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Analysis of Production Function in Layer Chicken Business in Soppeng District

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Production function is one method to understand the effect of production inputs used in an effort to achieve maximum profit. This study aims to identify how the use of inputs has an influence on the production of layer eggs in Soppeng Regency. The research was conducted from August to October 2023 in Soppeng Regency. The number of samples was 67 layer breeders located in each sub-district in Soppeng Regency using *Nonprobability sampling* technique. Data were collected through observations and interviews. Data were analyzed using multiple linear regression with the *Cobb-Douglass* production function model, and tested through simultaneous tests and partial tests. Independent variables consisted of seedlings, labor, cage area, farmer experience, *Newcastle Disease* (ND) vaccine, *Avian Influenza (*AI) vaccine, concentrate feed, ground corn feed and bran feed. The dependent variable included production (eggs). The study showed tshat the use of inputs of seedlings, labor, cage area, farmer experience, *Newcastle Disease* (ND) vaccine, concentrate feed, and ground corn feed had a significant effect on egg production of laying hens in Soppeng Regency, while the variable *Avian Influenza (*AI) vaccine and, bran feed did not have a significant effect on egg production of laying hens in Soppeng Regency. So the practical implication of this research is that layer breeders in Soppeng Regency can increase egg production by focusing on the use of quality seeds, efficient labor, optimal utilization of cage area, increasing the experience and knowledge of farmers, as well as, the use of Newcastle Disease (ND) vaccine, concentrate feed and ground corn feed, while the use of Avian Influenza (AI) vaccine and bran feed should be re-evaluated because it does not have a significant impact on production.
Keywords: Cobb-Douglass, Production Function, Production Inputs, Egg Production, Laying Hens.

INTRODUCTION

Layer chicken production is a livestock sub-sector that plays an important role in meeting animal protein needs, providing employment for the community and empowering women (FAO 2019; Zegeye *et al*., 2023). The development of layer breeds has great potential (Santoso *et al*., 2024). One of the most popular livestock commodities in South Sulawesi is eggs. The type of livestock product that is easily obtained and eaten is purebred chicken eggs (Tilong *et al*., 2023). One of the egg production areas in South Sulawesi is Soppeng Regency. This district consists of 8 sub-districts which are the main areas for laying hen farming and are areas of great potential in the livestock sector. Layer breed chicken farming itself is a poultry farming sector with great potential in Indonesia (Prasetiawati *et al*., 2023).

The production level of broiler eggs in Soppeng Regency in 2018, the total production was 3,582,672 kg. In 2019 the amount of production amounted to 3,870,846 kg. In 2020 the amount of production amounted to 6,450,951 kg. In 2021 the total production amounted to 7,794,973 kg. In 2022 the total production amounted to 14,264,122 kg so that it can be observed that the amount of purebred chicken egg production in Soppeng Regency increases every year. This shows that the demand for animal protein among the community continues to grow.

However, the immediate situation in layer breeders in Soppeng Regency is experiencing high production costs and an up and down egg price situation. As a result, despite the increase in production, the profits obtained by layer chicken business actors have not been proportional to the costs used, so it can be interpreted that layer chicken farmers in Soppeng Regency failed to overcome this situation and caused their

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income to decline. This was also experienced by farmers in China in 2017, egg prices were in an up and down situation, and farmers failed to overcome the situation, and their income showed a marked decline (Yuhuan and Fu, 2019).

Efficiency is critical for the poultry farming industry to achieve high competitiveness, as this is influenced by production costs (Tangenjaya 2010; Ilham *et al*., 2022). Layer production costs are determined by the amount and price of various production goods used, including feed, DOC or pullets, vaccines, labor, and others (Play 2015; Saliu *et al*., 2015; Ilham *et al*., 2022). A similar situation exists in Malaysia, where the high cost of feed from farms significantly adds to the production cost burden (Gabdo *et al*., 2018).

