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PRODUCTION EFFICIENCY ANALYSIS OF DAIRY CATTLE BUSINESS IN CISARUA BOGOR DISTRICT

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ABSTRACT

This study aims to analyze the production efficiency of dairy cattle business in Cisarua Bogor District. The research focuses on identifying factors that affect production efficiency and provides recommendations for improving the efficiency of dairy cattle business. The study utilizes a quantitative research approach and collects data through a survey questionnaire administered to dairy cattle farmers in Cisarua Bogor District. The findings of this research contribute to the understanding of the factors influencing production efficiency in the dairy cattle industry. The results highlight the importance of precision feeding, genetic factors, and farmers' skills in promoting production efficiency. The implications of these findings for dairy cattle farmers and recommendations for future research are discussed.

KEYWORDS *production efficiency; dairy cattle business; precision feeding; genetic factors; farmers' skills*

INTRODUCTION

Subsector savings is one of the business fields that is growing in the national economy (Akhsan, 2023). The Gross Domestic Product (GDP) value of leaders in 2015 was at a constant price of IDR. 136.3 trillion or an increase of 3.1 percent compared to 2014 IDR. 132.2 trillion (Central Statistics Agency, 2016). This shows the signal of the increase in demand for the product or commodity farm in Indonesia during the period 2014 - 2015.

One of the commodities produced by pesimpanin in Indonesia that has potential as an extrivant is milk (Karuniawati & Fariyanti, 2013). Milk is a nutrient-rich animal food that is supplied by dairy farms. Dairy cows are the main milk producer. Indonesia has quite good potential for elimination of dairy cows (Nurtini & Anggriani, 2018). Based on the results of the 2014 Livestock Business

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Household Survey, the average milk production for dairy cows in Indonesia is 11.24 liters per cow per day with a lactation period of 257 days and a dry period of 57 days (Central Statistics Agency, 2016). The milk production of dairy cows is highly dependent on the factor of production. According to Sutardi (1981) the production factors that affect the milk production of dairy cows are the production capacity or genetic quality of dairy cows, feed, and ambient temperature. Fresh milk production in Indonesia is presented in Table 1.

Table 1. Production of Fresh Milk in Indonesia in 2012-2016 (Tons)

Year	Production
2012	959 732
2013	786 871
2014	800 751
2015	909 500
2016	974 700

Source: PKH Directorate General (2016)

Fresh milk production during the period 2012-2016 in Indonesia tended to be similar to stagnation. This production has not been able to produce national milk, which tends to increase every year. So that imports of milk from abroad continue to be produced in order to reduce the national milk demand. In 2015, imports of fresh milk from abroad were around 212 thousand tons (Central Statistics Agency, 2016). Susukupa, the national production of fresh milk, is a big challenge for dairy farmers for the need for a storage business. The performance of the dairy cow elimination business through the eruption of milk production needs to be continuously improved so that the business is more efficient and the production of livestock breeders increases. Table 2 presents the project need and preparation of cow's milk in Indonesia until 2020.

Table 2. Projections of the enthusiasm and enthusiasm of dairy cows in Indonesia during 2011-2020

Year	Description				
	Milk Demand per Capita per Year (kg/year)	National Need (000 tons)	Domestic Supply (000 tons)	Supply from Import (000 tons)	Imports (%)
2011	13 550	3 257	935	2 322	71.3
2012	14 070	3 433	1 023	2 410	70.2
2013	14 610	3 617	1 126	2 491	68.9
2014	15 170	3 812	1 245	2 567	67.3
2015	15 170	3 812	1 366	2 446	64.2
2016	15 750	4 077	1 529	2 548	62.5
2017	16 360	4 296	1 718	2 578	60.0
2018	16 980	4 528	1 941	2 587	57.1
2019	17 630	4 771	2 203	2 568	53.8
2020	18 310	5 028	2 514	2 514	50.0

Source: PKH Directorate General (2016)

Dairy cow lubrication business in Indonesia is concentrated on regional sempari. This can be reflected in the distribution of the population of dairy cows in Indonesia. West Java Province is the region with the third largest population of

dairy cows in Indonesia after East Java and Central Java, namely 116,400 in 2015 (Directorate General of Livestock and Animal Health, 2016). Regency of Bogor is the area with the largest population of cattle in West Java, which is 8,029 cattle in 2015. At the sub-district level, Cisarua is the area with the second largest population of cattle in Regency Bogor after Ciawi, which is 1,139 cattle in 2015 (Central Statistics Agency, 2016). This has made Bogor Khusany District, Cisarua Subdistrict, one of the centers for dairy cow elimination that needs to be sustainable.

