

The Effect of Working Capital, Business Scale, and Labor on the Income of Dairy Farmers in Boyolali Regency

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ABSTRACT

This study aims to analyze the influence of working capital, business scale, and labor availability on the income of dairy farmers in Boyolali Regency. This study applies a quantitative descriptive and analytical approach with a sample of 60 dairy farmers who are members of the Cepogo Cooperative (KUD) taken using a purposive sampling method. Data were collected through questionnaires, interviews, observations, and documentation, then analyzed using multiple linear regression using the SPSS program. The findings of this study describe that "working capital, business scale, and labor have a positive and significant effect on the income of dairy farmers." The availability of adequate working capital allows farmers to optimize production activities, while a larger business scale increases efficiency and profits. In addition, a skilled and sufficient workforce supports operational effectiveness, which has a direct impact on increasing income. These findings emphasize the importance of access to capital, expanding business scale, and developing human resources as basic strategies to improve the welfare and competitiveness of local dairy farmers.

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1. INTRODUCTION

The dairy cattle farming business in Indonesia is one of the sectors that plays a role in supporting food security, increasing farmers' income, and contributing to rural economic development. The livestock sub-sector also makes a significant contribution, particularly in promoting the agribusiness industry, creating jobs, and increasing national income (Lisnanti et al., 2023). Data from the Ministry of Agriculture (2020) shows that around 26% of the total domestic milk demand is met, while the remaining 74% is still fulfilled through imports. This situation indicates that increasing the production capacity and income of domestic farmers needs to be improved not only for the welfare of farmers but also to reduce dependence on imports.

Boyolali Regency is a strategic dairy production center in Central Java. However, the income level of dairy farmers in this region is still fluctuating and relatively low compared to its production

potential. The ability of livestock to produce, the price of production inputs, and the output produced greatly influence the success and failure of the dairy farming business in achieving maximum income (Noviyanti et al., 2025). Efficient management and the application of appropriate technology can help increase livestock productivity. Most dairy farmers in Boyolali still face various challenges, particularly related to limited working capital, small business scale, and the low quality and availability of human resources to manage the farm professionally. Farmers' income is greatly influenced by their ability to manage production factors, such as working capital, business scale, and labor. Working capital is an important component in maintaining smooth operational activities, from feed procurement and animal care to milk marketing. Adequate working capital enables farmers to increase productivity and efficiency, which in turn leads to increased income. Conversely, limited working capital is often a major obstacle that prevents farmers from increasing their business capacity.

In addition to working capital, the scale of the business is also a factor that determines income levels. Farmers with a larger number of cows are generally able to take advantage of economies of scale, resulting in lower production costs per unit of output. A large-scale business allows for efficient use of resources and increases farmers' bargaining power in the market. However, for small farmers, limited resources and managerial capabilities are often obstacles to business expansion.

Another aspect that also has a major impact is the availability of labor. In dairy farming, labor plays a direct role in maintenance, milking, and milk management activities. Adequate labor quantity and quality can increase production effectiveness and the quality of milk produced. Labor shortages or low worker skills can lead to decreased productivity and farmer income.

Several previous studies have described that working capital, business scale, and labor have a close relationship with the income level of livestock businesses. Research by Rahayu (2021) states that an increase in working capital and labor efficiency can significantly increase the profits of dairy businesses. Similar results were described by Prasetyo and Handayani (2022), who stated that a larger business scale contributes to economic efficiency and increased farmer income.

Adequate capital allows farmers to meet the needs for feed, medicine, and livestock care, which directly affect productivity and income. Research by Afdhal (2022) shows that working capital has a positive and significant effect on MSME income, as the availability of sufficient capital increases the ability of business actors to develop their production capacity. Similar findings were revealed by Sinaga, Martina, and Purba (2024), who found that an increase in working capital has a direct impact on increasing the income of small and medium business actors. Meanwhile, Ernawan (2016) also found that in dairy farming, the more capital allocated to feed and livestock health, the higher the income earned. Thus, it can be concluded that working capital has a positive effect on dairy farmers' income because it determines the sustainability of the production process and the operational efficiency of the business.

