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Research Article

Layer Male Chicken Farming: Characteristics and Net Income in west Lombok, Indonesia

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Abstract

Objective: Layer male chicken is considered as an important source of income for the rural livelihoods or household incomes. This study was conducted to assess the characteristics and current net income of layer male chicken farming in West Lombok, Indonesia during the period from June to August 2022.

Material and Methods: A total of 40 layer male farmers were visited and interviewed using structured questioner. Data were collected from individual growers involved in three different sizes of farm operations. Information relating to socio-economic, rearing practices, credit availability, marketing and emerging problems was collected.

Results: The farming practices were almost similar to the intensive system of broiler production and offered new employment opportunities for young people with less education. No antibiotic use was reported in commercial diet fed the chickens. The average live weight at marketing age (between 30 to 40 days) was approximately from 366 to 442 g. The average mortality of chicks was 5, 3 and 3% for small, medium and large farms respectively. The price of live chickens in the local market was relatively steady. The average rearing was 9.7 batch/year. Net income per bird was IDR 4,172 (USD 0.288); IDR 2,655 (USD 0.183) and IDR 2,286 (USD 0.158) in small, medium and large farm respectively whilst benefit cost ratios of 1.86; 1.43 and 1.35 were for small, medium and large farms. In the retails chain in the local market, women had the advantages of dressed meat and fresh visceral parts for increasing their income.

Conclusions: Layer male chicken in poultry production system resembled the broiler production system. The market price was steadier than broilers.

Keywords: Broiler Production; Commercial Diet; Rearing Cycle; Local Market

Introduction

Indigenous poultry farming plays a vital role in the domestic economy of Lombok particularly, as it improves and adds the income levels of the rural people and disadvantages people, providing employment and offers scope for value addition in the livestock sector. The livestock sector also ensures availability protein for the community. Unlike other places in Indonesia, the existence of indigenous chicken in Lombok is very important due to the demand for indigenous meat chicken supply specialty for a traditional cuisine "Taliwang Hot Grilled Chicken". As a tourist destination in the eastern part of Indonesia, the demand of these chickens continues to increase. Indigenous chicken population was 7679844 birds in 2020 increased to 9201252 birds in 2021 or increase 1.503.408 (19,5%) [1]. This is indicated by the growing new food vendors or restaurants where this type of chicken is the main menu. However, the limited supply of indigenous chicken meat forces the chicken growers to look for alternate chicken meat sources with similar taste as the indigenous chickens. Layer male chicken of exotic breed is a promising alternative meat chicken for this purpose. In countries such as Germany, however, introduction and development of layer male chicken were hampered by the high cost of production and lack of acceptability [2], even other parts of Indonesia. Nonetheless in Lombok, layer male chicken dominates the local market, replacing the indigenous chickens. The most im-

portant advantages of these chickens are the body size close to the indigenous chickens, often called Buras (bukan ras or non-Exotic) or non-exotic breed and a uniform carcass appearance when harvested at 30 to 40 days. Moreover, the white feather color of layer male chickens similar to the broilers is suitable because of the market demand for white meat. However, there are problems in promoting this sort of poultry production. Challenges for small poultry production in a developing country such as Indonesia include price fluctuations, seasonally fluctuating demand [3], shortage of feed quality, low availability of day-old chicks [4,5], lack of capital [6,7], limited market access [3], poor management [4] and high mortality rates [8]. The biggest risk of this poultry farming, however, is the uncertainty of costs inputs and outputs. Regardless of these challenges, West Lombok has a high potential for developing layer male chicken farming. This is because of its geographic position and is close to the capital of the province make a market available. Moreover, Lombok in general and west Lombok in particular has unique advantages in layer male chicken farming. Its people get used to consume the indigenous meat which is less tender and suits to the local food. West Lombok is one of eight regencies with the total of population of indigenous chickens on the third position (14,57% or 1,187,910 birds) in the year 2018 after central Lombok (37.74% or 3,078,320 birds) and East Lombok (18.22% or 1,485,844 birds) [9].

The objective of the study was to characterize and assess net income of layer male chicken farmers in Lombok to optimize farmer's incomes and to resolve the problems in development of layer male chicken farming.

Materials and Methods

Sample determination and selection

Stratified random sampling method was used considering farm scale to determine the layer male chicken farmers. A representative sample of 40-layer male chicken farmers was selected based on farm sizes. Number of birds reared in a farm was stratified into three size groups, viz. FS-1 or small (less or equal to 3000 birds), FS-II or medium (3100-5000 birds) and FS-III or large (5100 to 7000 birds) farms.

The study involved both formal and informal interviews. There were three main sets of information collected: namely, characteristics of the farmers' (age, occupation, education and experience), farm performance (rearing cycle, body weight, feed conversion ratio, marketing age, and mortality), and cost and returns in layer male chicken farming. Other information was credit accessibility, technical assistance of regional livestock officer, market information and input availability.

