

# Smallholder Dairy Farmer Income in Batu City, East Java, Indonesia

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**Abstract**— Batu City is a city located in the highlands and directly adjacent to Malang Regency. The objective of this study was to study the income of smallholder dairy farmers in Batu City, East Java, Indonesia. This research involved 40 respondents to be interviewed used questionnaires. The questionnaire contains questions about the sources of income of farmers consisting of dairy and non-dairy income; variable cost and fixed cost. The results showed that the average ownership of dairy cows in Batu month with average ownership of  $5 \pm 0.45$  herd size and  $3 \pm 0.15$  lactation g cows per household. The average milk production in 2018 was  $8.33 \pm 0.97$  L and increases to  $10.67 \pm 0.86$  L /head/day in 2019. Average feeding cost of IDR 44,700,000 per household or equal to 51,787% of total farm expense and replacement cows cost of IDR 27,500,000 per household per year or equal to 31,86% of total farm expense. Dairy cows under smallholder management in Batu City get an average net income of 822,689 IDR per household per month or equal to 9,872,272 IDR per household per year in 2019. Analysis of income in a livestock business helps farmers in finding opportunities to develop their business.

**Keywords**— Income; smallholder, dairy farmer.

## I. INTRODUCTION

The dairy farming business in East Java is dominated by small-scale farms with an average number of lactation dairy cows less than 5 per household. Dairy farmers have a well-coordinated group and milk production is deposited into the dairy cooperative in each district. Batu City is one of the regions in East Java that has the potential to develop dairy farming, in addition to its tourism potential. It is located directly adjacent to Malang Regency and is in a highland area with cold weather so that the environmental conditions support the maintenance of dairy cattle. The population of dairy cattle in Batu City has increased from 2017 to 2018, which indicates the potential development of the dairy farming business. In 2017 Kota Batu had a population of 6,931 productive dairy cows and increased to 7,357 productive females in 2018 (Report from Agriculture Department of Batu City, 2018).

Dairy farming is a side job for some farmers and their purpose of raising dairy cows was for savings that can be used at any time for their needs. Dairy farmers in Batu City generally have other jobs such as farming, labor, and other occupations. Income as a dairy farmer is influenced by many

factors. The number of lactation cows owned by breeders also determines how much profit they get. Ideally, farmers have lactation dairy cows and non-productive dairy cows with a ratio of 80%: 20%, so that the proceeds of milk sales can be used to finance the entire population, but this is still not considered by most of the farming community.

Most of the dairy farmers, in conducting their business rarely do financial records, so it is not known with certainty the profit or loss of the business. Farmers should conduct business analysis and evaluation to open opportunities for farmers to develop their business. The most influential production factors in the livestock business can be known after the breeder has calculated the total income and costs incurred. These production factors must be prioritized and managed well so that later they can increase the amount of revenue and net income [1]. This study aims to analyze the income received by smallholder dairy farmers in Kota Batu, to be able to provide recommendations to the breeder community about the factors that affect net income per household per year.

## II. MATERIALS AND METHODS

This research was conducted in March-August 2019 in Junrejo District, Batu City, East Java. The location was chosen because it has a dairy cow population and high milk production. Methods for selecting breeders who have a minimum of 3 dairy cows and a minimum of 1 lactation dairy cow. The number of samples taken in this study was 40 respondents. This study uses a survey method and the direct observation of the research location. The survey was conducted by direct interviews using a questionnaire to 40 respondents to get primary data while secondary data was obtained from recording local government/government information. The income analysis is done by calculating the costs of dairy farming input and income obtained from dairy farmers. Input costs include fixing costs consisting of taxes, housing and equipment depreciation, fuel, labor and land rent and also variable costs consisting of feed (forage and concentrate) costs, replacement cows, artificial insemination, minerals and vitamins, medicine and electricity. Total revenue came from milk sales, dairy cows sales, and other dairy farm incomes. Net income was calculated by the formula net income (IDR) = gross cash farm income – total farm expense.

Net income was calculated for one year per household with 3 lactation dairy cows and 5 dairy cows total per household ownership. Total income for one year will provide farmers with consideration about the opportunities in continuing their dairy farming business.

III. RESULTS AND DISCUSSION

Characteristics of respondents in this study are presented in Table I, including age, education, occupation, herd size and lactating cows ownership. The average age of farmers in Batu City is  $48.41 \pm 4.23$  years old with an average formal education in elementary school. Work as a dairy farmer in East Java generally will continue to cling for many years until someone continues their business, while most of the children of the breeders choose to look for other jobs so that the breeders continue to run their businesses until they are no longer productive. The majority of respondents have a history of Elementary School's last education because at that time school was a luxury for villagers and livestock was considered to be done based on experience so that many people did not continue their education to a higher level. Education will more or less influence the implementation of a business [2].

TABLE I. Characteristic of respondent in Junrejo District, Batu City.

Age of Respondent	Number of respondent	Percentage (%)
< 25 y.o.	0	0
25-40 y.o.	8	20
41-55 y.o.	29	72.5
> 65 y.o.	3	7.5
<b>Education</b>		
Elementary School	34	85
Junior High School	5	12.5
Senior High School	1	2.5
University	0	0
<b>Main Occupation</b>		
Dairy farmer	23	57.5
Farmer (Corn/Paddy/Horticulture)	15	37.5
Entrepreneur/Labour	0	0
Others	2	5
<b>Dairy Farming</b>		
Main business	23	57.5
Side business	17	42.5
<b>Herd Size (number)</b>		
3-4	14	35
5-6	10	25
6-7	4	10
>7	12	30
<b>Lactation Cow Ownership (number)</b>		
1-2	21	52.5
3-4	11	27.5
5-6	8	20
>6	0	0

The work as a dairy farmer in Batu City is not 100% as the main occupation of the community. Based on the results of the interview, as many as 57.5% of the main job respondents were dairy farmers while the rest had other jobs as their main occupation. Other jobs in question are labors, entrepreneurs, farmers, and others. As many as 42.5% of respondents keep cows with the aim of the investment and saving for further future needs. Someone who has the main job and a side job, he

will tend to put aside side jobs [3], or both are running less optimally [4]. But it has become the character of the village community that they have more than one livelihood to fill spare time and supplement their income. This condition is very influential on good dairy practices consisting of maintenance management, feeding, production handling, housing, sanitation and disease control in running a dairy farming business [5].