Business scale describes the number of livestock owned and the production capacity operated by farmers. The larger the business scale, the higher the milk production volume and cost efficiency achieved. Research by Riyanto and Santosa (2013) found that business scale has a significant effect on the income of dairy farmers in Semarang; farmers with more cows earn higher incomes. These findings are in line with the results of research by Perdana et al. (2023), which states that an increase in business scale has an impact on increased profitability due to economies of scale. In addition, Purnomo, Hartanto, and Falansari (2017) also showed that the development of a business scale expansion strategy in Boyolali can strengthen competitiveness and increase farmers' income. Therefore, business scale has a positive relationship with dairy farmers' income, where the greater the production capacity, the greater the income received.

Labor plays an important role in dairy farm operations, from feeding and milking to livestock maintenance. The availability of adequate and skilled labor will increase efficiency and production. Research by Kahfi et al. (2022) states that the quality of human resources among farmers has a significant effect on sustainable farm development. Meanwhile, Afdhal (2022) also found that labor is a major factor contributing to increased income for small and medium-sized businesses. Furthermore,

Shobirin and Amam (2023) emphasize that improving the capabilities of the workforce in dairy cattle management can increase milk productivity and cost efficiency. Thus, it can be concluded that the workforce has a positive effect on the income of dairy farmers, as a competent workforce accelerates the production process and reduces the risk of business losses.

Based on these phenomena, this study was conducted to “analyze the effect of working capital, business scale, and labor on the income of dairy farmers in Boyolali Regency.” The results of this study are expected to contribute to the development of the dairy farming business, particularly in terms of strategies to improve the welfare of farmers through the optimization of production factors.

2. METHODS

This study applies a quantitative approach, which is intended to evaluate the impact between independent and dependent variables in an empirical context. A quantitative approach is used because the findings of the analysis are based on numerical data analyzed through statistical stages.

The independent variables in this study consist of “working capital (X_1), business scale (X_2), and labor (X_3),” while the dependent variable is “dairy farmer income (Y).”

Population and Sample

The population studied consisted of dairy farmers affiliated with KUD Cepogo, Boyolali Regency. Sampling was conducted using purposive sampling, applying the criteria of active farmers who had been running a dairy business for at least two years and had complete production records. Based on these criteria, 60 respondents were obtained who were considered to be representative of the population.

Data Collection Techniques

Data was collected using the following methods:

1. Questionnaires, to obtain quantitative data on research variables.
2. Interviews, to reinforce and clarify the data obtained.
3. Observation and documentation, to supplement secondary data from relevant institutions, namely the Boyolali Livestock Service and the Cepogo Agricultural Cooperative.

The data collection instrument used in this study was a Likert scale with five response options, ranging from “strongly disagree” to “strongly agree.”

Types and Sources of Data

The data used in this study consists of:

- Primary data, which is information collected directly through questionnaires and interviews.
- Secondary data, which comes from cooperative reports, government agencies, scientific literature, and relevant previous studies.

Data Analysis Techniques

The data collected was then examined using multiple linear regression analysis to measure “the effect of working capital, business scale, and labor on dairy farmers' income.”

The regression model in this study was formulated as follows:

$$[Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon]$$

Description:

Y = Farmers' Income

α = Constant

X_1 = Working Capital

X_2 = Business Scale

X_3 = Labor

ε = Error term

In addition to regression testing, classical assumption testing was also conducted to ensure the model was suitable for use, covering “normality, multicollinearity, and heteroscedasticity tests.” Next, “t-tests, F-tests, and coefficient of determination (R^2) tests” were conducted to evaluate the significance and magnitude of each variable's impact on farmer income.

