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308 Lasani Town, Sargodha Road, Faisalabad - Pakistan  
Mob: +92 300 3008585, Fax: +92 41 8815544  
E-mail: editorijps@gmail.com

## Productivity and Profitability Layer Chicken Farm Using Small Scale Feed Mill Production in Sidrap Regency, South Sulawesi, Indonesia

Irmasusanti<sup>1</sup>, Isbandi<sup>2</sup>, B.W.H.E. Prasetyono<sup>2</sup> and A.R. Siregar<sup>3</sup>

<sup>1</sup>Faculty of Animal Science and Fishery, Sulawesi Barat University, Majene, West Sulawesi, Indonesia

<sup>2</sup>Faculty of Animal Science and Agriculture, Diponegoro University, Semarang, Indonesia

<sup>3</sup>Faculty of Animal Science, Hasanuddin University, Makassar, Indonesia

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**Abstract:** The objective of this research was to determine differences in productivity and profitability of layer poultry farm that used small scale feed mill production quality Indonesia National Standard (SNI) and not based on SNI. The research survey was conducted to 30 layer farmers in Sidrap district that used feed produced by small scale factory by interview and observation. Primary and secondary data obtained were used to answer the research objective. Responses characteristic, productivity, revenue, production costs and income were recorded for two months. Descriptive statistic and one sample t-test were used to analyze the data. Layer chicken farmer that used small scale feed mill produced generally raising chickens with business scale less than 5,000 chickens. Quality of productivity and productivity of layer chicken farm that used small scale mini feed mill produced was suited to SNI, significantly different ( $p > 0.01$ ) compared to one that wasn't based on SNI.

**Key words:** Productivity, profitability, layer, small scale, feed mill, SNI

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### INTRODUCTION

Feed poultry holds an important role in layer chicken farm. The existence of feed influences significantly on the success of a farm business. The price of feed poultry keeps increase all the time nowadays as a result of dependency on imported raw ingredients that also keep rising, today about 70% of raw ingredients is still imported. This has caused poultry farmers still considered as a volatile industry because it does not depend on local. The cost of feeding in poultry breeding business has the largest portion or reaching 70-80% of the total cost production.

Centre of layer chicken farm development in South Sulawesi is Sidrap District. Sidrap district is also known as the largest granary. In the middle of 1997 Indonesia's economy condition experienced crisis causing livestock sector had been through severe downturn. This led to dramatic increase of the price of feed so that many ranchers went out of business. Especially for poultry sector, the high percentage of imported raw ingredients had caused the production cost of breeding became not balanced with the output price. This condition had attracted farmers to develop livestock feed mill business with local raw ingredient basis. In 2011, the population of layer reached 3,479,976 in this area. (Dinas Peternakan Provinsi Sulawesi Selatan, 2012).

The increase of poultry feed production for layer is needed in an effort to fulfil and anticipate the need of poultry feed of big size layer. This must be supported by the availability of local raw ingredients of production

process so that the company can improve its business activity and gain maximum profit. The company considers both gaining profit to keep the running of the business and meeting demand of local poultry for layer from small scale feed mill.

The small scale feed mills produce feed with different quality. The quality of the feed should meet Indonesia National Standard (SNI). General Director of Husbandry issued regulation about quality supervision of feed ingredients and product from all feed mills. The inspection is held based on standard method established in A.O.A.C (*Association of Official Agricultural Chemist*). Based on SNI 01-3929 (2006) about poultry feed of laying hen. Various advanced technologies, starting from the procurement of raw ingredients, the quality control of the raw ingredients and also production process, ration formula, production process, packaging and storage until the feed is delivered to the farmers has been applied. The technology that is developed for industry must give additional value (Tangendjaja, 2007).

The objective of this study is to find out the difference between productivity and revenue of layer chicken farm that used small scale feed mill with Indonesia National Standard (SNI) and without Indonesia National Standard in Sidrap Regency South Sulawesi, Indonesia.

### MATERIALS AND METHODS

**Study area:** This research was conducted by using purposive sampling method, which is the selection of

sample intentionally on 148 farmers of layer in Sidrap District, South Sulawesi, Indonesia. The determination of the number of samples used formula  $(t-1) (r-1) = 15$  (Notobroto, 2009). The overall number of farmers' samples was 30 farmers, with 15 farmers using feed based on SNI and 15 farmers using feed not based on SNI. Data was obtained by interview and direct observation.

