



# Evaluation of Duck Farming and its Development Strategy: The Case of Smallholder Farmers in Indramayu District, Indonesia

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**Abstract** | The agricultural sector in Indonesia plays a pivotal role in enhancing rural livelihoods and food security, with duck farming contributing significantly to smallholder farmer incomes. The research was conducted in Indramayu District because it has the largest rice field area in West Java Province. This condition makes Indramayu District very potential for the development of duck farming areas because the physiological status of ducks as waterfowl allows ducks to be reared in low tide areas such as rice fields and swamps. This study aims to analyze the factors influencing the profitability of duck farming and propose strategies for its sustainable development in Indramayu District. Using survey data from 96 duck farmers, multiple regression analysis identified 7 independent variables affecting profits. Among them, livestock population and egg sales had the most substantial positive impact, while seed prices, cage costs, feed costs, equipment costs, and labor costs negatively influenced profits. The 7 independent variables 95.3% (R<sup>2</sup>) explained the dependent variable and simultaneously had a significant effect on farmer profits. SWOT analysis revealed strengths such as abundant natural feed resources and favorable environmental conditions, alongside weaknesses like semi-intensive rearing systems and limited capital access. Opportunities include growing market demand, while threats involve low farmer bargaining power. Based on these findings, a “Growth Oriented Strategy” (S-O Strategy) was recommended, emphasizing a shift to intensive farming systems supported by accessible financial credit and capacity-building initiatives. Stakeholders, including local governments, financial institutions, and agricultural extension services, should collaborate to provide subsidized credit, farmer training, and market access, while policymakers focus on infrastructure and product distribution support for intensive farming. This research underscores the strategic importance of targeted interventions to improve profitability and productivity, offering a replicable framework for sustainable rural agribusiness development. However, this study is limited by its geographical focus on Indramayu District, which may affect the generalizability of findings to other regions with different environmental and socio-economic conditions.

**Keywords** | Duck Farming, Development strategy, Profit, Rural economic, Growth oriented strategy

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The livestock sector is one of the foundations of the rural economy in Indonesia as it significantly contributes to employment, food security and household income so that the output that can be achieved from the livestock sector is the increased welfare of the community and farmers (Fadhliana and Azizah, 2022). Among the various livestock commodities, duck farming has emerged as an important enterprise due to its dual role as a source of eggs and meat. Ducks are adaptable and require relatively low inputs, making them an attractive option for smallholder farmers. In addition, the ability of ducks to consume agricultural by-products such as rice bran and straw, makes duck farming economically viable and environmentally sustainable. These attributes have positioned duck farming as an important component in rural development initiatives in Indonesia, especially in areas with abundant agricultural resources. In line with the statement (Patil *et al.*, 2020) that duck farming has the potential to alleviate poverty in rural communities.

Indramayu Regency, located in West Java, is one of Indonesia's key centers for duck farming. The region contributes 29.26% of West Java's total duck population, amounting to more than 3.35 million ducks (Central Bureau of Statistics of West Java Province, 2023). Indramayu's comparative advantage lies in its vast rice fields—the largest in West Java—which produce significant agricultural by-products like rice bran and straw that serve as cost-effective feed for ducks. Additionally, its wetlands, tidal areas, and favorable climatic conditions create an ideal ecosystem for duck farming. Ducks thrive naturally in these environments, requiring minimal commercial feed inputs while maintaining consistent productivity. These factors make Indramayu a leading region for sustainable duck farming in Indonesia (Santoso *et al.*, 2023; Syafie and Djumadil, 2021).

Despite its strong potential, duck farming in Indramayu faces several challenges that limit its profitability and sustainability. Smallholder farmers, who form the backbone of this sector, struggling with high production costs, particularly for feed and labor, as well as limited access to capital and outdated management practices. Additionally, their low bargaining power in the marketplace hampers their ability to secure favorable prices for their products. Similar problems also occur in the smallholder duck farming industry in Central Java which faces potential problems that include access to production, sustainability and inefficient ways of managing resources, in addition, the margin between production costs and small sales makes farmers' profit receipts small (Ismoyowati *et al.*, 2020). Addressing these challenges is crucial to improving farmer profitability and ensuring the long-term viability of duck farming enterprises.