The development of the dairy cow lubrication business in Indonesia at Gymmune is still constrained by many factors. One of them is the low productivity of business results, which implies low business efficiency (Anugrah & Purwantini, 2021). Several factors train this to happen, the small scale of business/ownership skills, the difficulty in obtaining production inputs such as forage and concentrate, and the low education level of breeders. These factors reduce the low production and quality of milk produced by farmers. The reduction in milk production for dairy cows is the total handling of production inputs such as forage, tofu dregs concentrate, tempeh dregs, and labor. Forage feed cannot be constructors in factories such as concentrate, tofu dregs, and tempeh dregs (Angkasa, 2017). Forage feed is grass that grows naturally or develops.

The business of lubricating dairy cows in Bogor Khussani District, Cisarua District, is also constrained by housing politics from the location area. The policy on spatial planning in Bogor Regency, where the Cisarua sub-district is a tourist area, is due to the marginalization of the existing dairy cow liquefaction business. Fostered land/breeding has many functions as a vesetta or tourist location. This makes it difficult for dairy farmers to obtain production inputs, forage forage, in fact. Based on the background description, research regarding the factors that affect the efficiency of production on the dairy cow limping business in Cisarua District, Bogor Regency is challenged.

Based on the background behind the research problem, the purpose of the research is:

1) Analyzing the factors that influence the milk production of dairy cows.
2) Analyzing the efficiency of dairy cows' milk production technically and economically.

RESEARCH METHOD

Location and Time of Research

This research is carried outin the business of lubricating dairy cows in the Cisarua District, Bogor Regency. The location of this research is done deliberately with the usual formulation of the problem behind the background and purpose of the research. The research was conducted from August 2017 to January 2018.

Types and Sources of Data

The types of data that are opened in this review are primary data and seconds data (Creswell, 2021). Primary data is obtained through direct interviews with breeders in Cisarua District, Bogor Regency by using questionnaires prepared by researchers. Seconds data is supporter data that comes from the Central Bureau of Statistics, Directorate General of Livestock and Animal Health, Bogor District Fisheries and Livestock Service.

Sampling Method

The sampling method for this sample is the stratified random sampling method, i.e. the sample is randomly assigned to strata of business/ownership scale. The respondent in this research is a dairy farmer in Cisarua District, Bogor Regency.

The sample framework in this research is a list of names of dairy farmers in Cisarua District who are familiar with administrative data from the Ciawi Fisheries and Ciawi Department of Technical Implementation Unit (UPTD) administrative data, Bogor Regency. Based on the data, the summation of dairy farmers in Cisarua District is 103 people. The sample framework is divided into three strata business scale, namely: small scale (1-4 cows), middle scale (5-9 cows) and large scale (≥ 10 cows).

The next stage is the determination of sample size using the Slovin formula to determine the minimum sample (n) if the population size (N) is known at the level of α significance, as follows: : $n = \frac{N}{1+N\alpha^2}$. After that, sampling was carried out on each stratum using the formula: $n_h = n \times \frac{N_h}{N}$, n_h is the number of samples in the nth strata, n is the overall sample size, n_h is the number of breeders in the nth strata, and N is the population of breeders. Based on the sampling method using this method, a total sample size of 82 breeders was obtained with the following details: 32 small-scale breeders (1-4 cows), 28 medium-scale breeders (5-9 cows), and 22 large-scale breeders (≥ 10 cows)

Data Analysis

The method of data processing that is used is a descriptive method and a quantitative method (Sugiyono, 2019). The descriptive method is used to describe the general storage of dairy cattle in Cisarua District, Bogor Regency through the agribusiness application in the onfarm subsystem and its relationship with other subsystems. Quantitative data is analyzed using the Cobb-Douglas production function pressure model to determine the factors that affect the efficiency of dairy cows' milk production, production efficiency and pendasa. Data processing is done using a computer with Microsoft Excel and SPSS software applications.