**Analysis method:** Evaluation of productivity and profitability of farmers using poultry from small scale feed mill was conducted by testing the comparison of the average of both sample groups with statistic t test instrument. Treatment applied were T0 : farmers using from small scale feed mill based on SNI or Indonesia National Standard and T1 was farmers using from small scale feed mill not based on SNI. Parameter being observed were *Hen Day Production* (HDP), *Feed Conversion Ratio* (FCR), *Benefit Cost Ratio*, *Break Event Point* (BEP) and *Income Over Feed cost* (IOFC). Poultry productivity based on Hen Day Production (HDP) and Feed Conversion Ratio (FCR) using the following formula:

$$HDP = \frac{\text{No. of egg production}}{\text{No. of hen alive that day}} \times 100\% \quad (1)$$

$$FCR = \frac{\text{the amount of feed spent (kg)}}{\text{egg production obtained (kg)}} \quad (2)$$

Poultry profitability is based on B/C ratio, Break Event Point (BEP), Income Over Feed Cost (IOFC) and applied the following formula:

B/C-ratio (*Benefit Cost-ratio*) analysis to find out whether the business run by farmers is profitable or not, the following formula is used: (Soekartawi, 2002):

$$B / C - \text{ratio} = B / TC \quad (3)$$

B : Benefit  
TC : Total cost

With criteria, if:

- B/C-ratio > 1 meaning that the business profitable,
- B/C-ratio = 1 meaning that the business break-even (neither profitable nor loss) and
- B/C-ratio < 1 meaning that the business is not profitable

**Break event point (BEP) analysis:** BEP analysis can be explained through mathematical approach. It can be done with two ways; they are based on unit and based on rupiah just like BEP definition stating that:

- The business is not gained profit or experienced loss

- Total income the same as total cost profit is equal to zero (Cahyono, 1996)

If :

P = Actual product price (IDR)

TC = Total cost

Y = number/total production (unit), then BEP is in Rupiah, the formula is as below:

$$BEP_{Rp} = \frac{TC}{Y} \quad (4)$$

Income Over Feed Cost (IOFC) is the difference of total income with total cost of feed using during the raising period of layer. According to Prawirokusumo (1990), formula that can be used is:

$$IOFC = \text{income} - \text{total feed cost} \quad (5)$$

t-test comparison is used to know whether there is significant difference between two sample groups using feed based on SNI and using feed not based on SNI by looking the difference in mean. T-test analysis can be used if in a research, there are same objects but different subjects. To make the data processing easier, SPSS 17 software was used.

## RESULTS AND DISCUSSION

**Characteristic of layer chicken farmers:** Age factor is one of factors that determined the success of a farmer because it deals with physical condition and the way of thinking in managing and expanding his business. Ages of farmer respondents are generally at productive age range. The age of farmer respondents in the research area were around 25 to 70 years old. Most farmers are still in productive age. Profile of layer farmer respondents using produced by small scale feed mill business in Sidrap district can be seen on Table 1.

Common education level in our society is from elementary level to university level. To solve problem and make decision in farming or layer farming, skill is not enough, someone must also have knowledge. Someone can get knowledge by attending formal or non formal education. Formal level education becomes one of parameters because it has range of time and certain standard. Level of layer farmer was mostly from high school level (47.97%).

Knowledge about the way to raise laying hen in Sidenreng Rappang district was mostly obtained by the people from their farm experience. The longer someone involves in farming, the more he masters the technique and the ins and outs of farming. The knowledge gained during farm gives them more experience about raising layer. Respondents experience was various between 1 to 20 years. The number of farmer respondents that

Table 1: Characteristic of farmer research respondents

Farmer Characteristic	Number	Percentage
	---- person ----	---- (%) ----
<b>Age</b>		
≤ 24 years old	1	0.68
25-34 years old	31	20.95
35-44 years old	65	43.92
45-54 years old	45	30.40
≤ 55 years old	6	4.05
<b>Total</b>	<b>148</b>	<b>100.00</b>
<b>Education</b>		
Elementary graduate	25	16.89
Junior High School Graduate	38	25.68
Senior High School Graduate	71	47.97
University Graduate	14	9.46
<b>Total</b>	<b>148</b>	<b>100.00</b>
<b>Farming experience</b>		
0-5 years	24	16.22
-10 years	84	56.76
11-15 years	25	16.89
≥ 16 years	15	10.13
<b>Total</b>	<b>148</b>	<b>100.00</b>
<b>Business scale</b>		
<2.500 chickens	92	62.16
2.500 - 5.000 chickens	46	31.08
>5.000 chickens	10	6.76
<b>Total</b>	<b>148</b>	<b>100.00</b>

Source : Primary data after processed, 2012

had farming experience from 6 to 10 years was 56.76%. Farmers with long experience in farm started their business before the monetary crisis in 1998 and bird flu epidemic in 2003, even their chicken population before those two occurrences happened more than its number now. It indicated that there was tendency that the bigger the business scale, the longer the experience of farm needs.