Profitability, a key measure of economic success, serves as the dependent variable in this study. To comprehensively evaluate the factors influencing profit, this research considers 7 independent variables, each selected for its practical relevance and support from previous studies. These variables include livestock population, which reflects production capacity and output; feed costs, representing the largest share of production expenses; and labor costs, accounting for expenditures on human resources. Additional variables are seed prices, which reflect costs associated with purchasing ducklings; cage costs, representing infrastructure investments for housing ducks; equipment costs, encompassing tools and facilities needed for farming activities; and egg sales, which serve as the primary revenue stream that determines overall profitability (Hutahaean *et al.*, 2022).

To address these issues, this study adopts a mixed-methods approach, combining quantitative analysis through multiple regression with qualitative analysis using SWOT analysis. The multiple regression analysis evaluates the relationships between the independent variables and farmer profits, highlighting significant findings such as the positive effect of egg sales on profitability and the negative impact of feed costs and labor costs. This study extends previous research on the profitability and sustainability of duck farming by providing deeper insights into the economic and strategic dimensions of small-scale farming. This study analyzes the cost and income components that affect farmers' profits in more depth. Previous duck farm profit analysis research has been conducted by (Kalangi *et al.*, 2024) which analyzed the profitability of laying duck farms in North Sulawesi. However, the study did not analyze the specific contribution of each component of production costs to the profitability of duck farming.

SWOT analysis is a strategic planning method for evaluating the factors that influence a business in achieving goals, both short-term and long-term goals (Barus *et al.*, 2024). SWOT analysis complements these findings by identifying internal and external factors that influence duck farming in Indramayu. Key strengths include the availability of abundant feed resources and favorable environmental conditions, while weaknesses include limited access to financial capital. Opportunities, such as growing market demand for duck products, and threats, such as low bargaining power and price fluctuations, provide further context for understanding the sector's dynamics (He *et al.*, 2024; Santoso *et al.*, 2023).

This study aims to evaluate the profitability of duck farming in Indramayu Regency, assess the impact of key factors such as costs, labor, and revenue on farmer profits, and propose sustainable strategies to enhance productivity and profitability through SWOT analysis. By bridging the gap between financial analysis and strategic planning,

this research provides actionable insights for policymakers, stakeholders, and farming communities. The findings aim to strengthen the economic resilience of smallholder farmers while promoting the sustainable development of duck farming in Indramayu Regency.

Duck farming's socio-economic contributions extend beyond individual farmers to the broader rural economy. By improving productivity and adopting sustainable farming systems, such as transitioning from semi-intensive to intensive farming models, farmers can achieve higher profitability while minimizing environmental impacts. This transition is critical for addressing existing challenges, such as access to financial resources and market opportunities, and for maximizing the region's comparative and competitive advantages. These findings not only contribute to the academic understanding of duck farming but also provide practical solutions for ensuring its long-term sustainability and economic impact in rural Indonesia (Pangemanan *et al.*, 2014).

## MATERIALS AND METHODS

### OBJECTS AND SUBJECTS OF RESEARCH

The subjects in this study are duck farmers in Indramayu Regency who raise ducks both with intensive and semi-intensive maintenance patterns. The object of this research is the costs, benefits and profits of duck farming as well as farmer strategies in developing duck farming in Indramayu Regency.

### RESEARCH LOCATION

The determination of the research location was carried out deliberately, namely in Indramayu Regency, precisely in Sindang District and Sukra District with considerations: 1) Indramayu Regency has a large expanse of rice fields so that it has the potential to be used as a duck farm development area, and 2) Sindang and Sukra sub-districts are duck and duck egg production centers and have received duck livestock assistance from the government, this allowed the study to observe the effect of these interventions on duck farmer enterprise development. However, this also allows for limited generalization of the results to other regions in Indonesia.