Model Formulation

Analyzing the factors that affect the production using the Cobb-Douglas production function which is transformed into the form of multiple regression stress. Factors that affect the production of milk in the dairy cow in the model below:

Ln PROD = Ln β0 + β1 Ln HIJ + β2 Ln KON+ β3 Ln AMP + β4 Ln OVK + β5 Ln TK+ ε ..... (2.1)

The estimated value of the parameter that is expected is:

β1, β2, β3, β4> 0;

0 < Eps < 1

Description:

PROD = Milk production (Liters/cow/day)
HI = Forage feed (Kg/cow/day)
SEX =Concentrate Feed (Kg/cow/Day)
AMP = Tofu dregs feed (Kg/cow/day)
OVK = Medicines and health problems (ml/cow/day)
kindergarten = Labor (People)
β1, β2, β3, β 4= Parameter independent variable

The milk production of dairy cows is the result of the secretion of the mammary glands of female dairy cows (Sapura et al., 2018). The amount of milk yield of dairy cows is viewed per cow and per day. In this study one adult cow is equal to one ST (Livestock Unit), so the unit of milk production is liters per cow per day. Feed given to dairy cows includes forage, tofu dregs, and concentrates. Forage fodder in the form of leaves, grass, and other green plants. Forage feed is given to dairy cows several kg per cow per day. Forage feeding for each dairy cow varies in number. Concentrate feed, and tofu pulp are additional feeds given to dairy cows in addition to forage feed. The amount given to dairy cows varies from cow to cow.

Analysis Efficiency Production

The efficient use of inputs is described by the value of marginal product (VMP) or marginal product value (NPM). NPM is a value that increases the output value of the addition of X units, when Y is sold at a constant market price (Debert, 1986). Production efficiency occurs if the profit is maximum. The condition of achieving maximum profit is the first derivative of the profit function against each factor equal to zero (Doll & Orazem, 1984). Efficiency occurs when the marginal product value is equal to the input price, so it can be written as follows:

$\pi = TR - TC$
$\pi = P_Y.Y - P_X.X$
$d\pi/dY = P_Y.\ dY/dX - P_X$
$P_X = P_Y\ .\ dY/dX$
$P_X = P_Y\ .\ MPP$
$P_X = NPM_X$
$NPM_X/P_X = 1$..... (2.2)

1. $(NPM_X/P_X) > 1$, it means that the handling of input X is not efficient, but for efficiency sensitivity, input X needs a compass.
2. $(NPM_X/P_X) < 1$, it means that the X input generator is not efficient, it is necessary to measure the efficiency of X input efficiency.

The production of elasticity is formulated as follows:
$Ep = dY/dX\ .\ X/Y$
$= MPP.\ 1/APP$
$Ep = MPP/APP$.....(2.3)

RESULT AND DISCUSSION

Overview of Research Locations

Geographically, Cisarua District is located in the south region of Bogor Regency at 06°42'S and 106°56'W. Administratively, Cisarua District consists of nine villages and one ward, 32 hamlets, 73 RWs and 260 RTs, with an area of 6,373.62 Ha. The boundaries of the working area of Cisarua District are north of Megamendung District, south sekaba is Cianjur Regency, western sekaba is Megamendung District and borders with Cianjur Regency for east sekaba. Based on the characteristics of the area, Cisarua Kasmut District is included in the Bogor – Puncak – Cianjur (Bopuncur) area which is passed by the upstream Ciliwung River Basin (DAS). Cisarua District is an area of Arbanan, Pakistan, tourism, and a buffer zone of protected forest.

The population in the Cisarua District numbered 119 318 people, from 62 384 men and 56 934 women. The total population of men by gender in Cisarua District in 2015 is presented in Table 3.

Table 3. Number of inmates by gender in Cisarua District in 2015

No.	Villages	Male	Female	Total
1.	Citeko	6528	5921	12449
2.	Cibeureum	7494	7078	14572
3.	Tugu Selatan	9782	8546	18328
4.	Tugu Utara	5772	5359	11131
5.	Batu Layang	5030	4531	9561
6.	Cisarua	4782	4183	8965
7.	Kopo	9521	8786	18307
8.	Leuwimalang	4525	4282	8811
9.	Jogjogan	3964	3652	7616
10.	Cilember	4986	4592	9578
	Total	62384	56934	119318

Characteristics of Dairy Parsnips

Gender of Dairy Cow Parsnips

The difficulty of the job is different. There are many jobs that use muscle strength, but there are also many jobs that use brain strength. Each job can be done by women and men according to the abilities of men and women. Gender of dairy farmer is served in Table 4.

