Determinant Factors of Goat Milk Production in Banyuwangi East Java

Asmaul Khusna[1,2] Mujtahidah Anggriani Ummul Muzayyanah[1,*] Tri Anggraeni

Kusumastuti [1] Ahmad Romadhoni Surya Putra[1]

[1] Faculty of Animal Science, Universitas Gadjah Mada
[2] Departement of Livestock Product Processing Technology, Politeknik Negeri Banyuwangi
*Corresponding author. Email: m_anggriani_um@ugm.ac.id

ABSTRACT

Goat livestock is one of the livestock businesses that is overgrowing, especially in the Banyuwangi Regency. Dairy goats are dual-purpose type goats because they produce meat and milk. Efforts to develop dairy goats as milk producers in Banyuwangi Regency continue to be improved. This study aims to determine the factors that impact the milk production of dairy goats in the Banyuwangi Regency. Data were collected using direct interviews with respondents who had been selected using the purposive sampling technique. The method used in this study uses a quantitative approach. The indicators observed in this study were feeding, maintenance, environmental, disease, and methods of providing drinking water. The questionnaire that will be submitted was tested first using validity and reliability tests. The results obtained showed that the effect of production with indicators of feed, livestock care, pen environment, livestock disease, and water consumption had a significant effect on goat milk production. The t-test results on the feed indicator were 2,412, treatment 4,477, environment 3,000, disease 6,677, and water consumption 3,294. It was which were stated to be greater than the T table value of 2.0017, and the significance value for the indicator feed was 0.021, livestock care was 0.000, pen environment was 0.005, livestock disease was 0.000, and water consumption was 0.002, which means less than 0.05 and the hypothesis is accepted. The effect of feed, livestock care, pen environment, livestock disease, and water consumption had a significant effect with a value of 0.000, which was below 0.05 overall; The indicators of feed, livestock care, pen environment, livestock disease, and water consumption affected the milk production variable by 55.9%.

Keywords: Dairy Goats, Goats milk, Milk production

1. INTRODUCTION

Goats are small ruminants that play an essential role as savings and investments for people in rural areas [1]. in addition to providing a steady income, goats act as an asset that can be easily converted into cash (easy to cash) [2]. people choose to raise goats because they do not require significant capital, ample land, and are easy to fulfill for feed; besides that, goats are also easy to adapt to the environment. [3].

Banyuwangi was located in the eastern, which has outstanding potential in agriculture, plantations, and animal husbandry. Data from the Central Bureau Statistik *(*BPS*)*, the potential for goat breeding in Banyuwangi is quite good. However, the traditional farming pattern and the mindset of the people in Banyuwangi, who think that raising goats is a short-term investment, make the goat population in Banyuwangi fluctuate. Goat population data can be seen in Table 1.

Currently, the pattern of goat rearing has changed; people keep dairy goats for milk production because the global demand for goat's milk is increasing, and the price of goat's milk tends to be higher [4]. In addition, dairy goats are dual-purpose goats that can be taken for milk and meat to provide more benefits for farmers [5].

The dairy goat breed kept in Banyuwangi is the PE (Peranakan Etawah). The PE goat is a cross between the Jamnapari Goat (Etawah) breed from India and the Indonesian Kacang Goat. PE goats have a milk production of approximately 1-2 liters/head/day [6]. In the maintenance of PE goats, many aspects need to be considered so that milk production can be optimal, such as livestock breeds, feed, water consumption, livestock care, livestock diseases, and the environment around the

pen that can affect goat milk production [7]. Therefore, it is necessary to analyze what factors significantly influence the production of PE goat's milk production in Banyuwangi.

Table 1 Goat Population in Banyuwangi (Heads)

No	Years	Population
1.	2017	125.479
2.	2018	126.110
3.	2019	116.671
4.	2020	136.901
5.	2021	112.869

2. METHOD

This research was conducted on PE goat farms in Banyuwangi Regency from August 2021 to December 2021. The method used in this study was a survey method using a questionnaire as a research tool conducted on PE goat breeders. The purpose of survey research is to provide a detailed description of the background, characteristics, and characteristics of a case or event of a general nature [8]. This study uses regression analysis (multivariate) with a total sample of 40 obtained from the number of multiplication of the independent and dependent variables. by taking 15 members for each sample. The number of samples consists of 2 independent and dependent variables, namely 2 x 15 = 30 samples with an addition of 10 samples to avoid errors in the study results. Determination of the sample of respondents using the method of purposive sampling [9].