### DATA COLLECTION METHODS

This research uses a mixed-method approach that combines quantitative data (profit analysis through multiple regression) with qualitative data (SWOT analysis based on interviews and observations). The approach is a sequential explanation because the results of the quantitative analysis (regression test) are used to identify internal and external factors that influence the business strategy of duck farming, thus providing a foundation for qualitative analysis

(SWOT). The types of data used in this study are quantitative and qualitative data covering internal and external factors.

Data were taken from the year of duck cultivation starting from October 2022 to September 2023 to cover all seasons so that the results of the study can describe more comprehensive conditions and reduce seasonal bias in duck productivity. The data sources used in this study consist of primary and secondary data. Primary data was obtained from direct interviews with farmers related to duck farming in Indramayu Regency. All respondents were given an explanation of the purpose of the study and their consent was obtained prior to the interview. The data collected was kept confidential. Interviews were conducted using a questionnaire to obtain quantitative and qualitative data relevant to the study. The structure of the Questionnaire consisted of a quantitative section covering items measured using a Likert scale (i.e., 1 = Strongly Disagree to 5 = Strongly Agree). This scale was used to assess variables such as farmer satisfaction, access to resources, and perceived profitability. Meanwhile, the qualitative section consisted of open-ended questions to gather detailed insights on farmers' strategies, challenges and experiences in developing duck farming operations. This mixed-format questionnaire facilitated a comprehensive understanding of the factors affecting duck farm profitability while capturing contextual factors important for the SWOT analysis. Secondary data was drawn from official reports of the Indramayu District Livestock Service Office, BPS statistical data, and documents from the Ministry of Agriculture.

### SAMPLING AND ANALYSIS METHOD

**SAMPLING METHOD:** The research method used was a survey of duck farmers in Sindang and Sukra Subdistricts, Indramayu District. The sample determination carried out in this study was based on information from the Livestock Service Office of Indramayu Regency which directed to the Sindang and Sukra sub-districts which are centers of egg and duck production and have received duck livestock assistance from the government. The survey method is a method that aims to generalize the population from a sample by collecting information from a sample obtained from the population (Paturachman, 2012). Sampling in this study used non-probability sampling by incidental sampling. This is because the exact population of duck farmers is unknown. Thus the formula used in determining the number of farmer samples available and willing to be interviewed is Lemeshow as follows (Riduwan and Akdon, 2010).

$$n = \frac{Z^2 \times P \times Q}{L^2}$$

Keterangan:

n= Sample Size.

$Z^2$  = Standard Distribution Value (1.96).

P = Proportion Estimation Value (Maksimum 0.5).

Q = 1 – P.

L<sup>2</sup> = Accuracy Level (0.1).

Sample size is calculated using Lemeshow’s formula for unknown populations. Sample calculation using the above formula resulted in a value of n 96.04 respondents. Thus, the required sample size is approximately 96 respondents. This corrected value ensures compliance with social research standards.

**MULTIPLE LINEAR REGRESSION ANALYSIS:** Regression analysis was used to determine the relationship between operational costs and farmer income. By understanding which factors most influence profit, a business development strategy can be formulated. The multiple linear regression analysis was conducted using the SPSS (Statistical Package for Social Sciences) software tool. SPSS was used because of its extensive ability to perform multiple linear regression analysis., making it easier to process data. The following variables were selected because they are considered to be highly influential on the profitability of duck farming in Indramayu District. These costs are the main components that determine farmers’ profits. The multiple linear regression analysis model in this study is described as follows.

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + b_7 X_7 + \mu$$

**Description:**

Y = Duck Business Profit

a = Constant/Intersep

b<sub>1-10</sub> = Independent Variable Regression Coefficient

X<sub>1</sub> = Livestock Population (Duck)

X<sub>2</sub> = Seed Price (Rp)

X<sub>3</sub> = Cage Costs (Rp)

X<sub>4</sub> = Feed Cost (Rp)

X<sub>5</sub> = Equipment Cost (Rp)

X<sub>6</sub> = Labor Cost (Rp)

X<sub>7</sub> = Egg Sales (Rp)

μ = Other Variables Not Examined/Disturbance Variables

**TESTING THE COEFFICIENT OF DETERMINATION (R<sup>2</sup>):** The coefficient of determination is used to determine how much the percentage of the influence of the independent variables tested on the dependent variable. The higher the percentage of R<sup>2</sup>, the better the model used (Afied *et al.*, 2019).

