within a single feasibility-evaluation framework for a closed-house business unit.

Based on this background, this study examines Tridaya Farm's current business condition as a closed-house broiler plasma farming business in terms of production performance and business feasibility within a core-plasma partnership system. This study attempts to analyse Tridaya Farm's current business condition, covering technical production performance, financial condition and profitability, dominant risks, and profit sensitivity, as a basis for evaluating the business feasibility of broiler plasma farmers within a partnership context.

Literature Review

Broiler Chicken Farming Business

Broiler farming is a poultry cultivation activity oriented toward meat production as a source of animal protein, playing an important role in meeting society's food needs. Broilers are known as fast-growing, high-economic-value poultry commonly raised on a commercial scale, typically harvested at around 4-5 weeks of age with a body weight between 1.2-1.9 kg per bird (Nizam, 2013), while the rearing period may extend to 5-6 weeks with a body weight of 1.4-1.6 kg per bird depending on market demand (Rasyaf, 2011). Broiler farming operations involve interrelated production factors, including cage area, capital, DOC, feed, medicine, labour, and electricity, all of which directly influence production levels in each rearing cycle (Arwan, 2022).

Core-Plasma Partnership System

The core-plasma partnership is a form of cooperation between a company acting as the core and farmers acting as plasma in broiler farming. In this scheme, the core company supplies production inputs such as DOC, feed, medicine, and vaccines, and provides technical guidance to plasma farmers. In contrast, plasma farmers provide the cage and labour and carry out the rearing process according to the operating standards agreed in the cooperation contract (Ulfa et al., 2021). This partnership intends to strengthen smallholder farmers' position by ensuring input supply and marketing certainty, allowing the business to operate more systematically than under an independent model (Siregar, 2016). Nevertheless, within this partnership, plasma farmers have limited authority to set the selling price, since the cooperation contract with the core company regulates it (Nuraeni et al., 2006). The contract also defines the risk-sharing structure, whereby production risks such as mortality and feed efficiency become the farmer's responsibility, while marketing risk is more controlled because the core company guarantees the purchase of harvest output (Ulfa et al., 2021).

Cost Structure, Profitability, and Business Feasibility

The cost structure in broiler farming is a critical basis for financial feasibility analysis because it determines expenditure during one rearing period. Costs are generally divided into fixed costs, such as cage and equipment depreciation, and variable costs, which change with production scale, particularly DOC, feed, medicine, and labour costs (Rasyaf, 2001). Apart from cost structure, business profitability depends on revenue and profit. Revenue is obtained from the sale of broilers, calculated as the volume of production multiplied by the selling price per unit. Profit is the difference between total revenue and total production cost, so a business is considered profitable when revenue exceeds costs (Rasyaf, 2001).

Production Risk in Broiler Farming

Production risk is an important aspect in broiler farming because it can affect the stability of production output and business profit. Technical risk is primarily related to mortality levels and feed-use efficiency, reflected in the Feed Conversion Ratio (FCR). High mortality caused by disease or weather changes can reduce the number of harvested birds and directly affect business revenue (Vinanda et al., 2017). In addition to technical risk, broiler farming also faces price risk and operational risk. Price risk results from fluctuations in DOC, feed, and selling prices, which can change in every production period and affect farmers' revenue and profit (Fadhiela & Rosa, 2025). These risks indicate that broiler farming is highly sensitive to changes in both technical and price variables, making sensitivity analysis important for assessing business feasibility and sustainability.

METHODS

This study used a descriptive-analytical case study design focused on a single business unit, Tridaya Farm, a closed-house broiler plasma farming business located in Karawang Regency, West Java. Tridaya Farm maintains a rearing population of approximately 40,000 DOC per cycle in a two-story closed-house cage measuring 110 m x 15 m, has operated since 2023, and runs a partnership with the core company PT Charoen Pokphand Indonesia through PT Sarana Proteindo Utama.

