The 6th ISTAP International Seminar on Tropical Animal Production

“Integrated Approach in Developing Sustainable Tropical Animal Production”

PROCEEDINGS

October 20-22, 2015
Yogyakarta Indonesia

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PREFACE

On behalf of Faculty of Animal Science, Universitas Gadjah Mada, I am pleased to present you the 6th International Seminar on Tropical Animal Production (ISTAP) which is held on October 20 – 22, 2015 at Auditorium drh. Soepardjo, Faculty of Animal Science UGM, Yogyakarta. Under the main theme “Integrated Approach in Developing Sustainable Tropical Animal Production”, we expect that information and ideas on animal production systems in the tropics and its related problems will be shared among participants, thus we can elaborate an integrated approach in developing sustainable tropical animal production. I believe, this can be achieved since more than 250 animal scientists, researchers, students, and producers from more than 15 countries join this seminar.

In this moment, I have to address my great thanks to all people who have contributed for the success of this seminar. First, to all participants, thank you for your contributions, time, and efforts in participating in all sessions in this seminar. We also would like to extend our gratitude to the reviewers and editors for dedicate their expertise and precious time in reviewing and editing the papers. I deeply appreciate the hard work of all members of the Steering Committee, Organizing Committee, and students of Faculty of Animal Science UGM for making this seminar achieved a great success!

I hope all of you enjoy the seminar and Jogja as well!

Dr. Cuk Tri Noviandi

Editor in Chief
REPORT FROM ORGANIZING COMMITTEE

Dear all of the scientists, delegates, participants, ladies and gentlemen,

Praise be to The Almighty for His Merciful and Beneficent to raise up this memorable moment for all of the scientists and delegates from all over the world who were interested in Animal Science field to meet up together.

On behalf of all the members of Board Committee, it is my great pleasure and honor to welcome all of you and impress thankful, and present a high appreciation for your participation in joining the 6th ISTAP in Yogyakarta, one of the Special Region in Indonesia where culture and tradition live in harmony with the modern nuance and educational spirit makes it a beautiful venue of this seminar.

During this event, we have distinguished scientists from all over the world to present plenary papers Livestock Management, Production, and Environment; Feed, Land, and Landscape for Sustainable Animal Production; Livestock Industry and Technology; Economics, Social, and Culture in Livestock Development; and Special issue on Halal Food, Safety and Regulation. It is noted that around 200 scientists as well as livestock producers, companies, graduate and postgraduate students from 15 countries attend the seminar; and more than 160 research papers will be presented. We can see great enthusiasm of all the scientists to solve livestock problems as well as to share valuable information and knowledge for human prosperity all over the world.

The 6th ISTAP Program consists of scientific and technical programs as well as social and cultural activities. The scientific and technical programs offer 4 plenary sessions, field trip, and many scientific sessions (both oral and poster presentation). The social and cultural programs of the 6th ISTAP are very important as the scientific and technical programs since the promotion of friendship and future scientific cooperation are also central to this seminar. Opening Ceremony offers you the Seminar Program a glance. Participants will attend a warm invitation from Dean Faculty of Animal Science UGM in a Welcome Dinner that will give you the most memorable moment to attend. Field trip activity offers a wonderful sightseeing to the most spectacular natural landmark in Yogyakarta, Merapi Lava Tour and Ulen Sentalu Museum. We do hope that you will not miss any of these wonderful opportunities.

Closing Ceremony will be held on October 22nd, 2015, immediately after the last session of presentation. The 6th ISTAP award will be announced for some participant as an appreciation for their valuable research.

Finally, on behalf of 6th ISTAP Committee, I wish all of the participants having a great achievement of success and fulfill the expectation as well as enjoying the interaction with all scientists participating in the seminar.

High appreciation I may acknowledge to the Rector of Universitas Gadjah Mada and Dean Faculty of Animal Science UGM, who have concerned to facilitate the seminar site host.

Special thank to the Steering Committee, Scientific Committee, Reviewers and Editorial Boards for their great contribution to make the seminar successfully organized.

Terima kasih (Thank you).

Sincerely Yours,

Prof. I Gede Suparta Budisatria, Ph.D
Chairman
The Organizing Committee of the 6th ISTAP
Selamat pagi (Good morning)

Dear Rector of Universitas Gadjah Mada, all of Invited Speakers, honorable guests, all of delegates, participants, distinguished guests, Ladies and Gentlemen

Attendants of The 6th ISTAP,

It is my great pleasure and honor to extend a warm welcome to all of you at The 6th International Seminar on Tropical Animal Production, which be held on October 20 – 22, 2015 at Auditorium drh. Soepardjo, Universitas Gadjah Mada, Yogyakarta Indonesia. This seminar is proudly organized by Faculty of Animal Science Universitas Gadjah Mada.

The contribution of this seminar to the development of national food security is truly significant for introducing of new scientific knowledge and equipments that is much needed in Indonesia to maintain a safe and secure environment and to look at more effective ways to meet future challenges. We can see great enthusiasm of the entire participant to present their latest research as well as to share valuable information and knowledge for human prosperity all over the world.

In these 3 days of seminar, we have invited some Plenary Speakers and Invited Papers who are qualified as scientists and bureaucrats in animal science field to share their valuable information and knowledge. Other participants can deliver their precious research through oral and poster presentations.