**SWOT ANALYSIS (STRENGTH – WEAKNESS – OPPORTUNITIES – THREATS):** The duck business development strategy in this study was carried out by identifying internal and external factors using a SWOT approach analysis. In line with the statement of Barus *et al.* (2024), SWOT analysis is a

method of strategic planning by evaluating factors that will affect a business in achieving both short-term and long-term goals, while the factors evaluated consist of internal factors (strengths and weaknesses) and external factors (opportunities and threats).

- Internal and External Factor Analysis (IFAS and EFAS Matrix): The initial stage of SWOT analysis involves identifying internal factors (strengths and weaknesses) using the IFAS matrix and external factors (opportunities and threats) using the EFAS matrix. The identification of internal and external factors was based on the results of linear regression analysis and interviews with farmers using a questionnaire that gathered detailed insights into the strategies, challenges and experiences of farmers in developing duck farming. According to (Rusmiyati, 2018), the IFAS matrix aims to assess the influence of strengths and weaknesses on business continuity and the company’s response to internal factors. Meanwhile, the EFAS matrix is used to identify the impact of opportunities and threats to the business and the company’s response to external factors.
- SWOT Matrix: The SWOT matrix is the result of IFAS and EFAS analysis used to determine business development strategies. According to Ahmad *et al.* (2023), this matrix summarizes strategies based on a combination of internal and external factors, taking advantage of strengths and opportunities and reducing challenges and weaknesses. The SWOT matrix produces four alternative strategies. The SWOT matrix will produce four sets of possible alternative company strategies shown in Table 1.

S-O strategy is a strategy: utilizing opportunities with internal strengths

W-O strategy: reduce weaknesses and take advantage of opportunities.

S-T strategy: optimize strengths to deal with threats.

The W-T strategy: reduce weaknesses and avoid threats.

**Table 1: SWOT Matrix.**

IFAS and EFAS	Strengths (S)	Weakness (W)
Opportunities (O)	S-O Strategy Leverage potential to seize opportunities	W-O Strategy Overcoming weaknesses to seize opportunities
Threats (T)	S-T Strategy Utilize potential to deal with threats	W-T Strategy Minimize weaknesses to counter threats

**RESULTS AND DISCUSSION**

**GENERAL CONDITION OF RESPONDENTS**

The average duck farmer in Indramayu Regency is at a productive age of 43 years, which supports business success

through physical abilities and effective resource management (Makatita *et al.*, 2014). Most farmers have formal education from primary school to senior high school, but this does not affect the motivation and knowledge of farmers because the knowledge of farming is passed down from generation to generation with a semi-intensive pattern. The average experience of duck farmers reached 9 years. Research by (Santoso *et al.*, 2023) on duck farmers in Brebes Regency showed a similar thing that the majority of farmers were elementary school graduates and this level of education was low but did not affect the success of duck farming or was not an obstacle to the duck farming business being carried out.

Based on the results of the study, it is known that duck breeding activities are also carried out by women. 14 women have been breeding ducks for years. The division of breeding duties is carried out by women when their husbands go to the fields to farm. This finding is different from (Basriwijaya *et al.*, 2019) research on duck farmers in Rokan Hulu District, Riau Province where the majority of farming activities are carried out by men because they are considered physically stronger. On the other hand, it is important to integrate a gender perspective into livestock policy, involve women in decision-making, and establish gender-based working groups to ensure representation and support sustainable livestock development (Hill, 2009; Nadhira and Sumarti, 2017).

**PROFIT ANALYSIS**

This study begins by analyzing the profits of Indramayu Regency duck farmers using multiple linear regression analysis. Multiple linear regression tests were conducted to determine the relationship between variables such as feed costs, labor costs, and income from eggs on duck farming profits. These results will help identify strategic factors for the development of livestock farming.

