Trends Dairy Population and Milk Production in Boyolali, Central Java, Indonesia

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ABSTRACT: This study is one part of the business development strategy research of dairy cattle in Boyolali, Central Java. This study aimed to analyze the trend of the population of dairy cattle and milk production in Boyolali, Central Java. This study was conducted between November 2010 until January 2011 in the district of Boyolali by using the survey method. Total respondents were used in this study were 266 farmers. Primary data was collected by interviews based on a questionnaire that has been prepared. Secondary data were obtained from the Central Bureau of Statistics, Department of Animal Husbandry and Fisheries, and local governments Boyolali. The average of dairy lactation ownership is 6.40 AU. The average production of cow's milk in Boyolali is still low at 8 liters/head/day. Trend dairy cow population is $Y=4{,}7182e^{0{,}0063x}$, production trend equation is $Y=5.8567 e^{0{,}0052x}$. Both equations are used to estimate the size of the population of dairy cattle and milk production in the coming years. Trend population of dairy cows, milk production is increasing every year.

Keywords: population of dairy cows, milk production, trend

INTRODUCTION

Indonesia´s government had policies for development of dairy cattle such as; an increase in population of dairy cows, technical service support for marriage by artificial insemination (AI), training of field staff, aid credit package of dairy cattle distributed to farmers through cooperatives, marketing collateral fresh milk from the farmer to the milk processing industry (Directorate general of livestock, 2014). Dairy population is still dominant in Java reached more than 99% of the total population of dairy in Indonesia, in Sumatra just reached only 0.4% of the population of Indonesia, as well as a few others scattered on the island of Sulawesi, Kalimantan, Bali and Nusa Tenggara (Ministry of agriculture–Central bureau of statistic, 2011). Dairy population is the largest in East Java and Central Java next West (Central bureau of statistic, 2012).

Dairy products from year to year is increasing, in line with the increasing number of population, level of education, and public awareness of the role of nutrients, especially protein for life. Farm products, especially milk have good prospects. It supports dairy farm allow continues to grow. Dairy cattle is one of the livestock sub-sector commodities. With the commodity dairy cattle in the livestock sector it is expected that the fulfillment of animal protein in Indonesian society. The average milk production in Indonesia increased by 7.92% annually (Directorate General of Fisheries and Animal Health, 1996)

Milk consumption of Indonesian society over the years continued to increase. Increased milk consumption in Indonesia is not followed by an increase in milk production. The increase in milk production which is 7.92% less than the rate of increase in milk consumption is 13.73% (Directorate general of livestock, 1996). This is a problem in the fulfillment of the milk, if not offset by increased consumption of milk increased production of milk in the country, the government

needs to continue to grow so that it can affect the amount of imported milk continues. This will have an impact on domestic milk prices and will slow down the business competitiveness of dairy cattle Indonesia. According Wisnugroho *et al* (2005) that the consumption of cow's milk increases with the increasing public awareness of the importance of consuming fresh milk. However this is not backed up by efforts to achieve domestic milk production to meet the growing demand for milk. Demand higher milk into a market potential that need attention.

Free trade in Indonesia resulted in fresh dairy products in Indonesia will compete with imported dairy products. Repair various supporting factors in dairy farming should continue to be pursued, such as: productivity, maintenance management, handling of fresh milk (Anggraeni, 2006). Milk production is still low, it is a problem that must be solved. Milk production is influenced by two factors: genetic and environmental factors (Anggraeni, 2000). Environmental factors that influence milk production is feed, ambient temperature, parasites and diseases and livestock management and milk from the milking until ready for sale. On the other hand dairy farming activities have the potential strength, in terms of aspects ranchers and natural carrying capacity that began in colonial times until now still survive. This requires attention to the potential for development in order to increase the productivity of dairy so as can fullfil the needs of domestic milk and increase the income for farmers.