The grouping of farmer respondents business scale was based on the number of layer population raised by each farmer. Most farmer samples which was as much as 62.16% were at range of business scale less than 2,500 chickens, 31.08% of farmers were at scale between 2,500-5000 chickens and only 6.76% of farmers were at scale more than 5,000. The number of farmer at scale more than 5,000 chickens was fewer because they needed more complex permit, bigger capital, more workers, better management and more level of risk compared to business scale less than 2,500 and 2,500 to 5,000 chickens.

**Difference of productivity and revenue of layer chicken farm using small scale feed mill produced:** Nutrition content of feed is very essential in adjusting poultry need. Information about layer feed that is needed is raw protein, raw fibre and energy metabolism. Information about Calcium (Ca) and phosphor (P) content is also very useful as well as information about amino acid as feed source of protein (if possible), therefore laboratory analysis is needed. Result of nutrition content analysis in feed has been reported widely. Difference in nutrition

content can be caused by different in production area, the existence of forgery, length and condition of storage and also the process to produce feed.

Feed that was produced by small scale mill in research area was analyzed in laboratory to know its quality. The result of feed quality then will be adjusted with Indonesia National Standard (SNI) 01-3929-2006 about the standard quality of laying hen feed in layer phase. Zainuddin in Dewi *et al.* (2012) stated that nutrition standard in chicken ration in Indonesia is still using Scott *et al.* (1982) recommendation laying hen type light energy and protein 2600-3100 Kkal/kg and ration protein 18-24%, according to National Research Council (NRC) (1994) energy metabolism dan protein 2900 kkal/kg and protein 18%.

Febriyanti (2003) stated that attributes in poultry feed that are considered as the most important by consumers are feed nutrition content (protein), reasonable price, feed durability and technical services (TS). High content of raw fiber in feed can reduce ration consumption and cause nutrition absorption inhibited. The difference in nutrition content can occur because of difference in production area, the possibility of forgery, the length and condition of storage and also the process to produce those (Sinurat, 1999).

**Difference of productivity of breeding business using produced by small scale feed mill:** Hen Day Production (HDP) reflects real production from living chickens or from the number of chickens being kept. Hen Day Production (HDP) indicates good production that is used to identify daily production. Hen Day Production (HDP) is obtained from the calculation between the number of eggs produced and the number of chickens in percentage. Decrease in egg production is usually influenced by feed quality, problem with chicken health and also bad weather. On the average, HDP of layer farm business using feed based on SNI is 82.14% and using feed not based on SNI is 78.58%.

Feed Conversion Ratio (FCR) is known as the comparison between the amount of feed to the number of product given. During the starter-grower phase, feed is calculated from how much feed given divided by the body weight gain of chicken. During layer phase, feed is obtained from the amount of feed given divided by the number of eggs produced. On the average, FCR during this research for business using feed meeting SNI requirement was 2.12 and business using feed without SNI was 2.44.

The difference of layer productivity is seen from Hen Day Production (HDP) and Feed Conversion Ratio form the using of feed by farmers during farming level. Feed Conversion Ratio of chickens given feed based on SNI was significantly different with chickens given feed not based on SNI. Table 2 shows that there

Table 2: Result of productivity and profitability t-test of layer business using feed from small scale feed mill

Parameter	Feed not based on SNI	Feed based on SNI	Notation
Hen Day Production (HDP)	78.58	82.14	S
Feed Conversion Ratio (FCR)	2.43	2.12	S
B/C Ratio	0.86	1.02	S
Break Even Point (BEP)(Rp/egg)	822.8	807.6	S
Income Over Feed Cost (IOFC) (Rp/day)	1.031.300,80	1.214.076,73	S

S = significant at level 0.01

is real difference ( $p < 0.01$ ) between Hen Day Production and Feed Conversion Ratio of chicken given feed based on SNI and feed not based on SNI.

The lower the value of ration conversion, the higher the efficiency of ration usage and on the other hand, the higher the value of ration conversion, the higher and the ration needs to gain weight of body (Wahju, 1997). Layer take 80 to 90 weeks to produce. Production period that is considered profitable is for 15 months. By the time the chicken is at 22 weeks old, the production of eggs increases and reaches the peak at 28 to 30 weeks old, then egg production decreases slowly to 55% after chicken is at 82 weeks old.