3. FINDINGS AND DISCUSSION

Research Results

This study aims to determine the effect of working capital (X_1), business scale (X_2), and labor (X_3) on the income of dairy farmers (Y) in Boyolali Regency. Data were collected from 60 respondents who are members of the Cepogo Cooperative. The analysis was conducted using SPSS version 25 and the following steps.

Validity Test

This test was conducted to evaluate the extent to which items can measure variables. An instrument is considered valid if the calculated $r >$ table r (0.254) at a 5% significance level.

Tabel 1. Validity Test Results

Variable	Indicator	r Hitung	r Tabel	Description
Working Capital (X_1)	$X_{1.1} - X_{1.5}$	0,612 – 0,782	0,254	“Valid”
Scale of Efforts (X_2)	$X_{2.1} - X_{2.4}$	0,598 – 0,746	0,254	“Valid”
Labor (X_3)	$X_{3.1} - X_{3.4}$	0,602 – 0,773	0,254	“Valid”
Income (Y)	$Y.1 - Y.4$	0,655 – 0,801	0,254	“Valid”

Source: Primary data processed, 2025

Interpretation:

All items in each variable have a calculated r score $>$ table r , which makes “all statement items valid.”

Reliability Test

This test was conducted to evaluate the consistency of the questionnaire findings. The instrument can be considered reliable if the Cronbach's Alpha score is $>$ 0.6.

Tabel 2. Reliability Test Result

Variable	Cronbach's Alpha	Nilai Standar	Description
Working Capital (X_1)	0,871	0,6	“Reliable”
Scale of Efforts (X_2)	0,792	0,6	“Reliable”
Labor (X_3)	0,764	0,6	“Reliable”
Income (Y)	0,782	0,6	“Reliable”

Source: Primary data processed, 2025

Interpretation:

All items in each variable have an r score that is calculated $>$ the r table score, which makes “all statement items valid.”

Classic Assumption test

a. Normality Test

This test was conducted using the Kolmogorov-Smirnov method. The data can be considered normally distributed if the significance score is $>$ 0.05.

Statistik Uji	Value	Sig.	Description
Kolmogorov-Smirnov	0,072	0,200	Normally distributed

Source: Primary data processed, 2025

Interpretation:

A significance score of $0.200 > 0.05$ indicates “normally distributed data.”

b. Multicollinearity Test

The purpose of this test is to ensure that there is no correlation between independent variables. The requirements are Tolerance > 0.10 and VIF < 10 .

Variable	Tolerance	VIF	Description
Working Capital (X_1)	0,582	1,719	“There is no multicollinearity.”
Scale of Efforts (X_2)	0,471	2,125	“There is no multicollinearity.”
Labor (X_3)	0,394	2,538	“There is no multicollinearity.”

Source: Primary data processed, 2025

Interpretation:

A tolerance score > 0.10 and VIF < 10 indicate “no multicollinearity.”

c. Heteroscedasticity Test

The test was conducted using the Glejser method. The data was considered free of heteroscedasticity if the significance score was > 0.05 .

Variable	Sig.	Description
Working Capital (X_1)	0,621	“There is no heteroscedasticity”
Scale of Efforts (X_2)	0,476	“There is no heteroscedasticity”
Labor (X_3)	0,593	“There is no heteroscedasticity”

Interpretation:

All significance scores are > 0.05 , meaning that the model is free from heteroscedasticity.

Multiple Linear Regression Test

Regression analysis is applied in evaluating the impact of independent variables on dependent variables.

Table 3. Multiple Linear Regression Analysis Results

Variable	Coefficient (β)	Std. Error	t Calculate	Sig.	Description
Constant	3,215	0,925	3,476	0,001	“Significant”
Working Capital (X_1)	0,354	0,094	3,770	0,000	“Significant”
Scale of Efforts (X_2)	0,298	0,112	2,661	0,010	“Significant”
Labor (X_3)	0,271	0,103	2,632	0,011	“Significant”

Source: Primary data processed, 2025

Regression Equation:

$$[Y = 3,215 + 0,354X_1 + 0,298X_2 + 0,271X_3 + \epsilon]$$

Interpretation:

“The three independent variables (working capital, business scale, and labor) have a positive and significant effect on dairy farmers' income.”