The data used consisted of primary and secondary data. Primary data were obtained through semi-structured interviews with the cage manager and the core company's technical service officer, as well as field observation. Secondary data comprising production records for 21 rearing cycles were obtained from the Plasma Receivable Calculation Report (P4) issued by the core partner at the end of each cycle. In contrast, operational cost data (labour wages, electricity, gas, diesel fuel, and rice husk) were sourced from Tridaya Farm's internal financial records. The full 21-cycle historical dataset was used to identify general patterns and variation in business performance and to support the risk and sensitivity analyses. In contrast, the existing-condition analysis concentrated on a baseline of the last four cycles (Cycles 18-21, covering November 2025 to July 2026), as this period best represents current operating conditions in terms of production performance, cost structure, and business outcomes.

Existing Condition Analysis

Technical production performance was calculated through depletion, Feed Conversion Ratio (FCR), average harvest weight, livability, and the Performance Index (IP), using the following formulas:

$$\text{Depletion (\%)} = (\text{number of dead birds} / \text{initial population}) \times 100\%$$

$$\text{FCR} = \text{total feed consumption (kg)} / \text{total harvest weight (kg)}$$

$$\text{Livability (\%)} = 100\% - \text{Depletion (\%)}%$$

$$\text{IP} = (\text{Livability} \times \text{Average Harvest Weight} / \text{FCR} / \text{Harvest Age}) \times 100$$

Financial performance proved to be calculated through total production cost ($\text{TC} = \text{TFC} + \text{TVC}$), total revenue ($\text{TR} = \text{Q} \times \text{P}$), profit ($\pi = \text{TR} - \text{TC}$), and profit margin ($\text{Margin (\%)} = \pi / \text{TR} \times 100\%$). Production cost includes livestock-production-input costs (DOC, feed, medicine) supplied by the core partner and operating costs and depreciation of closed-house equipment investment borne directly by the plasma farmer, using the straight-line depreciation method (15-year useful life, zero residual value).

Dominant Risk Analysis

We conducted dominant risk analysis on five variables that directly affect business profit: FCR, depletion, feed price, live-chicken selling price, and harvest performance (livability). The risk score was calculated using the formula $\text{Risk Score} = \text{Probability} \times \text{Impact}$, with a 1-5 scale for each dimension. The likelihood score was assigned based on how often each variable deviated across 19 historical cycles, compared with the average baseline of Cycles 18-21. In contrast, the impact score was assigned based on the magnitude of the profit decline resulting from a deviation from the baseline. Risk levels were categorised as low (score 1-6), moderate (score 7-12), and high (score 13-25).

Sensitivity Analysis

Sensitivity analysis was conducted on a ceteris paribus basis for four variables, namely FCR, depletion, feed price, and live-chicken selling price, using the average baseline of Cycles 18-21 as the basis for calculation. Eight tested scenarios included a 0.1-point increase in FCR; a 1% and 2% increase in depletion; an IDR 100/kg and IDR 500/kg increase in feed price; and

a 3%, 5%, and 10% decrease in the live-chicken selling price. Profit change was calculated using $\Delta\pi = \pi_{\text{scenario}} - \pi_{\text{baseline}}$, and the percentage profit change was calculated using $\% \Delta\pi = (\Delta\pi / \pi_{\text{baseline}}) \times 100\%$. The variable producing the largest percentage profit change was categorised as the most sensitive variable to business profitability.

Results

Production Performance of Tridaya Farm

Tridaya Farm has completed 21 broiler production cycles with a relatively stable population of around 40,000 DOC per cycle. Table 1 summarises the technical performance for the last four cycles (Cycles 18-21).

