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Livestock farming income analysis of farm households in Indonesia

V Tenrisanna and K Kasim

Department of Social Economics, Faculty of Animal Science, Universitas Hasanuddin, Jalan Perintis Kemerdekaan KM.10, Makassar, 90245, Indonesia.

Email: vidyawaty@unhas.ac.id

Abstract. Animal husbandry development in Indonesia has been focusing on increasing farmers' income, expand employment and provide business opportunities for the community. A livestock enterprise is said to be successful if it can contribute income to farmers. This study aims to measure the income of livestock farming on farm household scale in Indonesia. This study observed the production costs, revenues, farm income, and revenue-cost (R/C) ratio. The R/C ratio determines the level of efficiency of livestock business based on the ratio between the variable costs incurred and revenues. The data used secondary data from BPS-Statistics Indonesia. In general, this study shows that livestock farming on household scale provided benefits for farmers in terms of positive incomes and appropriate values of R/C ratios.

1. Introduction

Livestock development is an important part of national development. The objectives of livestock development include: increasing the quality of human resources, increasing the income and welfare of farmers, preserving the environment and increasing the country's foreign exchange, to sustain poverty reduction [1–3]. The development of livestock commodities such as meat, milk and eggs is also very important in meeting the needs of animal protein in order to improve the quality of human resources [4]. Livestock contribute to household livelihoods in terms of cash income or income in kind, savings, livestock provide manure, draft power and transport services, source of wealth or social status [1].

Animal husbandry in Indonesia has a very good opportunity to continue to be developed, because the demand for livestock products continues to increase, along with population growth and national economic development. Rising incomes are a major driver of increased meat consumption [5]. In Indonesia, between 1990 and 2018 higher real GDP per person coincided with higher rates of meat consumption. Recently, Indonesia's meat consumption is 2.72 kg per capita per year and is expected to increase to 3.36 kg per capita per year by 2020 [6]. Moreover, meat production and consumption trends in Indonesia from 2007 to 2027 fluctuated and tend to increase from year to year [7].

The competitiveness of the livestock industry is largely determined by several inputs, such as the availability of feed, seed factors, animal management and health, as well as technological innovation and other external factors. The development of livestock is aimed at increasing food security and increasing



people's purchasing power through increased income. Active community participation in livestock enterprise will encourage community enterprise empowerment and livestock development. Generally, in Indonesia livestock business is a household business. The results of Inter-Census Agriculture 2018 Survey (SUTAS 2018) that the number of households doing business in the sector of animal husbandry in Indonesia reached 13.56 million households [3].

The consumption for several livestock products, especially beef, milk, poultry meat and eggs, generally increases every year. Based on the results of the Staple Food Consumption survey in 2017 [2], the need consumption of beef and buffalo reached around 704.9 thousand tons, or around 2.70 kilograms per capita per year. When compared with the results of the study of staple foods in 2015, beef consumption has increased by 19.92 percent in 2 years. Furthermore, consumption of chicken meat in 2017 reached around 3.93 million tons, or around 15.07 kilograms per capita per year. Consumption of chicken eggs and duck eggs in 2017 reached around 4.81 million tons, while consumption per capita reached 18.44 kilograms per capita per year.

Domestic per capita use of fresh cow's milk during 2017 reached 4.83 kilograms per capita per year, consisting of 3.70 kg per capita used by Large Medium Industries as raw material and 0.30 kg per capita used by households directly, while the rest is used by other food and beverage companies.

In terms of livestock products, the production of livestock products in Indonesia mainly comes from beef, buffalo, mutton and lamb and poultry meats. In 2017, total meat production was 3.5 million tons consisting of beef and buffalo meat 0.5 million tons, native chicken 0.3 million tons, mutton and lamb 0.1 million tons, pork 0.3 million tons, broilers 2.0 million tons, layers 0.1 million tons, and others livestock 0.05 million tons [8]. Meat production is a carcass resulting from livestock slaughtered plus edible offal during a certain period and in a certain region. Total egg production in 2017 was 2.1 million tons which is the production of layers chicken, native chicken, ducks, quails, and Muscovy ducks. Milk production in 2017 was 0.93 million tons and produced by dairy cows only. When compared to previous year, milk production of 0.91 million tons, it increased by 1.68 percent.

Profit is the driver for agribusinesses as they work to generate the greatest possible returns from their resources. Successful achievement of this objective means making good decisions, and it means carefully managing the financial resources of the firm [9]. Livestock income is defined as the value of sales and barter of livestock, plus the value of sales, barter and self-consumption of livestock products (such as milk, meat, eggs, honey, and so forth) minus the expenditures related to livestock production which, depending on the country, may include feed, labour and veterinary services [1].