Average dairy cows ownership as a small-scale dairy farm in Batu City  $5 \pm 0.45$  herd size per household and  $3 \pm 0.15$  lactating cows per household. The average ratio of ownership of productive and non-productive livestock, respectively, is 60%: 40%, where the figure is still not ideal because non-productive cattle will impose their maintenance costs on productive cattle.

Table II showed that the average income of the respondent was 86,314,078 IDR per household per year. The biggest farm expense was feeding cost consisting of forage and concentrate cost or equal to 51,787% of total farm expense. Total revenue in dairy farms came from milk and cows sales and also other farm income such as the sale of feces to be used as fertilizer on agricultural land. Livestock sales each year consist of the male calf and adult dried cattle. The number of cows selling depending on the total of male calves that are born and the adult cattle that are due to be dried. Milk is sold by respondents to the Batu dairy cooperative twice a day, every morning and evening.

TABLE II. Average income per household per year

	2019	
	IDR/Household/Year	Percentage
<b>Cash farm income</b>		
Milk Sales	50,514,350	52.517%
Dairy cows sales	25,500,000	26.511%
Others farm income	20,172,000	20.971%
<b>Gross Cash Farm Income</b>	<b>96,186,350</b>	
<b>Cash farm expense</b>		
Feed cost (forage)	7,955,000	9.216%
Feed cost (concentrate)	36,745,000	42.571%
Vitamin and mineral	270,000	0.312%
Replacement Cows	27,500,000	31.860%
Artificial Insemination Fees	7,955,000	9.216%
Medicine	364,378	0.453%
Fuel	1,930,200	2.403%
Electricity	750,000	0.933%
Land rent	250,000	0.311%
Taxes	315,000	0.392%
Miscellaneous	2,254,500	2.807%
Labour	3,150,000	3.922%
Housing and equipment depreciation	4,450,000	5.540%
<b>Total farm expense</b>	<b>86,314,078</b>	
<b>Net farm income</b>	<b>9,872,272</b>	

Note: the calculation is obtained from the number of ownership of  $5 \pm 0.45$  herd size per household and  $3 \pm 0.15$  lactating cows per household

Farmers sold milk at a price of 5,000 - 5,200 IDR per Liter to Batu dairy cooperative depending on the milk quality. The dairy cooperative sees density as a representative of the total solid of milk so that farmers are competing to improve the quality of milk to maintain price stability. Dairy farmers in Batu, from year to year, evaluate the type and quality of feed used because feed is one of the factors that influence milk

quality. In 2018 the average milk production per head per day was  $8.33 \pm 0.97$  L and increased to  $10.67 \pm 0.86$  L. Forage is very influential feed on milk quality because cellulolytic bacteria will degrade crude fiber into VFA with the highest ratio of acetic acid as a precursor milk fat [6]. Farmers get grass from the land they have rented and they plant. The use of rice straw was still carried out by a small number of breeders in the previous year when the stock of grass was exhausted during the dry season, but now some farmers prefer to maize stover from outside the Batu area when the dry season arrives.

Concentrate cost is the biggest cost requirement reaching 42.571%, but farmers cannot avoid it because livestock nutrition requirements must be met. The need for dairy cow protein at initial lactation is 105-110 g / kg Dry Matter [7], while the crude protein content in elephant grass has not been able to meet these needs. KUD produces two kinds of concentrate feed with PK quality of 14.45% and 19.84% at a price of Rp. 2,500 and Rp. 3,000 / kg and breeders can buy non-money by purchasing milk products from KUD. Protein and concentrate also affect the quality of protein in milk [8] so that breeders pay close attention to protein intake in the feed.

The cost of replacement cows was also quite large, reaching 31.86% of the total farm expense. Replacement cows cost is the cost used to buy adult dairy cows to replace dairy cows that have been rejected due to illness, age and other reasons. The price of adult dairy cows varies between 20,000,000 - 25,000,000 per head depending on performance. Farmers inevitably do replace it to get good productivity.

Based on data from Table II, the average net income was 9,872,272 IDR per household per year or equal to 822,689 IDR per household per month. Net income for farmers per month is not large due to the low scale of ownership. Capital limitations can be a factor affecting the scale of cow ownership [9], but as long as the farmer receives cash farm income every month his business will continue to run. Farmers whose business purpose is only for savings and investment will usually not increase the population of livestock ownership as long as the cash flow does not lose. Whereas the potential for developing dairy cattle in Batu City is very large in terms of climate, strategic location, aspects of feed availability and supporting natural resources.

#### IV. CONCLUSION

The dairy farmers in Batu City receive an average net

income of IDR 9,872,272 per household per year or equivalent to IDR 822,689 per household per month. The individual farmer's net income came from milk sales was IDR 50,514,350, and IDR 25,500,000 from livestock sales and IDR 20,172,000 IDR from feces sales. Feeding cost and replacement cows are the most influential factors on the income of farmers.

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