Table 4. Number of dairy farmers based on gender in Cisarua District in 2017 (People)

No.	Gender	Total	Percentage (%)
1.	Male	66	80.5

2.	Female	16	19.5
	Total	82	100

Table 4. shows that dairy farmers in Cisarua who are male, namely semanta 80.5 percent and women 19.5 percent, because geboja as a farmer requires more manpower to drive the cage, find feed, bathe the catch, milk, and so on. Beef women breeders have abandoned their business because they are taking care of the Engendei business, which has already matured or has other avenues.

Livestock Experience

The length of time in which the storage business lasts is only a matter of raising livestock. Breeding experience is a benchmark for breeders' enthusiasm in their farming business (Puspito, 2004). The longest experience in raising dairy farmers in Cisarua is 37 years, but there are also breeders who have only been given security as breeders for two years. Experience of raising dairy farmers in Cisarua presented on Table 5.

Table 5. Experience of raising dairy farmers in Cisarua District in 2017

Breeding experience	Total	Percentage (%)
<10 years	15	18.29
10-19 years	14	17.07
20-30 years	31	37.80
>30 years	22	26.83
Total	82	100

Age of Dairy Cow Parsley

Indonesian residents are classified as workers when they are of middle age. The working age in Indonesia is 15-64 years. Because of this, people aged between 15 and over 64 are not considered productive at work. Age distribution of breeders in Cisarua District is presented in Table 6.

Table 6. Age of dairy farmers in Cisarua District in 2017

Age	**Total**	**Percentage (%)**
20-40 years old	20	24.39
41-60 years old	45	54.88
>60 years old	17	20.73
Total	82	100

Based on Table 6, it shows that dairy farmers in Cisarua are aged between 41-60 years, namely 54.88 percent. Parsley at that age thinks that the scenery is the main source in managing a pet. Parsnips aged 20-40 24.39 percent. Breeders aged 20-40 years in Cisarua are breeders whose business is passed down from their ancestors. The youngest dairy farmer in Cisarua is 38 years old, while the oldest is 71 years old.

Education Level of Dairy Farmers

Education has a role to play in productivity, because with education, breeders know the treats, gifts and new ways in the domain of their activities. The level of education can provide an indicator to measure the productivity and work creativity of a farmer (Hutapea et al., 2007). Education level of dairy farmers in Cisarua is presented in Table 7.

Table 7. Education level of dairy farmers in Cisarua District in 2017

Education level	Total	Percentage (%)
SD	49	59.76
JUNIOR HIGH SCHOOL	14	17.07
SMALL	11	13.41
PT	8	9.76
Total	82	100

The education level of dairy cows in Cisarua based on Table 7 is dominated by elementary school graduates at 59.76 percent. Farmers whose education level reaches college is 9.76 percent. The high level of education will affect livestock business decisions and the ability of farmers to absorb information and technology to develop their business, thus impacting productivity output and income.

Characteristics of Dairy Farming Business

Business Scale and Age of Dairy Cows

The number of adult dairy cows in Cisarua was greater than the young and calf, with 467, 168, and 152 respectively. This is very reasonable because the business of storing dairy cows is indeed dominated by mature, mature women who are in the process of lactation. Productive cows that are lactating are the main capital in the business of storing dairy cows. Large-scale dairy cattle lubrication business (≥ 10 cow) has the highest percentage (66.6 percent) in the population of dairy cattle compared to other business scales.

Table 8. Number of dairy cows with business scale and age in Cisarua District in 2017 (cows)

Business Scale	Mature	Young	Child	Total	Percentage (%)
Small (1-4 Cows)	41	20	15	76	9.6
Medium (5-9 Cows)	97	44	46	187	23.8
Large (≥ 10 Cows)	329	104	91	524	66.6
Total	467	168	152	787	100

Table 8 shows that the number of male livestock decreases with age. While the number of female livestock increases with age. This is in accordance with the characteristics of dairy farming businesses that produce milk from female livestock.

