Economics of resource use efficiency in Poultry enterprise in Jaipur District of Rajasthan State

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Abstract

The present study examined the factors that affect the poultry production in poultry enterprise of Jaipur district of Rajasthan state. The sample size of twenty poultry farms were randomly selected from a list of two hundred poultry farms in Jaipur district. The cob douglas production function was used to determine the factors affecting the poultry production as well as resource use efficiency. The ratio of marginal value product (MVP) and marginal factor cost (MFC) defined the resource use efficiency. The major factors involved in the poultry production like cost of chicks, feed cost, medicine cost, transportation cost and human labour cost were chosen for computation of resource use efficiency. The efficiency indicator i.e. RUE= 0.27 for feed cost showed feeds were over utilized and other factors RUE indicated that the cost of chicks, medicine cost, transportation cost and human labour cost were found underutilized.

Keywords: MFC, MVP, poultry enterprise, Resource use efficiency

Introduction

Livestock is important for increasing productivity in agriculture sector. Among the Indian livestock based vocations, poultry farming occupies a pivotal position due to its enormous potential to bring about rapid economic growth with low investment. Poultry industry contributes about Rs. 400 billion accounting for about 0.7 per cent of the national GDP and about 10% of the Livestock GDP.(FAO Statistical Book, 2011). Poultry sector is dubbed as the one having highest employability per unit of investment among all the livestock sectors. The Indian poultry sector with 7.3% growth in poultry population, has witnessed one of the fastest annual growth of about 6% in eggs, 10% in meat production and 8.35% in broiler production over the last decade amongst all animal based sectors (FAOSTAT). In spite of a spectacular growth in the poultry sector during the past two decades, a huge gap exists between availability and need of poultry products. Despite such progress, the average per capita availability is still merely 53 eggs and 2.4 kg of poultry meat against the recommended levels of improved upon. Therefore, it is a high time to evaluate the different economic aspects from standpoint of performance of poultry farms in Jaipur district of Rajasthan.

Materials and method

The study was conducted in Jaipur district of Rajasthan state of India. In the organized poultry farming Jaipur district occupies the second place in both layers and broilers population in the state {about 3.22 lakhs total poultry population (Directorate of Animal Husbandry, Jaipur)} and most of poultry farms of district are concentrated in and around Jaipur city. There were 200 organized poultry farms in Jaipur district. A 10 per cent sample that is 20 poultry farms were selected randomly for the present study.(Nmadu et al. 2013) Both primary and secondary data were used for the study. The relevant primary data were collected by interviewing the farmers personally and from the records maintained by them with the help of pre-prepared schedules for the year 2010-11 to 2012-13. The secondary data with respect to the list of organized farms, egg prices were collected from Directorate of animal husbandry, Jaipur. The efficiency of resource use in poultry farm were determined by using the multiple regression model. To obtain the marginal product of some inputs used

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in poultry farm, a production function was estimated using the ordinary least square (OLS) method.(Vincent *et al*. 2010)

The factors affecting gross return of poultry farm in the study area were identified by regressing gross returns on the following explanatory variables.

Functional relationship

$y = f (x_1, x_2, x_3, \ldots\ldots\ldots\ldots\ldots\ldots, x_5)$

Where,

Y = gross return

x_1 = feed cost

x_2 = veterinary Expenses

x_3 = Cost of day old chicks

x_4 = Cost of Transportation

x_5 = Human labour

Both linear and log-linear (Cobb-Douglas) forms of the multiple regression function as shown below were fitted to the data.

(i) Multiple linear functional forms

$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + \ldots + b_5 X_5 + U$

(ii)Multiple log-linear (Cobb-Douglas) functional form

$Y = a\ X_1^{b1}\ X_2^{b2}\ X_3^{b3} \ldots\ldots\ldots X_5^{b5}\ U$

Which on log transformation takes the following form:

$Log\ Y = Log\ a + b_1\ Log\ X_1 + b_2\ Log\ X_2 + \ldots\ldots + b_5\ Log\ X_5 + U$

Based on the magnitude of R^2 (coefficient of determination) and significance of the estimated regression coefficients multiple log-linear (Cobb-Douglas) relationship was chosen for further study.

The marginal analysis of input utilization was used to estimate the resource use efficiency in poultry farm production. This is given thus:

Resource-use efficiency (RUE) = MVP/MFC

Where,

MVP = Marginal value product of each input.

