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Allocative Efficiency of Sentul Chicken Farming in Ciamis Regency, West Java Province, Indonesia

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Abstract
This research was carried out with the aim to determine allocative efficiency, factors that influence allocative inefficiency and the level of allocative efficiency achieved in the Sentul chicken farming in Ciamis District. Allocative efficiency is approached by using a stochastic frontier cost function model. The results showed that output and feed costs have a positive and significant effect on production costs, while day-old chicken costs, labor costs and veterinary costs have no significant effect. Education, family size, sex and extension have a significant effect on allocative inefficiency, while age, experience and access to credit have no significant effect. Allocative efficiency level ranged from 0.4561 to 0.9956 with an average of 0.7984.
Keywords: Sentul chicken, Allocative efficiency, Allocative inefficiency

1. Introduction

Local chickens are one of the sources of meat and egg supply (Awaluddin, 2012), but there are still obstacles in the development of local chicken (Daryono, et al., 2012) and the level of efficiency (Saptana, 2012; Asnah, et al., 2015). Farmers are also faced with the constraints of limited production factors so that the use of production factors must be as efficient as possible (Darwanto, 2010). Efficiency consists of technical efficiency, allocative/cost and economical (Ogunniyi and Ajao, 2012). Technical efficiency is a requirement for the requirement to measure allocative efficiency and economic efficiency (Suprapti, et al., 2014). Cost efficiency is needed if the company wants to maximize profits or minimize costs (Ouattara, 2012).

Sentul Chicken is a native chicken from Ciamis District. Isyanto et al (2016) have conducted research on the efficiency of Sentul chicken farming by using R/C ratio which shows that the factors that influence the efficiency of Sentul chicken farming are productivity, number of chicken ownership, training, education, and experience. Sudrajat and Isyanto (2018) conducted a research on Sentul chicken farming income which showed that the number of chicken ownership, education, family siza, labor and access to credit had a significant effect on the income of Sentul chicken farming.

Research on allocative efficiency in Sentul chicken farming is still relatively rare, this is what underlies the implementation of this research. Some studies show the factors that influence costs are labor (Ogundari and Ojo, 2007); output, feed costs, drug costs (Ashagidigbi et al, 2011); land area (Rido, 2014). Some studies show factors that influence cost inefficiency are experience, education, marital status, extension, credit, sex (Ashagidigbi et al, 2011); land area, education, age (Rido, 2014); family size, education, number of livestock ownership, extension, group membership, land area (Debebe et al, 2015).

2. Research Methodology

The study sample consisted of 100 farmers who were taken randomly from 10 sub-districts in Ciamis Regency. the data used consists of primary and secondary data. The empirical model used is the Cobb-Douglas stochastic frontier cost function with the following equation:

$$\ln C = \beta_0 + \beta_1 \ln Q + \beta_2 \ln X_1 + \beta_3 \ln X_2 + \beta_4 \ln X_3 + \beta_5 \ln X_4 + v_i - u_i \quad (1)$$

where: C = production cost (Rp), X_1 = output (tail), X_2 = day-old chicken cost (Rp), X_3 = feed cost (Rp), X_4 = labor cost (Rp), X_5 = veterinary cost (Rp), β = regression coefficient.

The empirical model used to estimate the factors that influence the cost inefficiency of Sentul chicken farming as follows:

$$\mu_i = \delta_0 + \delta_1 Z_1 + \delta_2 Z_2 + \delta_3 Z_3 + \delta_4 Z_4 + \delta_5 Z_5 + \delta_6 D_1 + \delta_7 DZ_2 + \delta_8 DZ_3 \quad (2)$$

where: μ_i = allocative inefficiency, Z_1 = age (year), Z_2 = education (year), Z_3 = experience (year), Z_4 = family size (person), Z_5 = number of chicken ownership (tail), D_1 = sex (1 if male, 0 if other), D_2 = extension (1 if following extension, 0 if not), D_3 = access to credit (1 if having access to credit, 0 if not), δ = regression coefficient..