One method to increase productivity and profit in the layer farming business is to understand the use of inputs on layer egg production. Thus, farmers can identify and manage the use of production inputs effectively, so that farmers can reduce production costs and increase profits. With the aforementioned explanation, this study was designed to identify and understand the effect of input use on layer egg production in Soppeng Regency.

The previous research that is considered relevant to this research is Abadi *et al*. (2022) the purpose of the study was to determine the factors that affect the production of laying hens in the Association of Berkah Telur Makmur. The analysis method uses *Cobb-Douglas* production function analysis. The variables analyzed were the number of seeds, the amount of feed, the amount of OVK, labor and cage area. The results obtained are the factors of the number of seeds, the number of OVK, the amount of feed, and labor have a significant effect on egg production in the laying hen farming business in the Association Berkah Telur Makmur, while the cage area obtained has no significant effect

MATERIALS AND METHODS

***Sources of Data*:** The research was conducted for 3 months, from August to October 2023. This research was conducted in Soppeng Regency, South Sulawesi Province, taking into account that Soppeng Regency is a regency where many people develop layer-breed chicken farms. The selection of research locations used a *purposive* method.

***Population and research sample*:** The population in this study was 208 layer breeders. These breeders are layer breeders with varying business scales, which are spread across 8 sub-districts in Soppeng Regency, namely Marioriwawo, Liliriaja, Donri-Donri, Liliriaja, Marioriawa, Citta, Ganra and Lalabata sub-districts. The sample was selected using the non-probability sampling method, taking into account the researcher, so that not all farmers in the population have the same opportunity to be sampled. When the research sample was taken, the information obtained was considered relevant to the purpose of the research being conducted (Mamondol, 2021). The Slovin formula is used to determine the number of samples needed when the population size is known. The significance of the sample of respondents in this study is $\alpha = 0.1$ so the sample size needed is 67 respondents.

The methods used to collect data in this research are

1. Observation, namely direct observation of laying hen farms in Soppeng Regency.
2. Interviews are the collection of data and information provided orally, interviews are conducted directly face-to-face with sources, namely laying hen breeders in Soppeng Regency. to facilitate the interview process, a questionnaire or list of questions aimed at laying hen breeders is used.
3. Literature study is data collection by utilizing data sources, which are related to research such as books, journals, theses and dissertations, and other relevant sources.

***Data Analysis*:** This study used quantitative data analysis of the Cobb-Douglass Production Function Model (FPCD) to analyze the relationship between inputs and outputs in the production process of laying hens. The Cobb-Douglas production function was used because researchers still find the Cobb-Douglas production function useful in survey analysis involving many variable inputs and measuring the scale of output, factor intensity of production and overall production efficiency. It can also provide a means of obtaining coefficients to test hypotheses (Cobb and Douglas, 1928; Odetola *et al*., 2024).

The calculation of the Cobb-Douglas function in this study utilizes Microsoft Excel 2010 and SPSS version 16. The Cobb-Douglas function formula is generally applied to agricultural production, namely: (Gani and Amalia, 2018)

$$Y = Y0\ X1b1\ .X2b2\ .X3b3\ .X4b4\ .....\ Xibi$$

To facilitate the calculation and analysis of the relationship between inputs and outputs, the model is converted into logarithmic form as follows:

$$\ln Y = in\beta0 + \beta1 \ln X1 + \beta1 \ln X2 + \beta1 \ln X3 + \beta1 \ln X4 + \beta1 \ln X5 + \beta1 \ln X6 + \beta1 \ln X7 + \beta1 \ln X8 - \beta1 \ln X9\ Ɛi$$

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Description:

Y = Dependent variable; β0= Intercept (Constant); Ln= Natural logarithm; β1= Regression coefficient; Ɛ= Random variable error (error)

Independent variables (Xi):

X1= Seedlings (tail); X2= Labor (HOK); X3= Area of the cage (m^2); X4= Farmer experience (years); X5= *Newcastle Disease* (ND) (ml); X6= *Avian Influenza* (AI) (ml); X7= Concentrate feed (kg); X8= Ground corn feed (kg); X9= Bran feed (kg)

***Research Hypothesis*:** The research hypothesis used to see the effect of the use of various inputs on layer egg production in Soppeng Regency is as follows:

1. H0 = It is assumed that the use of production inputs (seedlings, labor, cage area, farmer experience, Newcastle Disease (ND) vaccine, Avian Influenza (AI) vaccine, concentrate feed, ground corn feed, bran feed)

has no significant effect on egg production of laying hens in Soppeng Regency.