Fortnightly visits to the farms were organized to elucidate the problems experienced by the farmers. We also took some chickens (10 birds) randomly at marketing age prior sale and were weighed for calculating the feed conversion ratio as an efficiency indicator. Mortality was also measured as the percentage of chickens that died within the period of rearing. The period of data collection was between June to August 2022.

Measurements

Production efficiency and economic return

To measure efficiency, we used two different indicators: namely feed conversion ratio (FCR) as applied to broiler chickens [(feed consumed (kg)/body weight (kg)] for characterizing management efficiency and benefit-cost ratio for evaluating economic efficiency. For measuring the net income, fixed and variable costs were the two main parameters calculated. Items to calculate on the production cost and net income were as per by [10-12]. Variable costs included expenses on day old chicks, feed, vaccines, vitamins, labor, heating, litter, electricity, water and disinfection. Fixed costs were expenses on housing, feeding and drinking troughs, brooders and other supporting facilities. Gross margin (GM) was calculated as Total Revenue (TR) subtracted by Total Variable Cost (TVC). For calculating the margin and other economic parameters, we did not use the real interest rate etc. Depreciation was calculated by using the straight line method as defined by [13] and [14] stated that is the depreciation value of fixed items used during the production season. Net income can be calculated as gross margin subtracted by fixed inputs [15]. The benefit-cost ratio (BCR) is the ratio between the gross returns from selling birds and manure to the total cost of inputs used [13]. As mentioned that analysis of benefit and cost ratio was assigned to estimate production efficiency [16].

Data analysis

The method of analyses used was both qualitative and quantitative. Qualitative and quantitative analyses of the data obtained were employed to assess the characteristics and return of layer male chicken farming. In presenting the findings, we used descriptive –analytical narrative as defined by [8].

Results and Discussion

As can be seen from table 1, the owners of the layer male chicken farms were dominated by people between 25 to 35 years of age (70%). The least number of people were in the category of more than 45 years of age (10.0%). Majority of the respondents had primary education (55.0%) and the main occupation was layer male chicken producers (70.0%), implying that the grower's main source of income was derived from chicken farming. The result on farming experience revealed the majority (40%) had between 5 to 8 years and the least (10%) was more than 12 years of experience. The study also revealed that 50 per cent of layer male chickens farmers raised less than 3000 birds per batch of production (Table 2) and only a few (10.0%) maintained more than 5000 birds per batch. This indicates the farming offered new jobs for young people with disadvantages in education.

Farm size and management practices

Farming practices of layer male chickens in Lombok were mostly similar to that of broiler chicken production. The housing system used was semi-permanent buildings with deep litter or slat floor systems and monitor type roof of zinc with a combination of coconut leaves (Figure 1). The cage density was 25 to 30 birds/m^2. The main farm equipment included feeder and drinking water troughs, lighting and brooders (LPG –Liquefied petroleum gas), which were simple and conventional. A formulated commercial diet has been used as a practical feeding for many years that is the birds were fed broiler starter crumble diets *ad libitum* from day-old until the marketing age (30-40 days). Prevention to viral diseases (Newcastle Disease and Infectious Bursal Disease) through vaccination was given importance. But aspects such as biosecurity and other routine medication received less attention. The chemical composition of commercial diets provided by the feed mill is presented in table 2. The diet composition implies that no antibiotics were used in the feed and enzyme was used as an alternative additive. This is presumably because the Indonesian Government has banned the use of antibiotics as growth promoter from the beginning of year 2018 in consonance with food safety awareness [3].

In regard to the employment, the present study found that the majority of the farms did not employ outside laborers. Most of

Variable	No. of Respondent (People)	Percentage
Age (years)		
25-35	28	70.0
36-45	8	20.0
>45	4	10.0
Occupation		
Layer male chicken producers	28	70.0
Farmers	0	0.0
Entrepreneurs/ Self-employed	6	15.0
Government officer	6	15.0
Others (constructor workers)	0	0
Education levels		
No formal education	0	0
Primary school	22	55.0
Junior high school	8	20.0
Senior high school	6	15.0
Tertiary education	4	10.0
Experience in raising chicken (years)		
1-4	10	25.0
5-8	16	40.0
9-12	10	25.0
>12	4	10.0
Field survey, 2022		

Table 1: Age, occupation, education and experience of the farmers.

Farm size (birds)	No. of Respondent (People)	Percentage
Less than or equal 3000	20	50.0
Between 3100-5000	16	40.0
Between 5100 - 7000	4	10.0
Field survey, 2022		

Table 2: Number of reared birds per period of rearing.

them used family labor to do the farm jobs. This could be due to the fact that layer male chickens' production may be viewed as small holder enterprise with no farmers holding more than 7000 birds. Another reason might be that layer male chickens rearing are relatively easy to handle because of small body size of birds.