Farmers' income in the agricultural sector varies, and this can affect household welfare, agricultural production, and environmental quality [10]. Related to profit goals, there are several other objectives, such as earning quality products or services, reward to employees, help business growing, striving for environmental concern, and promoting a positive public image for company [9]. The levels for the success of livestock business activities can be seen from the income earned. If the income is able to cover the production costs, it means that the business can be said to be profitable. Thus, this study estimates the income and efficiency level of livestock farming household scale in Indonesia.

2. Method

2.1. Data

The analytical method used is entirely based on descriptive analysis providing an overview of the benefits of a household scale farm business using Cost Structure of Livestock Household Survey 2017 [3]. The data collected was livestock production data as revenues of farmers and total cost data.

Estimated types of livestock farming including livestock production of meat and milk derived from beef cattle, dairy, buffaloes, goats, sheep, and pig, poultry (native chicken, layers, broilers, ducks, and Muscovy

ducks), Milk production is the production of fresh milk in the form of a female animal within a certain period, including those that are given to their babies, damaged, traded, consumed and given to others. Egg production is the production of livestock poultry eggs during a certain period, including those that are hatched, damaged, traded, consumed, and given to others.

2.2. Data analysis

The model specification for the livestock farming income analysis is generally the difference between total revenue and total cost [9]. Next, the revenue cost ratio explains the level of efficiency of livestock business based on the ratio between the variable costs incurred and revenues.

The economy efficiency of a livestock business can be done with profit function approach. Level of business efficiency livestock can be determined through revenue cost (R/C) ratio analysis. R/C ratio is the ratio of revenue and cost [11]. There are three criteria in the R/C ratio, namely [12]:

R/C ratio > 1, then the farm is feasible and profitable.

R/C ratio = 1, then the farm is not profit and loss.

R/C ratio < 1, it is not feasible or loss

3. Results and discussion

In Indonesia, livestock farming is still dominated by household farming. The implementation of small-scale household livestock businesses is generally still far from modern business principles. During the period 2003–2013 the number of agricultural business households has decreased by 5.1 million or 16.3 percent from 31.2 million households in 2003 to 26.1 million households on year 2013 [4]. Also, livestock enterprise households also decreased from 18.60 million to 12.97 million between 2003 and 2013. In addition, Employment of Livestock Subsector also decreased from 4,078,362 to 3,839,162 between 2016 and 2017 [8]. A decrease in the number of livestock business households and livestock workers will affect the number of livestock products produced. In terms of food security, support to the community for sustainable business in the field of animal husbandry needs to be continuously improved. Motivation to do business in the livestock sector, especially the young workforce, also needs to be continuously provided.

Type of livestock such as buffalo, beef cattle and dairy cows provide benefits for farmers, but the number of business scales per farmer is still small. To increase the income of farmers, the number of livestock productivity levels must be increased through the addition of business scale. When compared to cattle farmers in Australia, beef cattle farms are only cultivated by hundreds of large breeders with ownership scale tens of thousands of head per farmer, while in Indonesia in Indonesia only 2–3 heads and operated by approximately 5 million households [4]. Furthermore, the results of the agricultural census showed that the average income of livestock enterprise household as the main business was only 14.6 million per year or around 1.2 million per month. When compared to other agricultural businesses, the income of the livestock farm household was low although it was still higher than that of food crops, breeding of wild plants / animals, and agricultural services. The indication of low income from livestock business is due to the low scale of farming.

The type of livestock that was mostly raised by households was native chicken with 6,620.4 households. (see table 1). However, the maintenance is not for profit oriented. The opportunity for the development of native chicken is quite large because at this time native chicken is the choice of consumers because the meat tastes more savory than broilers. The price of native chicken is also much more expensive than broilers. Recently, the price of native chicken is 150,000–200,000 IDR/bird and broilers 40,000–65,000 IDR/bird respectively.

Table 1. Number of livestock farm household by type of livestock, 2013.

Type of livestock	Number of livestock farm household (thousand)	Number of livestock raised (thousand head)
Beef cattle	5,079.0	12,329.5
Dairy	142.0	411.2
Goat	2,728.5	13,491.2
Sheep	645.6	13,491.2
Pig	1,271.5	5,843.5
Native chicken	6,620.4	87,904.4
Layer	29.9	81,149.0
Broiler	77.1	1,306,663.9
Duck	786.7	25,932.2

Source: Agricultural Ccensus 2013 [4].