2. H1 = It is suspected that production inputs (seedlings, labor, cage area, farmer experience, Newcastle Disease (ND) vaccine, Avian Influenza (AI) vaccine, concentrate feed, ground corn feed, bran feed) have a significant effect on egg production of laying hens in Soppeng Regency.

RESULTS

***Respondent Characteristics*:** The characteristics of respondents are detailed in several important points that include the age of the farmer, gender, and education level. Characteristics of respondents of layer breeders in Soppeng Regency can be seen in Table 1.

Table 1. Characteristics of respondents.

Respondent Characteristics	Number (Person)	Percentage (%)
Age		
<15	0	0.0
15 - 65	64	95.5
> 65	3	4.5
Gender		
Male	58	86.6
Female	9	13.4
Education Level		
Elementary school	11	16.4
Junior high school	19	28.4
Senior high school	33	49.3
Scholar	4	6.0

Source. Primary data processed, 2024

Based on Table 1. Respondent characteristics indicate that the average age of layer breeders in Soppeng Regency ranges from 15-65 years. The age of farmers is still classified as productive. In terms of gender, 86.6% of the respondents were male, while 13.4% were female. In terms of education level, the average farmer has a high school education equivalent of 49.3%.

***Production Function*:** The use of egg production inputs for laying hens in Soppeng Regency are seedlings, labor, cage area, farmer experience, *Newcastle Disease* (ND) vaccine, *Avian Influenza* (AI) vaccine, concentrate feed, ground corn feed, and bran feed. Based on the results of research on the use of production inputs to the production of laying hens in Soppeng Regency can be seen in Table 2.

***R2 Test*:** The value that indicates the large or small level of diversity in the dependent variable can be explained by the independent variable is the coefficient of determination. The coefficient of determination is used in evaluating how much the independent variable can explain the dependent variable (Damayanti, 2019). From the R-square value of 0.928 obtained, it can be concluded that as many as 92% of the independent variables have an impact on the dependent variable. This means that the variables applied in this study were carefully selected to explain 92% of the dependent variable, while the remaining 8% were influenced by other factors not included in the study.

Table 2. Results of Multiple Linear Regression Analysis of *Cobb-Douglas* Production Function.

Variables	Regression coefficient	Std. error	t-count	Sig.
Constant	3,280	1,000	3,280	0,002
Seedlings	0,376	0,097	3,870	0,000
Labor	0,097	0,042	2,288	0,026
The size of the cage	0,291	0,122	2,386	0,020
Breeder experience	0,069	0,030	2,322	0,024
ND Vaccine	0,161	0,078	2,048	0,045
AI Vaccine	0,059	0,063	0,946	0,348
Concentrate feed	0,431	0,182	2,367	0,021
Ground corn feed	0,656	0,325	2,016	0,048
Bran feed	-0,023	0,100	-0,226	0,822
R-Square	0,928			
F-Count	81.686			

Source: Primary Data Analysis, 2024
Description: F table α 0.05: 2,05, T table α 0.05: 1,672

***F Test*:** Simultaneous (F) test is a test to see the magnitude of the association of independent variables on the dependent variable. The following F test results in this study can be found in Table 3.

Table 3. F Test Results.

F-statistics	F-table	Conclusion
81.686	2,05	H_0 is rejected

Source: Primary data processed, 2024

According to Table 3, the regression analysis results show that the F value obtained is 81.686, while the F table value is 2.05. This value explains F count > F table with α 0.05. This indicates that layer production is simultaneously related to the independent variables in the model. H1 states that layer production is jointly influenced by the use of seedlings, labor, cage area, farmer experience, Newcastle Disease (ND) vaccine, Avian Influenza (AI) vaccine, concentrate feed, ground corn feed and bran feed used simultaneously influence layer production.