Table 1. Production Performance of Tridaya Farm, Cycles 18-21

Parameter	Unit	Cycle 18	Cycle 19	Cycle 20	Cycle 21	Average
FCR	-	1.472	1.479	1.459	1.488	1.475
Depletion	%	5.81	10.13	6.24	3.91	6.52
Livability	%	94.19	89.87	93.76	96.09	93.48
Average Harvest Weight	kg/bird	1.83	1.91	2.01	2.20	1.99
Average Harvest Age	days	30	32	31	32	31.25
Performance Index (IP)	-	390	363	417	444	403.5
Number Harvested	birds	37,676	35,947	37,503	38,434	37,390

Table 1 shows that Tridaya Farm's technical performance is generally good. The actual FCR across all cycles (1.459-1.488) is consistently below the core partner's standard (1.561-1.655), indicating good feed-use efficiency, consistent with feed efficiency as a key determinant of broiler production cost (Puspita, 2019). The Performance Index (IP) also shows an increasing trend, from 390 in Cycle 18 to 444 in Cycle 21, well above the IP threshold of 300 that signals suboptimal production performance (Amam, 2022), indicating continuous improvement in rearing management.

However, the depletion rate fluctuated considerably between cycles, ranging from a low of 3.91% in Cycle 21 to a high of 10.13% in Cycle 19, exceeding the core partner's standard of 3.68-4.28% in Cycle 19. This fluctuation corresponds with findings that broiler production risk, particularly mortality, tends to be high because of vulnerability to disease and uncertain environmental conditions (Vinanda et al., 2017; Fadhiela & Rosa, 2025). The depletion spike in Cycle 19 directly reduced the number and weight of birds harvested, making it a main determinant of pressure on business profitability in that cycle, as discussed further in the financial performance section.

Monetary Performance and Business Feasibility

A summary of the cost structure, revenue, profit, and profit margin of Tridaya Farm for Cycles 18-21 is presented in Table 2.

Table 2. Financial Performance of Tridaya Farm, Cycles 18-21

Parameter	Unit	Cycle 18	Cycle 19	Cycle 20	Cycle 21	Average
DOC Cost	IDR	314,000,000	314,000,000	300,000,000	300,000,000	307,000,000
Feed Cost	IDR	859,725,000	858,065,000	985,330,000	1,126,395,000	957,378,750
Medicine/Vitamin Cost	IDR	20,528,139	16,820,673	23,766,731	21,999,124	20,778,667
Operational Cost	IDR	88,126,040	83,520,492	85,294,650	98,928,080	88,967,316

Parameter	Unit	Cycle 18	Cycle 19	Cycle 20	Cycle 21	Average
Investment Depreciation	IDR	24,144,139	22,355,684	26,826,821	21,908,571	23,808,804
Total Production Cost (TC)	IDR	1,306,523,318	1,294,761,849	1,421,218,202	1,569,230,775	1,397,933,536
Total Revenue (TR)	IDR	1,340,057,523	1,324,603,044	1,498,758,436	1,678,962,740	1,460,595,436
Profit (π)	IDR	33,534,205	29,841,195	77,540,234	109,731,965	62,661,900
Profit Margin	%	2.50	2.25	5.17	6.54	4.12

Financially, the average profit margin during the baseline period was recorded at 4.12% of total revenue, with an average profit of IDR 62,661,900 per cycle. Tridaya Farm's cost structure is dominated by feed cost, which accounts for about 68% of total production cost, consistent with findings that feed is the largest component of variable cost in broiler farming (Puspita, 2019; Suwarta et al., 2012). This thin margin indicates that although Tridaya Farm's technical performance is good, the economic feasibility remains vulnerable because the core partner unilaterally sets livestock-production-input prices (DOC, feed, and medicine), leaving plasma farmers no room to negotiate input costs (Fadhlurrohman et al., 2024). This pattern is clearly visible across cycles: the lowest profit margin occurred in Cycle 19 (2.25%), coinciding with the highest depletion spike (10.13%), while the highest margin occurred in Cycle 21 (6.54%), coinciding with the lowest depletion (3.91%). This negative relationship between depletion and profit margin confirms that depletion is a key determinant of Tridaya Farm's profitability and business feasibility.

Dominant Risk Analysis

We conducted dominant risk analysis on five variables that directly affect business profit. Table 3 presents the probability, impact, and risk scores for each variable.