From the improving of poultry farming productivity, it is expected that farmers income from the selling of eggs increases and the rate of loss caused by the death of the poultry decreases. Poultry can be resistant to diseases because its nutrition need id fulfilled. Indreswari *et al.* (2012) stated that improving in feed quality and management determines business efficiency. Proper and efficient portion of ration usage is expected to be able to improve optimum productivity of poultry by increasing the efficiency value of nutrient usage by the poultry. Brown strain egg weight and production can have better production efficiency and higher egg quality than white strain chicken. Raising brown layer is more useful for poultry industry (Ragheb *et al.*, 2013)

**Profitability difference of breeding business:** The analysis of income and profit of layer chicken farm business was conducted by calculating all expense components during production process. The calculation included feed, workers, chicks, tools and infrastructure and medicine and vaccine. Whenever there is increase in cost beyond critical limit will make the companies become not economical (Farooq *et al.*, 2002). Layer chicken farm business profitability used B/C ratio, Break Even Point (BEP) and Income Over Feed Cost (IOFC). Economy value deals with Benefit Cost Ratio (BCR) felt by farmers. Basic assumption applied in this approach was that farmers were willing to make relation with feed mill sides. It is determined by the analysis of comparison between cost and benefit or existence of cooperation between both sides. On the average BCR of layer business using feed based on SNI was 1.02 and the business using feed not based on SNI was 0.86. The result of the study implied that layer using feed

based on SNI was profitable, on the other hand, layer using feed not based on SNI experienced loss so that farmers need to be selective in choosing feed produced by small scale whose quality feed SNI requirement. Ekunwe and Alufohai (2009), egg distribution business that has Benefit Cost Ratio (BCR) 1.10 shows that the distribution of eggs is proper.

The safe limit of a business can be obtained through Break Even Point (BEP) or it can also be seen from the volume of production and price. From these analyses, it can be identified how big is the ideal level of selling of a business. Result of these analyses can be guidance in assessing the feasibility of a business in making decision if the income or revenue earned from the business can not cover the expense costs. The result of BEP analysis during this research for layer chicken farm business using feed based on SNI,  $BE_{Prupiah}$  value was Rp. 807,66 and for business using feed not based on SNI was Rp. 822,89. Research finding of Irmasusanti and Siregar (2012) showed that BEP of production price ( $BE_{Prupiah}$ ) layer business with business scale from 2,500 up to 5,000 chickens is Rp. 833,19/egg.

Income Over Feed Cost (IOFC) is a calculation to identify how much income that is gained after subtracted with feeding cost for a day. Daily IOFC calculation can be done by subtracting total revenue obtained for a day with total expense in the same day. On the average, laying hen breeding business using feed based on SNI is Rp. 1.214.076,73 and using feed not based on SNI is Rp. 1.031.300,80

The difference of breeding business using Feed with SNI quality and using feed without SNI quality can be seen in Table 2.

Table 2 shows that there is obvious and significant difference between the profitability of poultry given feed based on SNI and feed that was not based on SNI because p statistic value is less than 0.01. Poultry group that was given feed based SNI has higher profitability. Suprijatna (2005) research found out that increasing protein level during growth period did not influence the ration consumption. Cumulatively during production period, ration consumption, percentage of egg production and ration conversion did not show any difference except for increasing egg mass. Income Over Feed Cost during production period increased protein level that was sufficiently high showed better performance and profit. The result of produced by small scale feed mill using based on SNI in Sidrap district

showed the productivity and efficiency level in laying hen breeding business. Although it was only in small range scale, it was good enough.

Ekunwe dan Soniregun (2007) stated that on the average the poultry raising that was researched in small scale faced some main problems such as financial problem, high cost of feed, low price of egg and also high cost of vaccine and medicines. Chandrakumarmangalam and Vetrivel (2012), farming activities are subject of diversification covering agriculture, forestry, husbandry and fishery that include in agro basis industry in a broader sense. The development of villages to improve quality life of the people has opened the opportunity for people to participate and involve in the process of decision making in economy and social aspect of society life. Stephen (2011) found out that it is essential to have technology concept and its relevancy towards the building of poultry incubator by using local knowledge and with the help of local materials. Poultry feed businesses in the research area need government involvement for the sustainability of those small scale feed mills because feed is made of local raw so that it can contribute in increasing local area income. Economy analysis showed that BCR, BEP and IOFC of layer business using produced by small scale feed mill based on SNI has given proper result for farmers. Based on the previous explanation, it is expected that the level of relationship between farmers and small scale feed mill side can be maintained well so that people welfare is achieved.

**Conclusion:** Layer farmers who used produced small scale feed mill generally had business scale less than 5,000 chickens. Productivity and profitability of layer farming business using small scale feed mill production was suited to SNI, significantly different ( $P>0.01$ ) compared to one that wasn't based on SNI.

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