**MULTIPLE LINEAR REGRESSION ANALYSIS**

The regression model used in this study has met the classical assumption test consisting of normality test, multicollinearity test, and heteroscedasticity test. The following regression model is generated.

$$Y = 86,490.025 + 48.321X_1 - 1.929X_2 - 0.841X_3 - 1.049X_4 - 2.049X_5 - 1.083X_6 + 0.985X_7$$

Based on the equation, a constant value of 86,490.025 is obtained, which indicates that if the independent variables (livestock population, seedling prices, cage costs, feed costs, equipment costs, labor costs, and egg sales) are not taken into account, then farmers will experience a profit of a constant value. This explains why farmers are still doing duck farming even with limited capital. Raising ducks in smallholder farms is one of the profitable economic activi-

ties, because the production costs are very low (Mathew *et al.*, 2020). This study found that seedling prices, cage costs, feed, equipment and labor contributed negatively to profitability, while livestock ownership and egg sales contributed to the main income generation. Further explanation of the contribution of each variable to the profitability of duck farming in Indramayu Regency is provided in Table 2.

**Table 2: Variables in multiple linear regression analysis.**

Variables	Expected Sign	Reference
Livestock + Population	+	The larger the duck population, the greater the profit. This is due to the increase in egg or meat production that can be sold, thus increasing income (Situmeang, 2022)
Seed Price	-	The increase in duckling seed prices increases production costs, which can reduce profit margins if not offset by an increase in selling prices or production efficiency. (Situmeang, 2022) study showed that the cost of depreciating ducklings is a significant component of fixed costs, and an increase in this cost can affect the profitability of the enterprise.
Cage Cost	-	According to (Situmeang, 2022), cage depreciation costs are part of the fixed costs that affect total production costs. High housing costs add to fixed costs, which can reduce profits if not offset by increased production or other efficiencies.
Feed Cost	-	Feed costs are the largest component of duck production costs. Research in the (Tumion, et. al., 2017) shows that feed costs account for about 77% of total production costs in poultry farming
Equipment Cost	-	High equipment costs increase fixed costs, which can reduce profit margins if the equipment does not provide significant efficiency or production improvements.
Labor Cost	-	High labor costs can reduce profits, especially if labor productivity is not commensurate with costs incurred.
Egg Sales	+	Egg sales are one of the main sources of income in duck farming. The higher the sales yield (either due to higher prices or increased production volume), the higher the business income, which directly increases the profit margin (Iskandar <i>et al.</i> , 2022)

**COEFFICIENT OF DETERMINATION (R<sup>2</sup>)**

The R square value shows how much influence the independent variables tested have on the dependent variable. If the R2 result is close to 0, it means that the ability of the independent variables to explain the variation in the variables is very limited. The result of R<sup>2</sup> in this study is 0.953

(Table 3). This means that the independent variables provide all the information needed to predict variations in the dependent variable, namely the profit of duck farming. This can be interpreted that 95.3% of the profit of duck farming is influenced by the 7 independent variables. The high coefficient of determination can be caused by the selection of independent variables that are relevant to the factors that affect profitability (costs). Respondents in this study have homogeneous characteristics such as the same region and similar maintenance systems, thus reducing variations in the data.

**Table 3:** Coefficient of determination.

Model Summary <sup>b</sup>				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.976 <sup>a</sup>	.953	.949	11625.30108

**a:** Predictors: (Constant), Livestock Population, Seed Price, Cage Cost, Feed Cost, Equipment Cost, Labor Cost, Egg Sales; **b:** Dependent Variable: Duck business profit.

**Table 4:** IFAS matrix for duck farming in indramayu regency.

No Internal Factors		Weight Rating Score		
Strength (S)				
1	Availability of Rambon seedlings	0.12	5	0.58
2	Feed is easy to obtain	0.12	5	0.58
3	Grazing land is large and not uniformly grazed	0.12	5	0.58
4	Simple and readily available equipment	0.12	5	0.58
5	Semi-permanent cage	0.12	4	0.47
6	In the dry season, rice and egg production increases	0.12	4	0.47
Total Strength				3.26
Weakness (W)				
1	Semi-intensive livestock rearing process of less than 1 year to avoid molting	0.12	4	0.47
2	Limited capital	0.12	4	0.47
3	Minimal farming skills because it is passed down from generation to generation	0.12	4	0.47
4	No recording	0.07	5	0.35
Total Weakness				1.74
Total IFAS				5.00