***T-test*:** Measuring the magnitude of the influence of independent variables is the t test, which consists of seeds, labor, cage area, farmer experience, *Newcastle Disease* (Nd) vaccine, Avian Influenza (AI) vaccine, concentrate feed, ground corn feed and bran feed. This study uses a 95% confidence level α = 0.05 and degrees of freedom (df) = n-k = 67- 10 = 57. Based on the results of the t-test analysis can be seen in Table 4.

Table 4. T-test Results.

Free Variable	t-statistic	t-table
Seedlings	3,870	1,672
Labor	2,288	1,672
The size of the cage	2,386	1,672
Breeder experience	2,322	1,672
Newcastle Disease (ND) Vaccine	2,048	1,672
Avian Influenza (AI) Vaccine	0,946	1,672
Concentrate feed	2,367	1,672
Ground corn feed	2,016	1,672
Bran feed	-0,226	1,672

Source: Primary data processed, 2024

Based on Table 4, the t-test indicates that the variables that have a significant relationship with layer production are seedlings, labor, cage area, farming experience, *Newcastle Disease* (ND) vaccine, concentrate feed and ground corn feed. While the variables that do not have a significant influence with the production of laying hens are Alvian Influenza (AI) vaccine and bran feed.

***Seeds*:** The t-count value of the seed variable is 3.870 > 1.672, which means that the t-count value is higher than the t-table at the 0.05 significance level. Therefore, there is an influence with significance on the egg production of laying hens in Soppeng Regency. The regression coefficient value obtained is 0.376 with a positive sign which means that there is a unidirectional relationship, this means that with the addition of 100 laying hen seedlings, egg production of laying hens will increase by 37 eggs, assuming other variables are constant or unchanged. This is consistent with (Lestari's, 2022) that the use of the number of chickens (seedlings) used has a positive and significant impact on the production of laying hen seedlings in the Wei Kenanga area of West Turang Bawan District.

***Labor*:** The t-count value of the labor variable is 2.288, which is higher than the t-table of 1.672 with a significance standard of 0.05. This shows that there is a significant influence with the egg production of laying hens in Soppeng Regency. The regression coefficient value obtained is 0.097 with a positive sign indicating a unidirectional relationship. Thus, if the labor variable increases by 100 HOK, egg production will increase by 10 eggs, assuming other variables remain constant. This finding is consistent with the research of Idris *et al*. (2023) which shows that the labor variable has a positive and significant influence on egg production of laying hens in Karuppan Village, Maiwa District, Enrekang Regency.

***Cage area*:** The calculated t value of the variable cage area is 2.386> 1.672, which means it is higher than the t table at the 0.05 significance level. Thus, it is concluded that there is a significant effect on egg production of laying hens in Soppeng Regency. The regression coefficient value of 0.291 with a positive sign indicates a unidirectional relationship, which is concluded that if the cage area increases by 100 m^2, egg production will increase by 29 eggs, provided that other variables remain constant or unchanged. This is similar to the findings of Idris *et al*. (2023) which showed that the variable cage area had a positive and significant effect on the egg production of purebred chickens in Karuppan Village, Maiwa District, Enrekang Regency, and the same research results from Murib *et al*. (2014) which showed that cage size had a positive and significant effect on egg production in Halma Banjarharjo farm, Ngemprak District, Sleman Province.

***Breeder Experience*:** The t-count value of the breeder experience variable is 2.322> 1.672, which is higher than the t-table with a significant level of 0.05, so it is concluded that there is a significant effect on egg production of laying hens in Soppeng Regency. The regression coefficient value is 0.069 with a positive sign can indicate a unidirectional relationship and can be interpreted if the more experience of breeders by 1 year, egg production increases by 0.069%, provided that other variables are constant or unchanged. This is the same as the results of research from Ningsih (2014) showing that the farmer experience variable has a significant relationship with broiler egg production. Where farmers with many years of experience affect egg production.