Table 9. Number of dairy cows based on sex and age in Cisarua District in 2017 (cows)

Gender	Mature	Young	Child	Total	Percentage (%)
Male	1	43	50	94	11.9
Female	466	125	102	693	88.1
Total	467	168	152	787	100

Land Area and Enclosure Area

Land is one of the main assets, because it is a place for storage activities. Taluk land area from the area of the stable and the area of the breeder's residence. The area of land that is used by breeders is diverse, this is a liability with limited initial capital to buy land. Cages are used to preserve and treat livestock. The area of the stable is determined by the large number of dairy cows involved. The more dairy cows, the wider the cage. The area of the barn can be increased by the number of dairy cows. Land area and area of dairy cow sheds in Cisarua are presented in Table 10 and Table 11.

Table 10. The area of dairy farming land in Cisarua District in 2017

Land Area (m2)	Total	Percentage (%)
100-400	59	71.95
401-1000	16	19.51
>1000	7	8.54
Total	82	100

Table 10 explains the dairy farmer in Cisarua. 71.95 percent of dairy farmers have a land area between 100-400 m2, 19.51 percent have a fresh land area of 401-1000 m2, and 8.54 percent have land larger than 1000 m2.

Table 11. The area of dairy farmers' pens in Cisarua District in 2017

Land Area (m2)	Total	Percentage (%)
20-100	62	75.61
101-300	12	14.63
>300	8	9.76
Total	82	100

Table 11 shows that 75.61 percent have a cage area of 20-100 m2, 14.63 percent have a 101-300 m2 interval, and 9.76 percent of farmers have a cage with an area of more than 301 m2.

Number of Lactation Cattle

The milk produced in a dairy farm is determined by the number of cows that are in lactation. The lactation period is the time when cows can still produce milk for milking. Cows that are in the dry period of the stall cannot be milked. The number of lactation dairy cows in Cisarua is presented in Table 12.

Table 12. Number of lactating dairy cows in Cisarua District in 2017

Number of Cows	Number of people	Percentage (%)
<10	70	85.37
10-20	9	10.98
>20	3	3.66
Total	82	100

Table 12 shows that the number of lactation dairy cows owned by 70 farmers in Cisarua is less than 10 cows. A total of nine people have lactation dairy cows at intervals of 10-20 cows, while farmers who have lactation dairy cows more than 20 cows there are three people. The number of lactation cows determines the amount of milk yield produced. The more lactation cows you have, the more milk you produce.

Type of Business

There are two types of business, namely main business and side business. Main business is a job that gives income to the person who does it. A side business is an occupant of sampling besides the main business. Types of business of dairy farmers in Cisarua presented on Table 13.

Table 13. Types of dairy farmers in Cisarua District in 2017

Type of business	Number of people	Percentage (%)
Primary business	77	93.90
Secondary business	5	6.10
Total	82	100

Based on Table 13, 93.90 percent of the farmers who run the pelican business as their main business. Five respondents were involved in a dairy cattle keeping business as a part-time business. Table 13 shows that the majority of income is that the main respondents are dairy farmers. Breeders who work as dairy cows as a part-time business have other masters as civil servants (PNS), private employees, and traders.

Use of Input

The inputs used in producing milk are lactation cows, feed, vitamins, and labor. The feed is in the form of forage, concentrate, and tofu dregs. The labor used comes from within the family and non-family. The average use of dairy farm production inputs in Cisarua is presented in Table 14.

Table 14. Dairy cow lubrication business inputs in Cisarua District in 2017

Inputs	Use rates	Price average (IDR/kg or * IDR/day)
Forage (kg/cows/day)	25.66	300
Concentrate feed (kg/ cows /day)	4.87	3000
Tofu dregs feed (kg/ cows /day)	3.79	19000
Medication and vitamins (ml/ cows /day)	5.8	4500
Labor (people)	2	62764.63*

Table 14 shows the proportion of input usage per cow per day of dairy farming in Cisarua. The amount of input used per day can determine the size of the amount of milk produced per day. Feeding is combined between forage feed, concentrates and tofu dregs. Drugs and vitamins are useful for maintaining the health of dairy cows.

Parsley looking for forage in the garden around the pesimparan. The laborers who are on duty look for belitsa mengat grass in the morning and return in the afternoon. While concentrate feed is purchased by breeders through the Giri Tani Village Unit Cooperative (KUD). Tofu dregs feed is bought by breeders from traders outside the cooperative.

The number of workers in each store is different, because the company has a low number of cows. The more money you have, the more energy you have. The duties of the workforce are cows, stables, milking, looking for feed and feeding. In one day, two times of milking are done, but each farmer has different milking times. Therefore, the number of working hours of workers from fixed breeders varies.