**BUSINESS DEVELOPMENT STRATEGY**

**INTERNAL-EXTERNAL FACTOR ANALYSIS:** Business development must be systematically structured to maintain the profits that have been analyzed. The first step is to analyze the internal and external factors of the business. Based on interviews and analysis, the internal

and external factors are shown in Table 4 and Table 5. It is known that the total score of internal factors (IFAS) of duck businesses in Indramayu Regency is 5.00, with the main strengths being the availability of seeds, feed, large land, simple equipment, and semi-permanent cages (score 0.58). The main weaknesses are the short rearing process, limited capital and hereditary farming skills (score 0.47). The external factor score (EFAS) is lower at 3.03, with the main opportunity being easy marketing (0.68) and the main threat being the low bargaining position of farmers (0.41).

**Table 5:** EFAS Matrix of duck farming businesses in indramayu regency.

No External Factors		Weight Rating Score		
Opportunities (O)				
1	Availability of H5N1 vaccine from the government	0.14	4	0.54
2	Provision of vaccines from veterinarians	0.14	1	0.14
3	Duck and feed grants to some locations	0.14	2	0.27
4	Easy marketing	0.14	5	0.68
5	Comparative study to Blitar from the government	0.14	1	0.14
6	There is a People's Business Credit program from the bank	0.11	1	0.11
Total Opportunities				1.86
Threats (T)				
1	Grazing is a threat to duck loss and mortality	0.03	4	0.11
2	Lower egg production compared to intensive rearing	0.08	4	0.32
3	Unequal grants are a source of conflict	0.08	4	0.32
4	Low bargaining position of farmers	0.14	3	0.41
Number of Threats				1.16
Total EFAS				3.03

		TOTAL SCORE OF INTERNAL STRATEGY FACTORS		
		Strong (3.0-4.0)	Medium (2.0-2.99)	Weak (1.0-1.99)
TOTAL SCORE OF EXTERNAL STRATEGY FACTORS	High (3.0-4.0)	I (Grow and Build)	II (Grow and Build)	III (Hold and Maintain)
	Medium (2.0-2.99)	IV (Grow and Build)	V (Hold and Maintain)	VI (Harvest or Divest)
	Low (1.0-1.99)	VII (Hold and Maintain)	VIII (Harvest or Divest)	IX (Harvest or Divest)

**Figure 1:** Internal-external matrix.

The IFAS and EFAS matrices were used to construct the Internal-External (IE) matrix to determine the business position. With an IFAS score of 5.00 and EFAS score of 3.03, the duck farming business is in cell IV (grow and build) as shown in Figure 1.

**Table 6:** Formulation of SWOT matrix for duck farming in indramayu regency.

IFAS and EFAS Strengths (S)	Weakness (W)	
Availability of Ram-bon seedlings Feed is easy to obtain Grazing land is large and not uniformly grazed Simple and readily available equipment Semi-permanent cage In the dry season, rice and egg production increases	Semi-intensive live-stock rearing process of less than 1 year to avoid molting Limited capital Minimal farming skills because it is passed down from generation to generation No recording	
Opportunities (O)	S-O Strategy	W-O Strategy
Availability of H5N1 vaccine from the government Provision of vaccines from veterinarians Duck and feed grants to some locations Easy marketing Comparative study to Blitar from the government There is a People's Business Credit program from the bank	Maintain good production quality and improve marketing network (S1, S3, S4, O4, O6) Optimize production by adjusting the maintenance system to be intensive (S5, S6, S4, O3, O6) Establish good relationships between business actors such as comparative studies, counseling, etc. (S3, O5, O6)	Improving maintenance management (W1,W2,W4,O4, O2, O3) Regenerating breeders and conducting more massive marketing with the help of social media or cooperation with other breeders (W2, W3, O4). Create a business development plan through government agencies/programs (W2,W3,O1, O3,O5,O6) Creating management counseling
Threats (T)	S-T Strategy	W-T Strategy
Grazing is a threat to duck loss and mortality Lower egg production compared to intensive rearing Unequal grants are a source of conflict Low bargaining position of farmers	Forming cooperatives/livestock groups (S1,S3,T3,T4) Determine feed modifications, monitor feed prices and product selling prices (S2, T2, T4) Improve livestock care (S4,S5,T1)	Increase capital acquisition with proportional grant assistance and switch to intensive maintenance to maximize production (W1, W2, T1,T2,T3) Improve the quality of human resources to improve the bargaining position of farmers, understand government regulations including grant scheme regulations, and record livestock maintenance (W3,W4,T3,T4).