Table 3. Dominant Risk Score of Tridaya Farm

Risk Variable	Unit	Normal Condition	Actual Condition (Range)	Probability	Impact	Risk Score	Category
FCR	-	1.475	1.459-1.488	2	3	6	Low
Depletion	%	6.52	3.91-10.13	4	5	20	High
Feed Price	IDR/kg	8,733	8,449-8,982	2	4	8	Moderate
Live-Chicken Selling Price	IDR/kg	19,648	18,920-21,120	4	5	20	High
Harvest Performance (Livability)	%	93.48	89.87-96.09	3	4	12	Moderate

Table 3 shows that depletion and live-chicken selling price are the two dominant risk variables, each with the highest risk score (20) and falling into the high-risk category. Depletion is a dominant risk because its deviation frequency is high and directly affects the number and weight of birds harvested, which determines business revenue. Meanwhile, the live-chicken selling price is a dominant risk because it consistently declines within each harvest cycle, ranging from around IDR 20,800-21,120/kg on the first harvest days to IDR 18,920-19,700/kg on the last days. At the same time, plasma farmers have no room to negotiate the price under the contractual scheme with the core partner. This condition confirms that plasma farmers essentially face structurally embedded price risk arising from the partnership mechanism itself, rather than from free-market dynamics alone. Harvest performance falls into the moderate category (score 12) because it is closely related to depletion. In contrast, feed price falls into the moderate category (score 8) because, although its cost impact is substantial, its deviation

frequency is relatively low due to the locked-in contract price system. FCR is the lowest-risk variable (score 6) because it remains stable and consistently below the core partner's standard across all observed cycles.

Profit Sensitivity Analysis

Sensitivity analysis used the average baseline of Cycles 18-21, namely a profit of IDR 62,661,900 per cycle. Table 4 presents the results of eight tested scenarios.

Table 4. Profit Sensitivity Analysis Results of Tridaya Farm

Scenario	Change	Baseline Profit (IDR)	Scenario Profit (IDR)	Profit Change (%)	Sensitivity Level
FCR increase	+0.1	62,661,900	-2,064,158	-103.29	Very High (Loss)
Depletion increase	+1%	62,661,900	47,036,798	-24.94	Moderate
Depletion increase	+2%	62,661,900	31,411,697	-49.87	High
Feed price increase	+IDR 100/kg	62,661,900	51,698,150	-17.50	Moderate
Feed price increase	+IDR 500/kg	62,661,900	7,843,150	-87.48	Very High
Selling price decrease	-3%	62,661,900	18,844,037	-69.93	Very High
Selling price decrease	-5%	62,661,900	-10,367,872	-116.55	Very High (Loss)
Selling price decrease	-10%	62,661,900	-83,397,644	-233.09	Very High (Loss)

The results in Table 4 show that Tridaya Farm's profit is highly sensitive to changes in the live-chicken selling price and to increases in FCR. A mere 5% decline in selling price, which has occurred within the price range of a single harvest cycle, is already sufficient to cause a loss, and a 10% decline would generate a far greater loss. A 0.1-point increase in FCR can turn the business profit into a loss because a higher FCR directly increases feed consumption, the largest cost component in the business's cost structure. Similarly, a feed price increase of IDR 500/kg may reduce profit by up to 87.48%. In contrast, a 1-2% increase in depletion has a relatively more moderate impact, although still significant (a 24.94%-49.87% profit decline).

This finding is consistent with the dominant risk analysis above, namely that the live-chicken selling price and feed efficiency (FCR) are the variables most determinant of sustainable business profitability. This high profit sensitivity corresponds to the general characteristics of broiler farming, which is highly vulnerable to changes in price and technical variables, as reported in various other partnership contexts (Harits et al., 2025; Wakhidati et al., 2022; Borah & Halim, 2021). In Tridaya Farm's case, this vulnerability is exacerbated by a thin profit margin (average 4.12%), so a small shock to any key variable can turn a technically well-performing business into a financially loss-making one in a given cycle.

Discussion

This study aimed to analyse the existing business condition of Tridaya Farm, a closed-house broiler plasma farming business, in terms of its production performance and business feasibility. Although the analysis was conducted systematically using 21 cycles of historical production and fiscal data, as a single-case study, its findings reflect the characteristics of this particular business unit and partnership arrangement. They cannot be generalised to plasma farmers operating under different partnership schemes or cage systems.