Business Productivity and Sales Output

The average productivity of dairy cows cultivated by breeders in Cisarua is 13.66 liters per cow per day. This result is greater than the productivity of the Farmer Household Survey conducted by BPS in 2014, namely 11.24 liters per cow per day. Most of the milk produced by dairy farmers in Cisarua is sold to KUD Giri Tani. However, there are breeders who do not sell milk directly to consumers. Parsley, which sells milk to consumers, usually has a large business scale and is capable of processing dairy products such as yogurt, kefir, and various flavored pasteurized milk.

Production Factors of Dairy Farming Business

Production Factors of Dairy Farming Business

Factor analysis of excylate milk production regarding factors affecting the production of dairy cattle lubricating business. Analysis of the sikkei production factors so that farmers can understand the factors that affect the productivity level of dairy cows. In the following, a summary of the results of the analysis of dairy cows' liminance production factors will be presented.

The factors that affect the production of milk for dairy cows are analyzed based on the Cobb-Douglas function that shows the mathematical relationship between the production of milk and the factors of production that is used. The production function of the dairy cow elimination business is stabilized by applying the independent variables estimated into a multiple linear regression equation. Data processing uses the OLS (Ordinary Least Square) method with the help of the STATA 14 program. The results of the estimation of the production function of the sistema dairy cow lubrication business are in Table 15.

Table 15. Estimation results of the production function of the dairy cattle storage business in Cisarua District in 2017

Variables	The coefficient	*P-values*
Constant	0.081	0.009*
Forage (kg/cow/day)	0.666	0.002*
Concentrate feed (kg/cow/day)	0.131	0.007*
Tofu dregs feed (kg/cow/day)	0.154	0.004*
Medication and vitamins (ml/cow/day)	0.174	0.005*

Labor (people)	0.252	0.005*

Note: (*) significant at 1%.

Based on Table 15, the milk production function of the dairy cow lubrication business is as follows:

Ln PROD = 0.081 + 0.666 Ln HIJ + 0.131 Ln KON + 0.154 Ln AMP + 0.174 Ln OVK + 0.252 Ln TK

Description:
PROD = Milk production (liters/cow/day)
HI = Forage feed (Kg/cow/Day)
SEX = Feed concentrate (Kg/cow/do you have)
AMP = Tofu dregs feed (Kg/cow/day)
OVK = Medicines and health problems (ml/cow/day)
kindergarten = Labor (People)

Forage

The results of the Cobb-Douglas production function analysis showed that the elasticity of the forage production factor was 0.666. This means that the adhansat of one unit of forage amount will increase the production of milk as 0.666 with other factors being fixed. Forage feed coefficient value as 0.666 production elasticity range (0 < EP < 1), the condition that forage feed is in the rational area (area II). This proves that forage feed with a certain amount of certen can produce maximum output. Based on the t-test at level α = 0.05 forage forage was significantly significant for the production of milk in dairy cows.

Concentrate feed

The results of the Cobb-Douglas production function analysis showed that the elasticity of the concentrate feed production factor was 0.131. This means that the output of one unit of concentrated feed will be equal to the milk production of 0.131 with other factors being constant. The feed coefficient value of concentrate feed as 0.131 yield elasticity of production (0 < EP < 1), indicating that concentrate feed is in the rational area (area II). This means that concentrated feed with a certain amount of feed can produce maximum output. Based on the t-test at level α = 0.05, non-velud concentrate feed was significantly equivalent to milk production in storage dairy cows.

Tofu Dregs Feed

The results of the Cobb-Douglas Sekke production function analysis show that the elasticity of the production factor for tofu dregs is 0.154. This means that the ratio of one unit amount of tofu dregs feed will reach production as 0.154 with other factors being constant (cateris paribus). The coefficient of tofu dregs feed 0.154 shows elasticity of production (0 < EP < 1), it is seen that giving tofu dregs feed in a particular quantity can produce optimal output. Based on the t-test at level α = 0.05, the feed for tofu dregs was significant for the production of milk.

Drugs and Health Maintenance

The results of the Cobb-Douglas production function analysis show that the elasticity of the production factors for medicines and health healing is 0.154. It means that each addition of one unit of medicine and health persuasion will increase production to 0.154 with other factors being exact (cateris paribus). The coefficient

of medicine and health care 0.154 shows the elasticity of the production (0 < EP < 1), it can be seen that giving medicine and health care in a certain amount can achieve optimal output. Based on the t-test at level α = 0.05, drug intake and veludus health persuasion are significantly equivalent to milk production.