***Newcastle Disease (ND) vaccine*:** The t-count value of the vaccine variable is 2.048> 1.672 which is higher than the t-table at a significant level of 0.05 so, it can be concluded that the use of the Newcastle Disease (ND) vaccine has a significant effect on egg production of laying hens in Soppeng Regency. The regression coefficient value is 0.161 with a positive sign can show a unidirectional relationship and means that if the Newcastle Disease (ND) vaccine increases by 1% then egg production increases by 0.161%, provided that other variables are constant or do not change. This is the same as the findings of Okechukwu *et al*. (2020) from the results of his research showing the use of ND vaccine with three repetitions for three months can protect laying hens from decreasing egg production, so it can be interpreted that the ND vaccine variable has a significant effect on egg production of laying hens in Soppeng district.

***Alvian Influenza Vaccine (Ai)*:** The t-count value of the vaccine variable is 0.946> 1.672, which is smaller than the t-table with a significant level of 0.05 so it is concluded that it does not have a significant effect on the production of purebred chicken eggs in Soppeng Regency. The regression coefficient value is 0.059 with a positive sign can show a unidirectional relationship and means, if the Avian Influenza (AI) vaccine increases by 1% then, egg production will increase by 0.059%, provided that other variables are constant or unchanged. This is similar to the results of research by Samadieh and Bankowski (1970) that the use of AI vaccine did not significantly increase egg production in vaccinated chickens.

***Concentrate Feed*:** The t-count value of the feed variable is 2.367> 1.672, which is higher than the t-table at a significant level of 0.05 so that it can be said that there is a significant effect on egg production of laying hens in Soppeng Regency.

The regression coefficient value is 0.431 with a positive sign can show a unidirectional relationship and means that if the concentrate feed increases by 1% so that egg production will increase by 0.431%, provided that other variables are constant or unchanged. This is the same as the results of research by Purnamasari *et al*. (2022) showed that the average use of concentrate feed used was 35% of the total feed, and it was concluded that it was efficient from the use of concentrate feed of 50%. which will cause large cost expenditures**.**

***Ground Corn Feed*:** The calculated t value of the feed variable is 2.016 > 1.672, which is higher than the t table at the 0.05 significance level. Therefore, it can be explained that there is a significant influence with purebred chicken egg production in Soppeng Regency. The regression coefficient value of 0.656 with a positive sign shows a unidirectional relationship, meaning that if ground corn feed increases by 1%, egg production will increase by 0.656%, provided that other variables remain constant or unchanged.

Bran feed: The calculated t value of the feed variable is -0.226 > 1.672, which means it is smaller than the t table with a significance level of 0.05. Explaining that there is no significant influence with egg production of laying hens in Soppeng Regency. The regression coefficient value of -0.023 with a negative sign indicates an opposite relationship, which means that if ground corn feed increases by 1%, egg production will decrease by 0.023%, provided that other variables remain constant.

DISCUSSION

The effect of seeds with egg production of laying hens in Soppeng Regency explains the significant effect. This is due to variations in the number of layer breeds used by farmers in Soppeng Regency. The more the number of laying hens used by farmers, the greater the egg production produced. This is the same as the results of research from Khan *et al*. (2022) that the larger the number of laying hen flocks, the relationship with increasing egg production is higher. Also confirmed by Udeh (2010) in his research showed that the number of chickens used was larger, tending to obtain high egg production.

Egg production of laying hens in Soppeng Regency has a significant influence with labor. This is due to the quality and quantity of labor in providing optimal time devotion at each stage of production. Laying hen farms in Soppeng Regency use more male labor than female labor. This is in accordance with the opinion of (Hartono *et al*., 2021) in his research explaining that seen from the contribution of male and female workers, male workers play a greater role in the livestock sector, this is because the livestock business is a job that requires labor so it is better handled by male workers.