Dairy farm in Boyolali district, which is one potential area for development of dairy cattle business, although still traditional farms. Boyolali district is one potential area, as the area is support for the development of dairy cattle. Dairy cattle production activities has long been taking place, that since 1900, where Boyolali district is one of the places that already have a cow breeding pure FH, which then happened interbred with local cows that produce offspring called *Peranakan* Holstein Friesian (PFH) . Dairy cattle still survive in Boyolali although traditional farms, so we need to analyzed population of dairy cattle and milk production in Boyolali .

Trend analysis is an analytical method that is intended to estimate or forecast in the future. Good forecasting require various kinds of information are quite a lot and observed over a period of time that is relatively long, so that the results of the analysis can be known until how big fluctuations occur and what are the factors that influence these changes (Rusli, 2014). Trend is used to estimate future conditions based on data in the past. The exponential trend is a trend that the value of the independent variable rise is not linear, when expressed in the form of a mathematical equation as a linear equation, y' = ab^x(Rusli, 2014).

MATERIAL AND METHOD

Material

The research material that is 266 dairy farmers in Boyolali and recording from the Central Bureau of Statistics, Department of animal husbandry and fisheries, and the Local Government in Boyolali. Secondary data is data obtained by the relevant agencies, including the population of dairy cows, milk production, and population.

Method

The method used is survey method. Methods of analysis using exponential trend analysis of the data population of dairy cows and milk production in Boyolali district, central Java. Y' = abx
log y' = log a + x log b, where:
Y'   = future of dairy milk production
a   = constants
b   = the average increase in production per year

RESULT AND DISCUSSION

Milk Production

The average milk production in Boyolali is still low at 8 liter/head/day. Frieshien Holstein dairy production is the highest compared with the nations of other dairy cow, the milk fat content is lower (Sudono, 1999). To optimize the production of milk in Boyolali, farmers should be able to combine and manage the factors of production in order to obtain high milk production both physiological factors and environmental factors

If the dairy cattle business is managed more optimally it is expected that the production of cow's milk in Boyolali can be increased. Dairy's milk from farmers usually taken to the calf and its own consumption, and then deposited into cooperatives respectively, both Mojosongo cooperative, Musuk cooperative, and Cepogo cooperative.

Trends Dairy Population and Milk Production in Boyolali

Trend is a tendency to move up or down in the long term derived from the average change over time and the value is quite flat (smooth). This movement could indicate an increasing trend (positive result) and the tendency of decrease (negative result). The development of the population of dairy cows, milk production, and the number of people in Boyolali increase in the number of population. It can be a reference that the dairy farm business in Boyolali progress although not huge every year, but this increase can be measured by the development of the milk production. The highest increase in population of dairy cows occurred between years 2010-2011 in the amount of 7.1%. One factor that supports the increase in dairy population that is the institution that helps dairy cattle business well so that the dairy population in Boyolali not decreased .

The production of dairy's milk in Boyolali has increased and decreased. The increase in milk production was highest between the years 2010 - 2011 in the amount of 7.6%. Reduction in milk production also occurred between the years 2004 - 2005 is 1.1 %. This decrease is thought to result from a decline in dairy population in Boyolali district, but it is also less farmers to maximize the use of technology that has been introduced through counseling .