Chemical composition*	Boundary	Commercial diet	
(%)		A	B
Moisture	Maximum	12.0	13.0
Crude protein		20-22.5	21-23
Ether extract	Minimal	5.0	5.0
Crude fiber	Maximum	5.0	5.0
Ash	Maximum	7.0	7.0
Calcium		1.1	0.9
Phosphor	Minimum	0.5	0.6
Enzyme		+	-
Antibiotic		-	-
Coccidiostat		-	+
* Source: Feed mill, 2022			

Table 3: The chemical composition of commercial diets used by the layer male growers.

Farm performance

Data on average body weight, feed conversion ratio, mortality percentage, and age at marketing are presented in table 4. The three scales of farming were almost similar in relation to marketed body weight, which approximately from 366 to 442 g at marketing age of 30 to 40 days. The average rearing cycle per year was 9.7. Mortality rate was highest for the small farms (5%), probably because of the differences in skills, experiences, and farming techniques although the mortality rate could also be caused by the low-quality chicks [17]. Feed conversion ratio was 1.434; 1.278 and 1.131 in small, medium and large layer male farms, respectively. Rearing period of the FS-III was longer than that of FS-I and FS-II and they sold at heavier live weights. FCR of larger farm also improved compared to small and medium farms because of different management strategies and experiences which affected the farm performance.

Performance	Flock size		
	FS- I (Small)	FS-II (Medium)	FS-III (Large)
Body weight /bird (g)	366	407	442
Feed conversion ratio (g /g)	1.434	1.278	1.131
Age at marketing (day)	30-37	32-37	33-40
Mortality rate (%)	5.0	3.0	3.0
Batches/year	9.7	9.7	9.7

Table 4: Performance of layer male chicken rearing at different farm sizes.
FS-I: Flock size 2000 birds; FS-II: Flock size 5000 birds; FS-III: Flock Size 7000 birds per batch.

Marketing chain and price

Regardless of the differences in farm sizes, figure 2 presents the marketing chain of layer male chicken farming in west Lombok. The producer sells layer male chicken directly to the consumer or neighbor (farm gate) or through collectors and then to retailers. A main difference with broiler chicken is that layer male chicken is sold live without any processing. This is possibly the key for relatively low cost of production. In many cases, the collectors as a middle–chain determine the prices as the producers do not have direct access to regular customers. Such a situation could lead to marketing problems. However, in the present study, the growers reported that there were no crucial problems relating to marketing. The chickens were completely sold out within 7 days. In addition, the selling price itself was steady even if price fluctuation was faced by the broiler growers. The situation is similar to indigenous chickens studied by [8] and [18]. These authors reported that the absence of processing plants made indigenous chickens impossible to market through formal channels such as supermarkets and hotels. According to [19], socio-cultural preferences resulted in different poultry species dominating smallholder production systems in different regions. In Lombok where the local people preferred the Taliwang cuisine in which layer male chicken is a suitable substitute for the indigenous chicken meat. Looking at the system of production, majority of layer male farmers were independent growers and some followed a system similar to that of contract farming but informally. The growers were free to choose the suppliers of pro-

duction inputs. The selling price of the live chicken at marketing age (about 5 weeks) ranged from IDR.10,000.00/bird (USD 0,689) to IDR 15,000.00/bird (USD 1,03). At present currency (1USD = IDR 14,500). In the retail sector, both dressed chickens and fresh visceral products were sold locally, which gave additional returns to the retailers. It is apparent that women took these opportunities and earned about IDR 40.000 (USD 2.75) per 100 birds by selling the skewed boiled fresh visceral (Figure 3).

Figure 1: Deep litter (top) or slat floor (under) rearing system of layer male chickens.

Net income to layer male chicken growers

The calculated net income as shown in table 4 indicated that the average layer male chicken farmers provided a total net income of IDR 11,888.828 or USD 820 (FS-I), IDR 12,877,860 or USD 888 (FS-II) and IDR 15,521,184 or USD 1070 (FS-III) per batch. The net income per bird were IDR 4,172 (USD 0.288); IDR 2,655 (USD 0.183) and IDR 2,286 (USD 0.158) in small, medium and large farms respectively when the birds were raised from day old chicks to marketing age at 30 to 40 days. The benefit-cost-ratio of 1.86;