The effect of the use of cage area with egg production of laying hens in Soppeng Regency has a significant effect. This is because the cage area used by farmers in Soppeng Regency provides sufficient and comfortable space for their laying hens. Adequate cage area greatly affects the number of seeds used, the more seeds used, the wider the cage needed. The availability of sufficient space allows chickens to move freely, reduces stress, and improves their health and productivity. This opinion is similar to Wan *et al*. (2023) that chickens in large cages show high levels of egg production and better feed efficiency than chickens in small cages.

The effect of the use of breeder experience with egg production of laying hens in Soppeng Regency has a significant effect. This is because the average layer breeder in Soppeng Regency has sufficient experience, more experienced breeders can minimize negative impacts or losses on egg production. (Sumner *et al*., 2011). Also confirmed by Nidamanuri *et al*. (2017) who showed in their research that experienced farmers are better able to manage heat stress in laying hens, which is important for maintaining egg production in changing climatic conditions.

The effect of Newcastle Disease (ND) vaccine use with egg production of laying hens in Soppeng Regency has a significant effect. This is because most research respondents used the Newcastle Disease (ND) vaccine 3 to 4 times during the 6-month egg production phase. However, there are still a small number of farmers who only use the Newcastle Disease (ND) vaccine 2 times for 6 months. This is because farmers reduce their production costs to obtain maximum profit. However, farmers must maintain the use of Newcastle Disease (ND) vaccines in their laying hens, because based on reports from (Maliki *et al*., 2017; Santoso *et al*., 2024) that the decline in opinions in the laying hen business is caused by increased production costs and decreased production of laying hens due to Newcastle Disease (ND) infecting laying hens.

Newcastle Disease (ND) vaccines play an important role in maintaining chicken health and preventing the spread of ND disease, which is known as one of the deadliest diseases for laying hens. Transmission of ND disease occurs when healthy birds breathe in air that has been contaminated by the virus from sick birds in the vicinity. Transmission can also occur through infected chicken carcasses or indirectly through personnel and cage equipment contaminated with the virus (Kencana *et al*., 2015). In general, symptoms of ND include loss of appetite, decreased egg production, and swelling or edema around the eyes (OIE, 2012).

The effect of Avian Influenza (AI) vaccine use on egg production of laying hens in Soppeng Regency did not have a significant relationship with egg production but did have an effect on preventing and protecting against death from AI virus infection. This is similar to the results of research by Bertran *et al*. (2015) which showed that although AI vaccines can help reduce AI virus infection rates, the effect on egg production was not significant. On average, farmers in Soppeng Regency only give AI vaccine once every three to four months. Lack of vaccine is considered the most

challenging risk according to all production systems (Zegeye *et al*., 2023).

The effect of concentrate feed use on egg production of laying hens in Soppeng Regency has a significant effect. This is because layer breeders in Soppeng Regency use a concentrate feed formula of 30% - 35% which indicates that the use of concentrate feed for laying hens in Soppeng Regency is appropriate. Providing the right amount of feed is a major factor in egg production (Altahat *et al*., 2012).

The effect of the use of ground corn feed with egg production of laying hens in Soppeng Regency has a significant effect. This is because layer farmers in Soppeng Regency use a 45% - 50% ground corn feed formula. It should be noted that ground corn feed is one of the main components in layer feed rations because of the main energy content in layer feed (Farag *et al*, 2022). It was also emphasized by Singh *et al*. (2014) that ground corn is a good choice for increasing egg production.

The effect of bran feed variables on egg production of laying hens in Soppeng Regency did not have a significant effect. This is because layer breeders in Soppeng Regency use a bran feed formula of 15% - 20%. This is similar to the results of research from Safamehr and Attarhoseini (2011) which showed that the addition of rice bran up to 15% in laying hen feed did not have a significant effect on egg production, feed consumption, egg mass, or egg quality, so this indicates that rice bran does not significantly increase laying hen egg production. Wang *et al*. (2023) in their study found that although there was some improvement in certain parameters, the effect was not significant in terms of overall egg production.