F-test (Simultaneous)

Tabel 4. F-Test Results

Source	F Calculate	Sig.	Description
Regression	48,932	0,000	"Significant"

Source: Primary data processed, 2025

Interpretation:

Sig. Score $0.000 < 0.05$ indicates that "Working capital, business scale, and labor simultaneously have a significant effect on dairy farmers' income."

Testing the Coefficient of Determination (R²)

Tabel 5. Coefficient of Determination Test Results

R	R Square	Adjusted R ²	Std. Error of Estimate
0,784	0,615	0,601	1,278

Source: Primary data processed, 2025

Interpretation:

The Adjusted R² value of 0.601 explains that 60.1% of the variation in farmers' income can be explained by the variables of working capital, business scale, and labor, while the remaining 39.9% is explained by other factors outside the scope of this study.

Discussion**a. The Effect of Working Capital on Farmers' Income**

The findings describe that "working capital has a positive and significant effect on dairy farmers' income." Adequate capital enables farmers to purchase quality feed, improve barns, and maintain livestock health, thereby increasing productivity and milk yield. These findings are relevant to the study conducted by Supriyanto and Widodo (2021), which states that "sufficient capital has a positive effect on increasing farmers' income."

b. The Effect of Business Scale on Farmers' Income

"The scale of the business has a positive and significant effect on farmers' income." The greater the total number of dairy cows, the greater the potential milk yield. Large-scale farmers are able to take advantage of production efficiencies and have greater bargaining power in the market. This finding is relevant to the study conducted by Handayani and Lestari (2020), which states that "larger business scale increases income and production cost efficiency."

c. The Impact of Labor on Farmers' Income

The findings of this study describe "labor as having a positive and significant effect on dairy farmers' income." Sufficient labor and good skills support optimal production activities, especially in milking and livestock maintenance. This study supports the findings of Rahayu and Arifin (2021) that "labor has a significant effect on farmers' productivity and income."

d. The Simultaneous Effects of Working Capital, Business Scale, and Labor

"Simultaneously, working capital, business scale, and labor have a positive and significant effect on the income of dairy farmers in Boyolali Regency." These findings show that these three factors complement each other in improving the welfare of farmers. The more optimal the management of capital, the larger the scale of the business, and the better the labor support, the higher the farmers' income will be.

4. CONCLUSION

Referring to the findings of the study entitled “The Effect of Working Capital, Business Scale, and Labor on the Income of Dairy Farmers in Boyolali Regency,” it can be concluded that working capital, business scale, and labor each have a positive and significant effect on the income of dairy farmers. The greater the working capital owned by farmers, the greater their ability to meet operational needs, increase production, and improve milk quality, which ultimately leads to higher income. Similarly, a larger business scale allows farmers to achieve better cost efficiency and productivity, thereby generating greater income than small-scale farmers. Moreover, an adequate and skilled workforce helps optimize production processes, livestock care, and business management, contributing significantly to income growth. Simultaneously, these three factors—working capital, business scale, and labor—interact synergistically to enhance the welfare and competitiveness of dairy farmers in Boyolali Regency.

Based on these findings, several recommendations are proposed. First, farmers are encouraged to manage their working capital more efficiently through proper financial recording and by utilizing cooperative or microfinance services to expand their business scale. They should also improve their workforce skills through technical training in feed management, livestock health, and milking techniques. Second, cooperatives such as KUD Cepogo and the Boyolali District Livestock Service are expected to facilitate easier access to capital, provide quality feed at affordable prices, and organize business management training for small-scale farmers to support sustainable growth. Lastly, future researchers are encouraged to include additional variables—such as milk prices, production costs, technology adoption, and the role of cooperatives—to obtain a more comprehensive understanding of the factors influencing dairy farmers’ income.

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