

# Dairy Cows Productivity and Socio-Economic Profile of Dairy Smallholder's Communities in Yogyakarta, Indonesia

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## Abstract

The objective of this field questionnaire survey was to describe the dairy cow productivity and socio-economic profile of dairy cattle farmers in Daerah Istimewa Yogyakarta smallholder farming communities which have been targeted dairy development policy. The study was conducted on 190 Friesian Holstein (FH) cows maintained under smallholder's management system in Daerah Istimewa Yogyakarta, Indonesia. A total of 83 farmers were randomly selected and interviewed with structured questionnaire to assess the socio-economic dairy farmer and productivity performance of dairy cows. The number of dairy productivity performance within the normal. Shortages as well as high cost of feed, occurrence of disease, scarce information about feeding and high medicament cost were the main constraints which might have contributed considerably to delayed age at first service, late age at first calving, long calving interval, short lactation length and low milk production. Therefore, strategies designed to solve the existing problem should be important by involving all stakeholders in the formulation and implementation of improvement strategies or dairy development policy was being implemented and necessary respect to environmental factors affecting agricultural activities such as a constraint on land use and access to water resources.

## 1. Introduction

The Indonesia government has developed a policy aimed at the expansion of dairy production (dairy cattle, dairy goat and dairy buffalo) in order to satisfy the demand for dairy products and fresh milk in urban areas such as major cities and industrial areas in Indonesia, and alleviate poverty amongst dairy smallholder's communities. As a result, the number of dairy cattle has increased in recent years, example in 2015 the dairy population increased by 3.2% (0.52 million heads) [1], but the likelihood of further increases would depend on whether it can be demonstrated that farming smallholder's do benefit economically from this development.

Daerah Istimewa Yogyakarta, one of the provinces in Indonesia that is used to development dairy cow population. The population of dairy cattle in DIY is the fourth largest after the provinces of Central Java, West Java and East Java with DIY population in 2016 is 4,066 head [1]. Dairy farmers in DIY are mostly categorized as dairy farmer group and independent. The condition of the farm is in the highlands and low, most of which are incorporated in the dairy cooperative. The carrying capacity of the government is also enough to change and assist the farmers in managing their livestock,



unfavorable environmental conditions, unstable livestock productivity and socio-economic conditions of unequal breeders, became a separate object for research.

The objective of the current study was to profile smallholder farming communities in which on the Daerah Istimewa Yogyakarta Province (DIY) dairy development policy was being implemented, and know the condition of dairy cattle productivity that exist in farmer. Particular emphasis was placed on condition of dairy cattle productivity and socio-economic characteristics dairy farmer.

## **2. Materials and Methods**

### *1. Respondent and location of study area*

A total of 83 farmers were interviewed randomly with scheduled questionnaire which was mainly based on the socio-economic dairy farmer and productivity performance of dairy cows. A total of 190 Friesian Holstein (FH) cows were included in this study were maintained under smallholder's management system, located in Sleman Regency, Bantul Regency and Yogyakarta City, Daerah Istimewa Yogyakarta, Indonesia.

### *2. Questionnaire and interviews*

The questionnaire was developed in accordance with the objectives of the study and designed in a simple manner to get accurate information from the dairy owners. Each respondent was given a brief description about the nature and purpose of the study and the responses were recorded directly on the survey schedule. Major sections of this questionnaire study were on characteristics respondent and characteristics of the dairy cattle population, basic management practices, knowledge and family support received in dairy farming production. Data on reproductive performance such as calving intervals, abortions and calf survival were obtained from farmers through careful questioning about past reproductive history and occurrence of calf losses

#### *2.1. Data analysis*

All collected data were entered into Microsoft Excel 2013 and descriptive statistics such as mean, frequency and percentage were used to analyze the data using SPSS software for statistical analysis (version 16.0).

## **3. Results and Discussion**

### *3.1. Socio-economic characteristic of respondent*

The general characteristics associated with household respondents were distributed by sex, age, marital status, experience in dairy keeping and educational status was presented in Table 1. From the total interviewed respondents (N = 83), the majority of the (69.90%) respondents were male while the remaining (30.10%) were female. The majority age of the respondents in the study area ranges between 36–55 years (60.53%). This result showed that people in the most productive age are actively engaged in dairy activities. Of the total households interviewed, 98.79% are married. Concerning to level of education, the highest percentage (34.72%) of the respondents had diploma Elementary school, 30.56% had diploma Junior high school, 25% had diploma Senior high school, 4.17% had diploma university/college and above 5.56% of those respondents had not attended any formal or informal education. A 42.47% of the respondents had 11–20 years experiences in dairy keeping.