3. Results and Discussion

3.1. Factors Affecting Allocative Inefficiency

Analysis of the cost function and the factors that influence allocative inefficiency are carried out using the stochastic frontier cost function where data processing uses software frontier 4.1 TE effect model as can be seen in Table 1.

Tabel 1. Factors Affecting Allocative Inefficiency

Variable	Coefficient	Standard-error	t-ratio
Intercept	0.5490	0.2260	2.4291
Output	0.5947	0.0382	15.5886[a]
Day old chick cost	0.0369	0.0585	0.6309
Feed cost	0.1050	0.0052	20.0616[a]
Labor cost	0.1132	0.1189	0.9514
Veterinary cost	0.0999	0.4990	2.0040[b]
Intercept	-0.2548	0.2973	-0.8572
Age	-0.0067	0.0276	-0.2417
Education	0.3171	0.0663	4.7819[a]
Experience	-0.0111	0.0730	-0.1520
Family size	-0.4565	0.1013	-4.5068[a]
Sex	0.2779	0.0775	3.5847[a]
Extension	0.1236	0.0410	3.0161[a]
Credit	0.0145	0.1004	0.1449
Sigma-squared	0.0075	0.0013	5.8046[a]
Gamma	0.9999	0.0024	410.9066[a]
Log likehood function = 151.9353[a]			
LR test of the one-sided error = 181.8578[a]			

a,b significant at 1%, 5%

Sigma-square value (σ^2) more than zero indicates that the Sentul chicken farming in Ciamis District has not yet reached full efficiency level. A value of γ more than zero indicates the effect of allocative inefficiency in the model. Value of γ equal to 0.9999 indicates that the variation of production cost was due to allocative inefficiency.

Output and feed costs have a positive and significant effect on production costs, while day-old chicken costs, labor costs and veterinary costs have no significant effect. The more output the higher the production cost. Similar findings were reported by Ashagidigbi et al (2011) and Haile (2015). Feed costs have a positive and significant effect on production costs. Similar findings was reported by Amar et al (2015). This shows that the feed used has good quality and can support the growth of chicken body weight.

The cost of day-old chicken, labor costs and veterinary costs do not have a significant effect on production costs. Regression coefficients of the variable day-old chicken costs, labor costs and veterinary costs that are positively marked indicate that additional day-old chicken costs, labor costs and veterinary costs will increase production costs.

Age does not have a significant effect on allocative inefficiency. Regression coefficient with a negative sign indicates that increasing the age of the farmer will increase cost efficiency. Similar finding was reported by Islam et al (2011). Education has no significant effect on allocative inefficiency. The regression coefficient has a positive sign indicating that improving education will reduce cost efficiency. Similar findings have been reported by Sibiko et al (2013) and Haile (2015).

Experience has no significant effect on allocative inefficiency. Regression coefficient with a negative sign indicates that increasing experience will increase cost efficiency. Similar findings have been reported by Ashagidigbi et al (2011), Sibiko et al (2013) and Umar et al (2015). Family size has a significant effect on allocative inefficiency. Regression coefficient with negative sign indicates that increasing family size will reduce cost efficiency. This shows that the workforce has good technical skills. The same findings have been reported by Umar et al (2015).

Sex has a significant effect on allocative inefficiency. The regression coefficient has a positive sign indicating that the technical efficiency achieved by female farmers is higher than that of farmers breeders. In other words, female farmers are more efficient in using fees compared to male farmers. Similar findings have been reported by Ashagidigbi et al (2011) and Sibiko et al (2013).

Extension has a significant effect on allocative inefficiency. Positive coefficient of regression indicates that the technical efficiency achieved by farmers who follow extension is lower than those of farmers who do not attend extension. The same findings have been reported by Umar et al (2015) and Haile (2015). Access to credit has no significant effect on allocative inefficiency. Positive coefficient of regression indicates that the technical efficiency achieved by farmers who have access to credit is lower compared to farmers who do not have access to credit. The same findings have been reported by Mutoko et al (2015).