The evidence shows a notable paradox amid technical performance and financial workability in a closed-house broiler plasma farming business. On one hand, Tridaya Farm demonstrates consistently good technical achievement, reflected in an FCR that is always

below the core partner's standard and an IP that continues to increase, consistent with prior evidence that feed efficiency and mortality control are central determinants of broiler production success (Puspita, 2019; Amam, 2022). On the other hand, business feasibility as measured by margin and profit remains vulnerable due to two fundamental factors: first, the dominance of production-input costs whose prices are set unilaterally by the core partner, leaving the farmer without control over its largest cost component; and second, the uncertainty of the selling price, which is likewise outside the plasma farmer's control under the partnership contract mechanism. This reinforces the view that, within a core-plasma partnership system, plasma farmers' business feasibility is not determined solely by technical production efficiency yet is also strongly determined by the risk-sharing structure and price control embedded in the contract (Ulfa et al., 2021).

The dominant risk and sensitivity analyses additionally show that depletion and the live-chicken selling price are the two variables most critical to profitability. At the same time, FCR, although stable, becomes extremely damaging to profit if it deteriorates even slightly. This pattern is consistent with previous studies showing that broiler farming profit is highly sensitive to price and technical shocks throughout various partnership contexts (Harits et al., 2025; Wakhidati et al., 2022; Borah & Halim, 2021). These results indicate that improving business practicability in a plasma farming arrangement requires attention on two fronts simultaneously: strengthening depletion control through improved biosecurity and cage management to prevent spikes such as that observed in Cycle 19, and using a consistently good technical track record as a bargaining tool with the core partner to negotiate more favourable pricing terms or an expanded production quota. Without such measures, the thin profit margin will continue to leave plasma farmers' business feasibility vulnerable to even small fluctuations in production or price, regardless of how well they manage technical performance.

CONCLUSION

This study finds that Tridaya Farm's current business condition shows a paradox between strong technical performance and fragile financial feasibility. The results show that Tridaya Farm's technical performance during Cycles 18-21 is generally good, with an average FCR of 1.475 consistently below the core partner's standard and an IP that increased from 390 to 444. However, the depletion rate still fluctuates considerably (3.91%-10.13%) and exceeded the core partner's standard in Cycle 19, suppressing profitability that period.

Financially, the business generates an average profit of IDR 62,661,900 per cycle with a relatively thin profit margin, averaging 4.12% of total revenue. Depletion and the live-chicken selling price were identified as the two dominant risk variables with the highest risk score (20). The sensitivity analysis shows that profit is highly sensitive to declines in selling price and increases in FCR, where a 5% price decline or a 0.1-point FCR increase alone is already sufficient to push the business toward a loss. This evidence confirms that despite Tridaya Farm's strong technical performance, its business feasibility remains vulnerable to small fluctuations in production and price variables because of its thin margin and a price-control structure largely outside the plasma farmer's control.

From a practical perspective, Tridaya Farm's management is advised to maintain and continue improving feed efficiency (FCR) and to strengthen depletion control through improved biosecurity and cage-management standard operating procedures, so that spikes such as the one observed in Cycle 19 are not repeated. A consistently good technical track record can also serve as a basis for negotiation with the core partner to obtain pricing incentives or an expanded production quota, therewith strengthening business feasibility amid a thin profit margin. This study is limited by its single-case-study design and its focus on one partnership scheme with one core company; future research is therefore encouraged to extend the analysis to multiple plasma farming units and core partners to allow broader generalisation, and to

develop a increasingly dynamic risk-evaluation model that accounts for the evolving nature of feed and selling prices over time.

Funding Statement

This research received no external funding.

Conflicts of Interest

During the preparation of this manuscript, Turnitin, Grammarly, and ChatGPT were used as supporting tools to improve language, sentence structure, and overall clarity. The author carefully reviewed and revised the entire manuscript and remains fully responsible for its accuracy, integrity, and originality.

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