This study has identified various production inputs that have a significant effect on egg production, such as seedlings, labor, cage area, farmer experience, *Newcastle Disease* (ND) vaccine, concentrate feed and ground corn feed. However, there are several limitations that need to be considered so that the results of this study can be interpreted more carefully. One of the limitations of this study is the sampling. The sample used may not be fully representative of the population of layer breeders in Soppeng Regency. This may affect the generalization of the results of this study to a wider population. In addition, this study only analyzed certain variables and did not include all variables that might affect egg production such as weather changes, water quality and other diseases besides Newcastle Disease and Avian Influenza.

This study also has limitations on external factors that may affect the results of this research, such as climate and weather conditions. Climate and weather variability can affect the health and productivity of laying hens. For example, extreme temperatures can cause stress in hens which results in a decrease in egg production. Other factors include fluctuations in feed prices and production costs. High feed prices or changes in feed availability can influence farmers' decisions on the use of certain feeds.

Based on the limitations of this study, the results of this study recommend that layer chicken farmers in Soppeng Regency focus on using high-quality breeds for optimal production results. Farmers should ensure that the seedlings used come from a reliable source and have a good health record. Optimizing the workforce is also important, by providing regular training on farm management, and chicken care.

Adequate cage space is essential to reduce stress in the chickens and increase egg production. The coop should have good ventilation, enough space for the chickens to move around and cleanliness should be maintained. Farmer experience has also proven to be important, less experienced farmers should seek mentors or attend training to improve their skills. The use of *Newcastle Disease* (ND) vaccine should be a priority as it has been shown to significantly increase egg production. Vaccination should be done regularly according to the recommended schedule. The use of concentrate feed and ground corn has also been shown to be significant, so the feed should contain adequate and balanced nutrition. The use of bran feed, which was not significant and showed negative signs, should be reduced.

Although the *Avian Influenza* (AI) vaccine was not significant, it showed a positive effect and can still be considered as a disease prevention measure. By following these recommendations, it is expected that farmers can significantly increase egg production and optimize the efficiency of farming in Soppeng District.

The results of this study provide a basis for future research to further explore other production factors that may affect egg production and develop more effective strategies to increase the productivity of layer farms in a region.

***Conclusion*:** Production inputs that had a statistically significant effect on egg production were seedlings, labor, cage size, farmer experience, Newcastle Disease (ND) vaccine, concentrate feed and ground corn feed. The use of higher quality seedlings, skilled and efficient labor, and spacious and adequate cages were shown to significantly increase egg production. Farmers' experience in farm management also plays an important role in improving the effective use of production inputs. In addition, ND vaccines used regularly have proven effective in maintaining chicken health and increasing egg production. The use of good concentrate feed and ground corn provides adequate and balanced nutrition for the chickens, thereby increasing egg productivity. On the other hand, there is an insignificant use of production inputs on layer production in Soppeng Regency which is the use of Avian Influenza (AI) vaccine, although insignificant, it shows a positive influence on egg production. Although not statistically significant, the use of *Avian Influenza (*AI) vaccines can help in the prevention of disease in chickens which can consequently reduce production. In

addition, the use of bran feed was not significant and even showed a negative sign on egg production. This suggests that bran feed may not provide adequate or balanced nutrition to the chickens, so it is advisable to minimize its use.

***Authors contribution statement*:** Hasraful Anang, who wrote this article, contributed to concept development, data collection, formal analysis, funding acquisition, project administration, and draft writing; Syahriadi Kadir, contributed to conceptualization, monitoring, and validation; Kasmiyati Kasim, contributed to conceptualization, methodology, validation, and writing.

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***Availability of data*:** All data used are within the manuscript.

***Informed consent*:** Informed consent was obtained from all individual participants included in the study.

***Consent for publication*:** All authors have submitted consent to publish this research article in JGIAS.

***SDG's Addressed*:** No Poverty, Zero Hunger, Good Health and Well-being

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