Based on BPS-Statistics Indonesia (2020), detailed production costs incurred by farmers is divided into two including fixed cost and variable cost [3]. Generally, farmers spend on fixed costs such as small repair of capital goods, land lease, rent cages, machines, tools, tax on land and building, livestock services, retribution, loan interest, transportation costs, depreciation of capital goods. The types of variable costs incurred include feed labour wages (paid workers' wages and unpaid workers' wages), feed (forage animal feed, factory made/concentrated feed, other feed (household waste, waste agriculture, soybean meal, meal, palm, bran, salt, etc.), fuels, electricity, water and health maintenance (vaccination).

Production refers to outcomes of livestock farming in the form of meats, eggs, and milk on smallholder farm household. The profit analysis and revenue cost ratio are explained in table 2.

Table 2. Production cost, revenues, profit/loss, revenue cost ratio of livestock smallholder farming in Indonesia, 2017.

Types of livestock	Production Costs (IDR)	Revenues (IDR)	Profit/Loss (IDR)	R/C Ratio
Buffalo (per head)	3,101,320	4,326,230	1,224,910	1.39
Dairy (per head)	9,015,090	11,010,320	1,995,230	1.22
Beef cattle (per head)	3,429,970	4,539,250	1,109,280	1.32
Pig (per head)	882,090	1,133,560	251,470	1.28
Sheep (per head)	661,530	649,970	-11,560	0.98
Goat (per head)	659,920	650,780	-9,140	0.99
Duck (per bird)	106,320	133,990	27,670	1.02
Muscovy duck (per bird)	78,090	53,300	-24,790	0.68
Laying native chicken (per 1,000 birds)	97,020,130	162,243,050	65,222,920	1.26
Meat native chicken (per 5,000 birds)	644,536,500	830,968,390	186,431,890	1.29
Native chicken (per bird)	68,600	116,260	47,660	1.69
Broiler (per 5,000 birds)	127,407,760	175,951,340	48,543,580	1.38
Layer (per 1,000 birds)	136,385,150	209,239,030	72,853,880	1.53

Source: Processed of Secondary data [3].

As can be seen in table 2, in 2017 most of livestock farming got a profit and some livestock farming got a loss. Profitable livestock farming included buffalo, dairy, beef cattle, pig, duck, native chicken laying, native chicken meat, native chicken, broiler and layer. The household livestock businesses that suffered

losses were sheep, goat and muscovy duck. As a comparison, several research results in Indonesia indicate that goat farming provided profit for farmers. Goat fattening enterprise had an average of 9 heads in Demak District with a total production cost of IDR 9,843,000 and total revenue of IDR 18,408,000 and provided an income of IDR 8,565,000 per one period or IDR 951,666 per head in 2016 (6 months) [13]. Next, the profit of Etawa goat farmers in Sukomulyo Village Kajoran District, Magelang Regency was IDR 1,629,926.5/head/year [14]. When viewed from the value of the R/C ratio in table 2, almost all livestock businesses were feasible to develop where the R/C ratios were greater than 1, with the exception of sheep, goat and muscovy duck.

There are several factors that influence farmer's income. Based on study literatures, some of the factors that influence the success of raising beef cattle are age, education, number of household members, farming experience, agricultural land owned and the number of beef cattle ownership [15]. Next, factors that affecting the profit of small-scale beef cattle farmers negatively included depreciation cost of barn and equipment, the price of calves (fattening cattle), the price of forage feed, price of concentrate feed, and wage labor [16]. A literature on poultry found that farming experience and farm size significantly affect the income of native chicken farms [17]. The main constraints to livestock producers taking advantage of growing markets include; lack of forage and feed gaps, communal land tenure, limited access to land and water resources, weak institutions, poor infrastructure, mismanagement, and environmental degradation [18]. Therefore, addressing these issues will lead to improved sustainability, food security and rural livelihood.

4. Conclusion

Profit analysis and R/C ratio in this study show that in 2017, buffalo, beef cattle, dairy cattle, layer, broiler native chicken, laying and meat native chicken provide benefits for farmers on a household scale and are feasible to develop. The Muscovy duck, sheep and goat farms had not shown profit but their development potential is large enough where the R/C ratio is close to a value of 1. Thus, livestock development in Indonesia must continue to be developed considering the availability of natural resources and human resources. Constraints faced by farmers such as limited access to the availability of feed/grazing land, weak institution, poor infrastructure and mismanagement of livestock enterprise are the main concern for the government to be improved so that livestock in Indonesia will be more advanced and the income level of household farmers will increase.

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