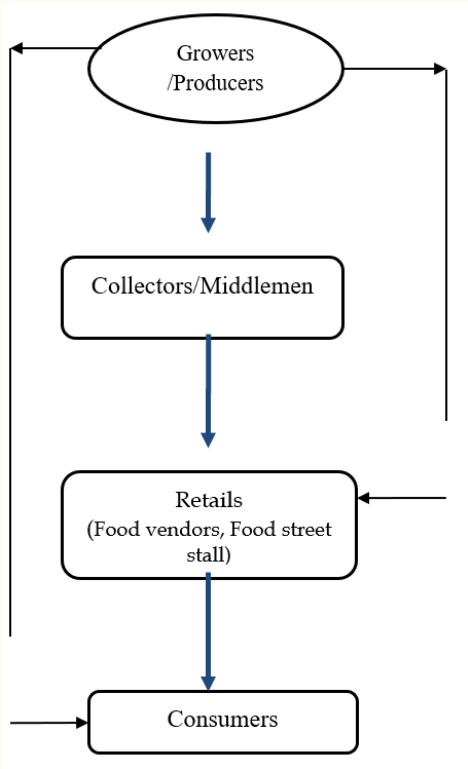

Figure 2: Marketing channel of layer male chickens.

Figure 3: Skewed fresh visceral (top) and dressed layer male chickens (under) sold in local markets by housewives.

1.43 and 1.35 for small, medium and large indicates that the farming was profitable. The higher benefit cost ratio in FS-II and FS-III was due to lower mortality rate, better feed conversion and relatively shorter time to sell out the birds and only a small number of the birds was marketed at 40 days. In other words, the flock size and marketing strategies had a positive effect on the profitability of production. This is because the small sized farms purchased inputs of production at higher costs than the larger farms and that there was higher mortality rate in the smaller farms. Another factor may be the longer marketing time which necessitates additional maintenance expenses. It is estimated to about 20 kg of additional feed is needed per 500 birds per day of delay in marketing. Similar findings were reported from previous studies [20] on broiler production and [21] for indigenous chickens.

	Flock size (FS)		
Fixed costs, variable costs and net income	**FS-I 3000**	**FS-II 5000**	**FS-III 7000**
Fixed costs			
Depreciation costs of the poultry house	500,000	1,000,000	1,500,000
Depreciation costs of equipment (heater, feeder and drinking troughs)	982,990	862,500	963,020
Total fixed cost	1,482,990	1,862,500	2,463,020
Variable cost			
Chicks	3,000,000	1,2500,000	17,500,000
Feed cost	9,447,192	17,509,140	26,620,776
Vaccines and medication	362.000	730.000	632.000
Litter	100,000	200,000	350,000
Heating /Brooder	36,000	108,000	150,000
Electricity	100,000	150,000	200,000
Labor	1,000,000	1,500,000	2,000,000
Total variable cost	14,045.192	32,697,140	48,452,776
Total cost			
Mortality (%)	5	3	3
Remaining birds (bird)	2,850	4,850	6,790
Gross income (selling birds) *	28,500,000	48,500,000	67,900,000
Manure and used feed bags	400,000	800,000	1,000,000
Total revenue	28,900,000	49,300,000	68,900,000
Gross margin (GM)	13,371,818	14,740,360	17,984,204
Total net income	11,888,828	12,877,860	15,521,184
Net income (USD*8)	820	888	1,070
Net income per bird	4,172	2,655	2,286
Net income per bird (USD*)	0.288	0.183	0.158
BCR	1.86	1.43	1.35

Table 5: Fixed cost, variable cost and gross profit margin (IDR) in male layer chicken farming at different flock size.

FS-I: in one cycle of rearing; * Live chicken per bird IDR: 10,000; **1 USD: IDR 14,500

Strengths of layer male chicken production

In spite of the problems mentioned, there is much strength for this farming business. Layer male chickens have a particular market in the local culinary restaurants. The taste and small body size are more preferable for the middle class and the price is relatively cheap. In addition, it is always available in the local markets in fresh form of eviscerated chicken (Figure 3). Furthermore, the birds are sold on individual basis of live chicken. No matter they are smaller than the expected size; the birds were accepted by the retails or consumers. Taliwang cuisine is also the symbol or a brand name of the Island of Lombok. The price of the live or eviscerated chickens was steadier than the broiler chicken meat. Lastly, women were involved more in selling the fresh eviscerated chickens in the traditional markets. The need of small capital for the retails to sell the chickens was also attractive for the housewives to increase their income (Figure 4). In other words, this agribusiness is promising for improving the rural livelihoods or household incomes.

Conclusions

Layer male chicken in poultry farming system resembled the broiler production system. Intensive rearing with a great attention to control of disease was evident. Young people with primary education dominated the farm business. Farmer return was dependent on farm size and the age at marketing. Layer male chicken remains profitable in increasing the income of the small growers. Women were involved in the retailing of fresh eviscerated chickens and fresh offal in local market contributing to the family income.

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Conflict of Interest

The authors have declared no conflict of interest.

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