3.2. Allocative Efficiency Level

The allocative efficiency achieved in the Sentul chicken farming varied from the lowest 0.4561 to the highest 0.9956, with an average of 0.7984 as shown in Table 2.

Tabel 2. Allocative Efficiency Level

No	Allocative Efficiency	The Number of Farmers (people)	Persentage (%)
1	0,41 - 0,50	3	3,00
2	0,51 - 0,60	10	10,00
3	0,61 - 0,70	16	16,00
4	0,71 - 0,80	15	15,00
5	0,81 - 0,90	35	35,00
6	0,91 - 1,00	21	21,00
	Total	100	100,00
Minimum		0,4561	
Maximum		0,9956	
Average		0,7984	

Table 2 shows that farms that achieve allocative efficiency are below 0.71 as many as 29 people, while those above 0.71 are 71 people. This shows that most farmers have achieved a high level of allocative efficiency so that farmers can earn high income in the Sentul chicken farming. However, efforts to increase allocative efficiency need to be done for farmers who achieve cost efficiency values below 0.71 through technical assistance. The illustration of the level of allocative efficiency can be seen in Figure 1.

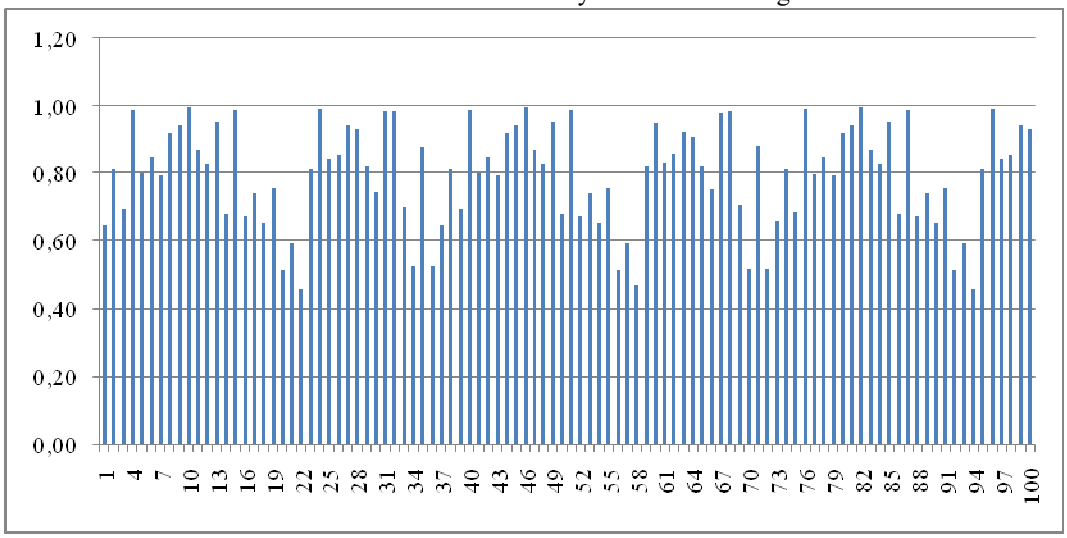

Figure 1. The Level of Allocative Efficiency

4. Conclusion

Output and feed costs have a positive and significant effect on production costs, while day-old chicken costs, labor costs and veterinary costs have no significant effect. Education, family size, sex and extension have a significant effect on allocative inefficiency, while age, experience and access to credit have no significant effect. Allocative efficiency level ranged from 0.4561 to 0.9956 with an average of 0.7984.

5. Recommendation

The involvement of women in barul chicken farms needs to be improved so that allocative efficiency can be increased which can increase the income of farmers' families. Technical skills of farmers and their families can be improved through technical guidance activities.

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