Finally, on behalf of Faculty of Animal Science, we would like to extend our sincere gratitude to the Minister of Rural, Rural Development, and Transmigration, Republic of Indonesia, Mr. Marwan Jafar, for his generosity to be with us here to give Keynote Speech. Then, it is our great honor and pleasure to have qualified scientists and bureaucrats as Plenary Speakers and Invited Papers to share their valuable knowledge during the plenary and concurrent sessions. Moreover, special thank you is for the Steering Committee, Scientific Committee, Reviewers and Editorial Boards for their great contribution to make the seminar a great success. Also, we would like to congratulate and deliver high appreciation to the Organizing Committee as the organizer for their great contribution and generous efforts to make the seminar successfully organized.

And to all of the participants, I hope that this seminar will always success and bring some acknowledgement for all of us. Also, I wish all of the participants having a great achievement of success and fulfill the expectation as well as enjoying the interaction with all participants.

With all of our hospitality, we will try our best to make your brief visit to our country become a wonderful and memorable moments.

We are looking forward to meeting you all in the future event.

Wish you all a very pleasant and most enjoyable stay in Yogyakarta, Indonesia, beside you scientific journeys.

Terima kasih (Thank you).

Sincerely Yours,

Prof. Dr. Ali Agus
Dean Faculty of Animal Science UGM
OPENING REMARKS

Dear all of Scientists, distinguished guests, delegates, participants, Ladies and Gentlemen,

On behalf of Universitas Gadjah Mada, I am happy to welcome you and present a high appreciation for your participation in joining the 6th International Seminar on Tropical Animal Production hosted by the Faculty of Animal Science UGM in Yogyakarta from 20 – 22 October 2015.

Under the theme of “Integrated Approaches in Developing Sustainable Tropical Animal Production”, we do hope that this seminar concludes with shared ideas and best practices, technology, and global networks that are required to increase animal production. The increase of animal production as one source of food is crucial to feed the world given that the population is expected to increase from 6 billion to about 8.3 billion in 2030. According to FAO (2008, 2009), the consumption of animal food increased from 10 kg/per annum in 1960, 26 kg/per annum in 200, and it is expected to be 37 kg/per annum. Animal production is an integral part of food production and contributing for the quality of human food supply. Animal and agricultural production is an important component in the integrated farming systems in developing countries as this produces high quality foods, provides job opportunities in rural areas, as well as enriching livelihood.

As a tropical country with high animal biodiversity, Indonesia and other tropical countries, have a variety number of indigenous and local animal genetic resources and germ plasm. This variety of animal germ plasm could be explored and developed not only for animal and food production but also for animal conservation. Apart from being exploited as food resources, it is therefore important to consider animal conservation. Conservation will protect the genetic potency of local bred and their family, and the domesticated animal bred, and this would secure our future food resources.

In these 3 days of seminar, we believe those aforementioned issues will be discussed, and technical solution as well as recommendation will be provided to solve the existing problems in tropical animal production.

Finally, on behalf of Universitas Gadjah Mada, we would like to congratulate and thanks to the Faculty of Animal Science UGM as the organizer for their great efforts to make the seminar successfully organized. To all of participants, I wish all of you have a great discussion and interaction with other scientists participating in the seminar as well as enjoying your time in Yogyakarta.

Thank you

Prof. Ir. Dwikorita Karnawati, M.Sc., Ph.D.
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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:
\[
Y' = \text{future of dairy milk production}
\]
\[
a = \text{constants}
\]
\[
b = \text{the average increase in production per year}
\]
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.

![Graph showing trend in dairy population and milk production in Boyolali](image)

**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

<table>
<thead>
<tr>
<th>Year</th>
<th>Dairy Population (head)</th>
<th>Milk Production (liter)</th>
<th>Boyolali Population (people)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>90612.23</td>
<td>46908700</td>
<td>1035812</td>
</tr>
<tr>
<td>2015</td>
<td>90613.31</td>
<td>46908701</td>
<td>1035813</td>
</tr>
<tr>
<td>2016</td>
<td>90614.39</td>
<td>46908703</td>
<td>1035814</td>
</tr>
<tr>
<td>2017</td>
<td>90615.48</td>
<td>46908704</td>
<td>1035815</td>
</tr>
<tr>
<td>2018</td>
<td>90616.56</td>
<td>46908705</td>
<td>1035817</td>
</tr>
<tr>
<td>2019</td>
<td>90617.64</td>
<td>46908706</td>
<td>1035818</td>
</tr>
<tr>
<td>2020</td>
<td>90618.73</td>
<td>46908707</td>
<td>1035819</td>
</tr>
<tr>
<td>2021</td>
<td>90619.81</td>
<td>46908708</td>
<td>1035820</td>
</tr>
<tr>
<td>2022</td>
<td>90620.89</td>
<td>46908709</td>
<td>1035821</td>
</tr>
<tr>
<td>2023</td>
<td>90621.98</td>
<td>46908710</td>
<td>1035822</td>
</tr>
</tbody>
</table>

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.
CONCLUSION

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.

REFERENCES


Ministry of agriculture-Central bureau of statistic. 2011. Begining Result PSPK. Jakarta