**Table 1.** Socio-economic characteristics of respondent

Parameters	$\Sigma$ Person	Percentage (%)
Age (years)		
≤ 15	0	0
16 – 25	2	2.63
26 – 35	6	7.89
36 – 45	19	25.00
46 – 55	27	35.53
56 – 65	13	17.11
≥ 65	9	11.84
Formal education		
No schooling	4	5.56
Elementary school	25	34.72
Junior high school	22	30.56
Senior high school	18	25.00
College/University	3	4.17
Experience raising dairy cattle (year)		
≤ 10	26	35.62
11 – 20	31	42.47
≥ 21	16	21.92
Average	15.92±10.14	
Farming purpose / priority in order		
Priority 1	Milk production	
Priority 2	Save	
Priority 3	Children's education	
Priority 4	Companion animal	
Priority 5	Fertilizer	
Number of family member (person)		
≤ 2	18	24.32
3 – 4	40	54.05
5 – 6	14	18.92
≥ 7	2	2.70
Average	3.57±1.28	
AI = Artificial insemination		

The purpose of raising dairy cattle by farmers (Table 1) prioritized on milk production (priority 1), savings (priority 2) and cost of children education (priority 3). The purpose other than maintenance is for companion animals or for pleasure (hobby) priority 4, as well as manure as fertilizer priority 5.

### 3.2. Description of study population or data ownership of cattle

On average, the household heads were 46 years old (range 15–65 years old) and had to look after five household members (range 3–4 people), including themselves. Not all of the households owned pasture land and most of the forage fed to dairy cattle came from pasture land is irrigated, native pasture cut along roadsides and river banks. Average cattle ownership in DIY is  $4.03 \pm 1.97$  head equal to  $2.83 \pm 1.32$  AU (animal unit). Conditions of livestock ownership is low partly caused by lack of capital and difficulty finding forage due to limited land for fodder crops to supply the quantity and quality of feed is also limited, which is also influenced by the availability of water in the dry season. This situation led to dairy farming has not been efficient [2]. The percent ownership of dairy cattle was presented in Table 2.

**Table 2.** Data ownership of dairy cattle

Animal Status	$\Sigma$ Animal Head per Respondent
Cows	
lactation	$1.72 \pm 0.83$
non-lactation (dry)	$1.32 \pm 0.48$
Heifer	$1.49 \pm 0.74$
Bull	$1.20 \pm 0.63$
Calf	$1.52 \pm 0.69$
Average cattle ownership	$4.03 \pm 1.97$
Average cattle ownership (AU)	$2.83 \pm 1.32$
AU = Animal unit.	

### 3.3. Productivity performance of dairy cows

The mean milk yield in the present study was found to be  $11.77 \pm 3.47$  L per cow days, respectively (Table 2). The mean milk yield in the present study is in accordance with the findings of Kebede [3] and who reported that the average daily milk production of crossbred cows was 8 L per cow days. In this study, the main reasons for low daily milk production as indicated by the respondents were shortage of feed and the interaction of poor health and management. Variation in milk production is mainly due to genetic and various non-genetic causes [4].

Success of reproduction performance is mainly determined by days open, the longer days open means the longer calving interval which affects the lowering amount of milk production throughout the cow life [5]. Reproductive performance of dairy cattle at the smallholder vary greatly, it is possible for a lot of factors that don't support the maintenance management of dairy cattle, especially the fulfillment of feed and environmental needs. The results overall of reproduction performance was presented in Table 3.

**Table 3.**Productivity performance of dairy cows in DIY

Parameters	Value
Milk yield (L/head/day)	11.77±3.47
Breeding system	AI
Postpartum mating (day)	72.18±31.51
Service per conception	2.88±1.68
Days open (day)	114.76±45.13
Calving interval (month)	15.61±6.38
AI = Artificial insemination	

The mean postpartum mating in this research of 72.18±31.51 days. The result are within the optimum (idea) value range of 60-90 days [6] this could be attributed to different factors. Most researchers suggest that the reason for the delay in interval to first service is greater negative energy balance in modern dairy cows. Negative energy balance delays the continuation of ovarian activity. Then the value of open days, service per conception and calving interval is still within normal range.

#### 4. Conclusion

Overall, productivity performance dairy cow was below the standard. However, the number of service per conception is within the normal that expected from commercial dairy herd. Shortages as well as high cost of feed, occurrence of disease, scarce information about feeding and high medicament cost were the main constraints which might have contributed considerably to delayed age at first service, late age at first calving, long calving interval, short lactation length and low milk production. Therefore, strategies designed to solve the existing problem should be important by involving all stakeholders in the formulation and implementation of improvement strategies or dairy development policy was being implemented and necessary respect to environmental factors affecting agricultural activities such as a constraint on land use and access to water resources.

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