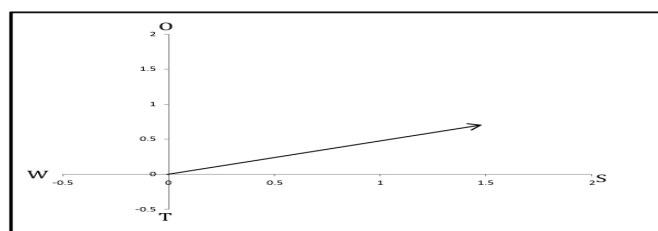
**SWOT ANALYSIS:** The SWOT matrix is used to systematically identify and develop strategic factors. This

matrix is formulated based on the IFAS and EFAS matrix rankings that have been obtained. The internal (strengths and weaknesses) and external (opportunities and threats) factor values are combined to form the SWOT diagram presented in Figure 2. The X and Y coordinates in the diagram are determined by the following formula.

$$X \text{ coordinate} = \text{Total strength value} - \text{total weakness value} \\ = 3.26 - 1.74 \\ = 1.51$$

$$Y \text{ coordinate} = \text{Total opportunity value} - \text{total threat value} \\ = 1.86 - 1.16 \\ = 0.70$$

The X and Y coordinates in this study show a positive value and place the duck farming business in Indramayu Regency in Quadrant I. Quadrant I is considered a very profitable business and supports an aggressive growth strategy to take advantage of opportunities and achieve maximum growth (Growth Oriented/S-O Strategy) (Abdillah and Arnilla, 2019). The business strategy design in this study is presented in Table 6.



**Figure 2:** SWOT diagram of duck farming in indramayu regency.

Duck farming actually has an easy opportunity because market demand continues to grow and needs to be accompanied by increased production (Darmawan et al., 2018). The abundant availability of seeds and feed in Indramayu Regency is an initial capital to increase duck and duck egg production. Supported by the statement of (Hutahaeen et al., 2022), Indramayu has great potential in the availability of animal feed ingredients because it is a rice farming area. In addition, Indramayu is also a coastal area rich in animal protein sources such as fish, shrimp and snails which are local feed ingredients for ducks. One of the efforts made is to expand the marketing network, one of which is by marketing online, one of the factors determining the success of marketing is online marketing media as one of the marketing strategies to expand marketing reach (Suwirmayanti et al., 2019).

The adoption of online marketing in duck farming depends on farmers' technological readiness, including internet access, smartphone ownership, and technical literacy. Although internet penetration in Indonesia has reached 77% (Kemp, 2023) rural areas such as Indramayu still face

limited connectivity due to low internet speeds and high costs. To maximize this potential, interventions are needed to overcome these challenges such as smartphone subsidies, expansion of internet infrastructure, and digital literacy training programs to encourage digital transformation of rural farming systems in Indonesia.

The majority of duck farmers in Indramayu Regency still use semi-intensive patterns due to limited knowledge and limited access to capital for farmers with low ownership numbers (Darmawan *et al.*, 2018). Semi-intensive duck rearing patterns (grazing) have a higher threat of livestock loss and mortality due to fatigue. In addition, egg production is relatively low and quality is not guaranteed because it depends on the availability of feed on grazing land. Therefore, farmers need to expand their business by switching to an intensive rearing system.