The data collected in this study consisted of primary data and secondary data. Primary data were obtained from direct interviews with PE goat breeders, including the state of the PE goat business. The PE goat breeders consisted of the number of PE goats kept, management of PE goat maintenance such as feeding, water consumption, livestock care, livestock disease, the environment around the pen, and milk production. Secondary data were obtained from the records of the Banyuwangi Regency Agriculture and Food Service and village monographs, the number of livestock and goat breeders, as well as the general condition of PE goat breeders. The analytical tool used is multiple linear regression with the mathematical model in equation. Please refer to Equation (1).

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 \qquad (1)$$

Information:
Y   = Goat Milk Production
α = Constant coefficient
β_1, β_2 = Regression coefficient
X   = Effect of goat's milk production
X_1 = feed
X_2 = livestock care
X_3 = Pen environment
X_4 = livestock diseases
X_5 = water consumption

The test used in multiple linear regression consists of 3 tests, namely the coefficient of determination (R^2), comprehensive parameter testing (F test), and single regression parameter testing (t-test).

2.1. Hypothesis

Based on the research framework, the authors set a conceptual framework for making hypotheses, which can be seen in Figure 1 below:
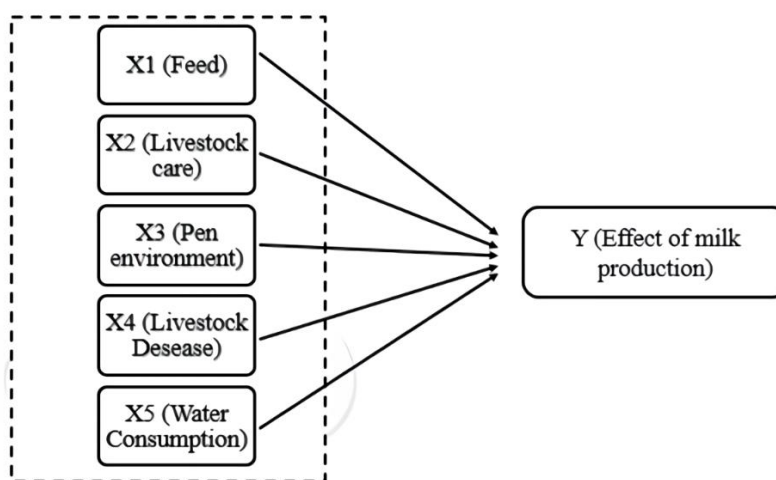

Figure 1. Research Hypothesis

Following the conceptual framework in taking the hypothesis that a research hypothesis can be raised as follows:

1) H_0 : Testing the Factors of Feed, Care, Environment, Disease, and Water Consumption Affect the Production of Goat's Milk (PE).
2) H_1 : Testing of Feed Factors Affecting Goat Milk Production (PE).
3) H_2 : Testing the Factors of Livestock Care Influence on the Production of Goat's Milk (PE).
4) H_3 : Testing of Pen Environmental Factors Affecting Goat Milk (PE) Production.
5) H_4 : Testing of Livestock Disease Factors Affecting Goat Milk Production (PE).
6) H_5 : Testing of Water Consumption Affects Goat's Milk (PE) Production.

2.2 Operational Definition

a) Feed: Feed ingredients provided by farmers (consisting of forage and concentrate feed) to goats (PE) and which affect milk production
b) Livestock Care: Appropriate handling of goats (PE) carried out by breeders and which affects milk production of dairy goats
c) Pen environment: Conditions around the pen affect the production of goats (PE), such as temperature, humidity, and cleanliness of the pen.
d) Livestock Diseases: Symptoms of livestock that make livestock conditions problematic
e) Water consumption: Method of providing drinking water and the amount of water consumed by livestock.
f) Quantity of goat's milk: The process of determining the quality of goat's milk (PE) on the effect of production.
g) Quality of production: The amount of goat's milk production (PE) was based on how the farmer provided feed.

3. RESULTS AND DISCUSSION

Respondents in this study were PE goat breeders who already had at least 10 PE goats and had been breeding for at least six months. The results of the Multiple Linear Regression Test of the factors that affect the production of PE goat milk in Banyuwanngi can refer to Table (2).