Based on population data and the production of 2004 - 2013 can be analyzed using a regression trend analysis method trend exponential equation dairy population is $Y=4,7182e^{0,0063x}$, milk production trend equation $Y=5.8567e^{0,0052x}$, and population trends in Boyolali is $Y=5,9661e^{0,0008x}$. Both equations are used to estimate the size of the dairy population and milk production in the coming years. Results of the data dairy population, milk production, and population using trend analysis. Trend graphs dairy population and milk production can be seen in Figure 1.
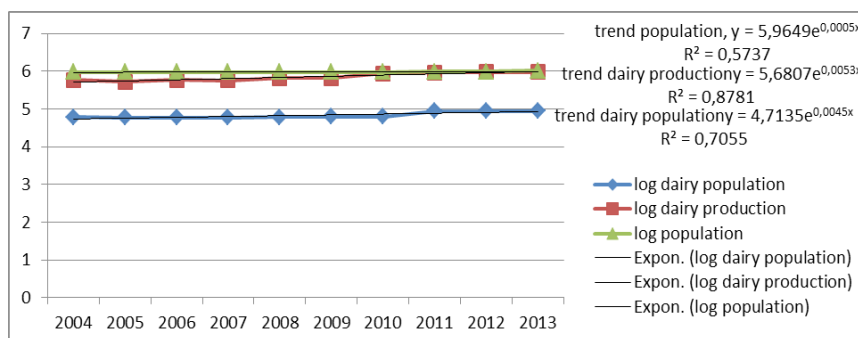

Figure 1. Graph the trend dairy population and milk production in Boyolali

Figure 1 shows that the trend of the dairy population, milk production and the number of people in Boyolali tends to increase every year. Increased production of milk in Boyolali is a positive aspect for the area, because of the expected production of milk produced in the area can meet the needs of milk processing industry and consumption of population in Boyolali. Fresh milk from farmers who paid into cooperative later deposited into milk processing industry such as Sari Husada, Susu Bendera, and the Cita Nasional. Milk production is increasing every year into a great opportunity to be deposited to milk processing industry about Boyolali. Boyolali district itself has few industries that have the potential to accommodate fresh milk .

Table 1. Estimated dairy population, milk production, and population in Boyolali

Year	Dairy Population (head)	Milk Production (liter)	Boyolali Population (people)
2014	90612,23	46908700	1035812
2015	90613,31	46908701	1035813
2016	90614,39	46908703	1035814
2017	90615,48	46908704	1035815
2018	90616,56	46908705	1035817
2019	90617,64	46908706	1035818
2020	90618,73	46908707	1035819
2021	90619,81	46908708	1035820
2022	90620,89	46908709	1035821
2023	90621,98	46908710	1035822

In Table 1, we can see the large population of dairy cattle and milk production over the next ten years. In this study, the data used to make estimates of future years are archived in the Central Bureau of Statistics, Department of Animal Husbandry and Fisheries, as well as the Local Government Boyolali from 2014 until 2023. Increased production of milk in Boyolali expected to meet the needs of milk processing industry and consumption of residents in Boyolali. Fresh milk from farmers who paid into cooperative later deposited into milk processing industry such as SGM, Milk Flag, and the National Cita. Milk production is increasing every year into a great opportunity to be deposited to milk processing industry about Boyolali. Boyolali district itself has few industries that have the potential to accommodate fresh milk.

Population of dairy cows, milk production, and population in Boyolali increasing from year to year. Milk production in 2004 to 2008 have not been able to meet the needs of the population in the district Boyolali milk. In 2009 began the production of milk can meet the needs of the population of fresh milk in Boyolali, it happens also in subsequent years. Consumption of fresh milk in Boyolali in 2009 supported by the increase in population of dairy cows by 0.46% which is accompanied with the increase in milk production by 2.17% and 0.22% increase in the total population.

In 2010 there was an increase dairy productivity because milk production increase 24% where the increase in dairy population is only 0.72%. The increase in population and fresh milk production occurred before the eruption of Mount Merapi affected, but after the eruption of Mount Merapi is precisely that increased dairy cow population is equal to 28.83% through a dairy cow aid program of the government.

CONCLUSSION

Trend dairy population, milk production and population in Boyolali tends to increase every year. Increased production of milk in Boyolali is a positive aspect for the area, because of the expected production of milk produced in the area can meet the needs of Milk processing industry and consumption of population in Boyolali. Milk production is increasing every year into a great opportunity for both Milk processing industry deposited into and out around Boyolali. Boyolali expected to produce their own dairy cooperative and facilitated by local government.

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