Intensive farming systems increase productivity and profits, but pose environmental challenges, such as waste management, water use and ecosystem disruption (Ryan and Sudarshan, 2019; Singh and Panda, 2024). Poor waste management can pollute water, while inefficient water use can exacerbate water scarcity. Sustainable practices such as composting, biogas, and efficient water management can reduce these negative impacts (Yadav *et al.*, 2022). By adopting sustainable practices, these challenges can be managed to support economic progress and environmental conservation. Another challenge of the system is the possibility of disease outbreaks such as avian and Newcastle flu that can reduce production as diseases spread rapidly. Mitigation strategies include vaccination which reduces mortality by 40% and increases egg production by 15% (Santoso *et al.*, 2023).

Compared to semi-intensive systems, intensive rearing requires a larger initial capital investment. However, this investment often pays off with higher profit margins, driven by better egg quality, lower mortality and higher production efficiency. Research by (Mathew *et al.*, 2020) showed that intensive duck rearing systems in Kerala yielded 20-30% more profit than traditional methods due to better resource utilization and economies of scale. Therefore, the transition of the duck rearing system in Indramayu Regency can be carried out with the support of the People's Business Credit (KUR) program which provides low-interest loans to help farmers with capital needs.

This effort has been made in the duck farmer group in Tegal City, which has shifted the maintenance system to intensive to increase productivity and the livestock business can be profitable and feasible to develop with an average profitability of 46.05% in one production period (Situmeang, 2022). The implementation of government programs such as KUR for smallholder farmers is often constrained by

complicated bureaucracy and limited literacy and financial management skills of farmers, especially in rural areas. In addition, the lack of socialization leaves many farmers unaware of the benefits and opportunities of such credit (Bakhtiar, 2023). To address these issues, it is necessary to simplify the bureaucracy, provide financial literacy training, and improve rural infrastructure, so that farmers can better access financial resources and support sustainable agricultural development.

Duck farming in Indramayu Regency is still a hereditary business, which is a weakness that hinders optimal farming knowledge (Srianingrum *et al.*, 2023). In addition, farmers have never made special notes about their business, making it difficult to ascertain the benefits of farming. Therefore, one of the efforts made by the government is support through comparative studies with duck farmers in Blitar District, East Java Province. The knowledge gained from the comparative study can be disseminated to other farmers by making brochures, videos, and or counseling and technical guidance on optimal duck breeding. Efforts related to counseling duck farmers about Android-based Recording Benefit have been made by (Hartati *et al.*, 2019) to laying duck farmers in Magelang District and produced a fairly good response. This strategy can also be pursued for duck farmers in Indramayu Regency to develop their livestock business.

The implementation of strategies to improve profitability and development of duck farming needs a systematic approach. Based on the research, the following are recommendations for systematic strategies that can be followed by farmers and policy makers.

- Strengthen farmers' skills through training programs
- Switch to intensive farming system
- Improve access to financial support (People's Business Credit)
- Encourage diversification of local feed sources
- Facilitate the establishment of cooperatives and farmer networks
- Strengthen biosecurity and health monitoring
- Expand market access through digital platforms

## CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the study, it is known that the threats faced by farmers are still lower than the opportunities. Growth-oriented (S-O) based strategy is an effective approach for duck business development in Indramayu District. The shift from semi-intensive to intensive systems is considered capable of increasing farmers' productivity and profitability, provided it is followed by the implementation of practical measures such as training, access to affordable



credit, and collaboration between farmers, government and financial institutions. This study has limitations in its geographical focus so the results are not fully generalizable to other regions. Further studies across different geographical contexts are needed to test the effectiveness of this strategy as well as identify expected outcomes.

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## NOVELTY STATEMENT

This study offers a novel approach of integrating SWOT analysis with profitability analysis to identify development strategies for duck farming in Indramayu. Not only does it highlight the internal and external factors that affect enterprise sustainability, it also provides strategic measures that can be practically implemented, such as a shift to a more productive intensive system.

## AUTHOR'S CONTRIBUTIONS

Achmad Firman: Conceptualization, Supervision, Validation and Review.

Anita Fitriani: Writing Original Draft, Data Analysis, Editing and Resources.

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## CONFLICT OF INTEREST

The authors have declared no conflict of interest.

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