Based on the calculations in table 2, the multiple regression equations obtained for the factors that affect the production of PE goat milk in Banyuwangi are as follows:

$$Y = 2.361 + 0.191 X_1 + 0.041 X_2 + 0.095 X_3 + 0.248 X_4 + 0.119 X_5$$

Table 2 Results of Multiple Linear Regression Test Calculation of the factors that affect the production of PE goat milk in Banyuwangi

Variable	Multiple Linear Regression Coefficient Value
(Constant)	2.361
Feed (X_1)	0.191
Livestock Care (X_2)	0.041
Pen Environmental (X_3)	0.095
Livestock Disease (X_4)	0.248
Water Consumption (X_5)	0.119

The results of the regression analysis above show that the feed and water consumption factors have the most significant influence on goat milk production in Banyuwangi. The quality of feed and the availability of drinking water have a significant role in increasing PE goat's milk production and quality. The provision of drinking water is essential for milk production because 87% of milk consists of water and 50% of the cow's body consists of water [10]. In addition, environmental influences such as temperature and humidity can also affect the production and quality of PE goat's milk [7].

3.1 Determinant Test (R^2)

Table 3 Determination Test Results (R2)

No	Information	Value
1	R	0.747
2	R Square (R^2)	0.559
3	Adjusted R Square	0.494

The coefficient of determination test results shows that the table's R Square value is 0.559. The number R Square is also known as the coefficient of determination. The magnitude of the coefficient of determination of 0.559 equals 55.9%. This figure means that 55.9% of milk production is influenced by feed, livestock care, pen environment, livestock disease, and water consumption.

3.2 Overall Parameter Test (F Test)

Table 4 Simultaneous Significance F Test Analysis Results

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	163.764	5	32.753	8.610	0.000^b
Residual	129.336	34	3.804		
Total	293.100	39			

Hypothesis testing illustrates that feed, livestock care, pen environment, livestock disease, and water consumption simultaneously affect the milk production of PE goats. It can be seen from the front of 8.610 with a

significant probability of 0.000 < 0.050 so that the factors of feed, livestock care, pen environment, livestock disease, and water consumption significantly affect goat milk production (PE). The result of the count of 8.610> 2.74, the independent variables together influence the dependent variable. The theory by [9] shows that F test results show that if $F_{ount} > F_{-table}$, it can be said that the independent variables have a combined effect on the dependent variable.

3.3 Partial Regression Significance Test (t-Test)

A t-test was used to determine the effect of each independent variable (feed, livestock care, environment pen, livestock disease, and water consumption factors) partially on a dependent variable (Effect of milk production) [9]. This analysis is also helpful in finding out which independent variable is the most influential among other variables. The way to analyze it is seen from the t_{value}> t_{table} results, and a significance value < 0.05 is then said to be influential. The t-table value was obtained from the degree of freedom (df) = N-2, so it can be calculated that df = 40-2 = 38, which means the t_{table} value at n = 40 is 2.0017. The results of the t-test can be seen in Table 5.

Tabel 5 T-Test Results

Variable	t-Value	t-Table	Signifi-cance Value	Explanation
Feed	2.412		0.021	Significant
Livestock Care	4.477		0.000	Significant
Pen Environme-ntal	3.000	2,0017	0.005	Significant
Livestock Disease	6.677		0.000	Significant
Water Consumpti-on	3.294		0.002	Significant

The results of the t-test in table 5 show that the influence of feed factors, livestock care, pen environment, livestock disease, and water consumption has a significant effect on PE goat milk production in Banyuwangi.

4. CONCLUSION

Based on the results of research with data processing, the results of the analysis can be concluded as follows: The variables of the effect of production with indicators of feed, livestock care, pen environment, livestock disease, and water consumption have a significant effect on goat milk production. It is indicated by the t-test results on feed indicators 2,412, livestock care 4,477, pen environment 3,000, livestock disease 6,677, and water

consumption 3,294, which is stated to be greater than the value.

The t-table is 2.0017, the significance value for the feed indicators is 0.021, livestock care is 0.000, pen environment is 0.005, livestock disease is 0.000, and water consumption is 0.002, which means it is less than 0.05 and the hypothesis is accepted. The effect of feed, livestock care, pen environment, livestock disease, and water consumption has a significant effect with a value of 0.000, which is below 0.05 overall from indicators of feed, livestock care, pen environment, livestock disease, and water consumption influence the variables milk production by 55.9%.

AUTHORS' CONTRIBUTIONS

Asmaul Khusna designed the study and drafted the manuscript, Mujtahidah Anggriani Ummul Muzayyanah, Tri Anggraeni Kusumastuti, and Ahmad Romadhoni Surya Putra reviewed the manuscript. All the authors approved the final manuscript.

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