Labor

The results of the analysis of the Cobb-Douglas production function reach the elasticity of 0.252, meaning that each addition of one unit of labor will result in milk production yields of 0.252 with other factors fixed. The coefficient of labor 0.252 shows the elasticity of production (0 < EP < 1), it can be seen that the use of labor is in the rational area (area II). This means that the maximum output can be achieved with the use of energy at the specific level. Based on the t-test at level α = 0.05, the handling of complementary labor is equivalent to milk production in dairy cows.

Analysis of Dairy Farm Business Efficiency

The level of input efficiency is also proportional to the magnitude of the exposure of the Marginal Product Value (NPM) to the input price (BKM). Efficiency can be interpreted as the effort to handle the smallest possible input to provide maximum output or in other words the NPM of an X input is the same as the price of the X input itself (NPM = BKM), but in terms of NPMx/BKM it is not always equal to one, which means if it is larger than 1 or smaller than 1. If it is larger than 1, the use of factor X may not be efficient, whereas if it is smaller than 1, it may not be efficient (Dillon et al., 2011).

Data in Table 16 shows that the average production of milk is 13.66 liters per cow per day and the price of milk is IDR 4738 per liter. The control of production factors in the business of lubricating dairy cattle has not been sensitive to optimal conditions. The ratio of NPM and BKM is not equal to one. Forage feed and tofu dregs have an NPM-BKM ratio of more than one, while concentrate feed, tempe dregs, and labor have a ratio value of less than one.

Table 16. Production efficiency of the dairy pelican business in Cisarua District in 2017

Factor Production	Average Input	The coefficient	NPM	BKM	NPM/BKM
Forage	25.66	0.666	1680.07	300	5,600
Concentrate feed	4.87	0.131	1740.96	3000	0.580
Feed dregs tofu	3.79	0.154	2629.83	19000	0.138
Medicines and vitamins	5.8	0.174	1941.32	4500	0.431
Labor	2	0.252	8154.86	62764.63	0.130
Milk production (liters/cow/day)					13.66
Price of milk (IDR/liter)					4738

The NPM-BKM ratio of forage is 5,600, meaning that the number of forage feeders needs to be copasa to produce enough. NPM of forage as 1680.07. This

means that each addition to one kg of forage will be the main cost of the breeder IDR. 1680.07 with a cost of IDR. 300.

The NPM-BKM ratio of concentrate feed is 0.580, meaning the amount of concentrate feed submission needs to be pointed out so that it is efficient. NPM feed concentrate as 1740.96. This means that one kg of concentrated feed will cost the breeder IDR. 1740.96 with a sabasang fee of IDR. 3000.

The NPM-BKM ratio of tofu dregs feed is 0.138, meaning the number of tofu dregs feed carriers needs to rest so that it gains efficiency. NPM of tofu dregs feed as 2629.83. It means that one kg of tofu dregs feed will cost farmers as IDR. 2629.83 with a shared cost of IDR. 19000.

The NPM-BKM ratio of drugs and vitamins is 0.138, meaning that the number of preparations for drugs and vitamins needs to be reduced to achieve efficiency. NPM of tofu dregs feed is 1941.32. Means that each addition of one kg of drugs and vitamins will be paid by the farmers as IDR 1941.32 with the cost of abesang as IDR 4500.

Marginal Product Value for labor handling as 8154.86. Means that the teipang exabsana one worker will only receive a farmer's bond bond as IDR 8154.86 with a cost as IDR 62764.63. The NPM-BKM ratio for manpower handling is 0.130, meaning that for an executive branch it is necessary to have a total workforce.

CONCLUSION

The production factors that had a significant impact on the dairy cattle business in Cisarua District at a significant level of $\alpha = 0.05$ were forage feed, concentrated feed, tofu waste, medicine and health aids, and labor. The use of forage feed, concentrate feed, tofu waste, medicine and health care, as well as labor in the dairy cattle business in Cisarua District is not yet efficient. Parsnips are the main product of forage feed for dairy cows, because based on the analysis of the input production factors it significantly influences milk production. Parsley is recommended to reduce the use of concentrate feed, tofu dregs feed, medicine and vitamins, as well as the amount of labor, for an effective factory allocating inputs in the context of optimum production.

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