MFC = Marginal factor cost of each input.

RUE = Resource-use efficiency.

The resource use efficiency could be judged based on the MVP (marginal value productivities), which indicates the increase in the gross return from the use of an additional unit of a given input while keeping the level of other inputs constant. The marginal value productivity of the ith input was measured by using the following formula:

$$MVP = b_i \frac{\overline{Y}}{\overline{X_i}}$$

bi = Regression coefficient of ith factor

Y = Geometric mean of gross returns (Rs)

Xi = Geometric mean of ith input (Rs).

The MFC of input can either be taken as the market price or geometric mean value of the input costs, or depreciation of durable assets. The poultry producers would be assumed to be purchasing their input in a purely competitive market.

Thus, When Resource-use efficiency RUE = 1, resources are optimally utilized; When RUE < 1, resources are overutilized profit will be increased by decreasing the quantity used of that input When RUE> 1, resources are underutilized and increasing the rate of use of that input will increase the level of profit.

Results and Discussion

With respect to poultry enterprise, it was observed from table 1 that the coefficient of multiple determination was 0.99, indicating 99 per cent variation in gross returns in poultry was explained by the independent variable in the function. Among the various independent variables, expenditure on chicks and human labour had positive regression coefficients (0.66 and 0.20, respectively) and were statistically significant at 1 per cent. Nmadu *et al*. (2013) matched the findings here. Poultry feed and veterinary expenses were statistically significant at 5 per cent level and had positive regression coefficient 0.08 and 0.06, respectively. (Nchinda and Thieme 2011). Transportation cost is statistically significant at 10 per cent level and it had regression coefficient 0.07. Nsikak-Abasi *et al*. (2013) and Ike (2011) revealed in their study that feed is the most important and critical resource in poultry egg production and is significant (P < 0.05) whereas family labour, drugs and water are positive and significant (P < 0.10). The sum of output elasticities was higher than unity (1.10) which indicated the increasing returns to scale. (Table 1) Same as found by Afolabi *et al*. (2013). In poultry enterprise, income can be further increased through better care of the birds by spending more on the veterinary medicine, the day old chick and at the same time, the major cost factor in poultry i.e. feed, the use of which should be curbed forthwith as revealed by the ratio of MVP/MFC. The return can be increased by further spending on better transportation and human labour proficiency. Results were in the line of Ohajianya *et al*. (2013). The efficiency indicator (RUE= 0.27) for feed cost shows that feeds were over utilized.

Table 1: Production function estimates for resource use efficiency

S. No.	Particulars	Parameters	Coefficient
1.	Intercept	A	0.241(0.98)
2.	Feed(Rs./unit)	b_1	0.088[**](0.034)
3.	Chicks (Rs./unit)	b_2	0.666[*](0.76)
4.	Veterinary Expenses (Rs./unit)	b_3	0.069[**](0.030)
5.	Transportation Cost (Rs./unit)	b_4	0.073[***](0.047)
6.	Human Labour (Rs./unit)	b_5	0.205[*](0.045)
7.	R square	R^2	0.990
8.	Adjusted R square	R^2	0.989
9.	Return to scale	$\sum b_i$	1.101
10.	F value	F	776.04

Figures in parentheses indicate the respective standard error.
*, **, *** indicate significant at 1 per cent, 5 per cent and 10 per cent leve

(The same results were found by Vincent *et al*. 2010). This implies reducing feed expenditure in their poultry enterprise. With respect to veterinary services the economic efficiency (RUE= 2.43) took a positive sign which shows that vaccines, drugs, chemicals were being underutilized. This implies that veterinary expenses need to be increased and by investing one rupee, the profit can be increased to Rs. 2.43. The resource use efficiency of day old chicks, transportation and labour shows scope for efficient use of these resources by increasing their quantity. Day old chick, transportation and human labour showed the resource use efficiency indicator 3.48, 2.89, 1.72 and 2.48, respectively which reveal that by investing of one rupee, the profit can be gained by Rs. 3.48, Rs. 2.89 and Rs. 1.72 rupees. (Table 2). Jatto *et al*. (2011) concluded that the poultry egg farmers are relatively technically efficient. The study recommend that reducing excess amount of inputs on one hand and raising output on the other hand, efficiency level can be improved and farmers could benefit economically.

Table : 2 Comparison of marginal value productivity with their factor cost in poultry enterprise-

S. No.	Particulars	MVP/MFC	Description of efficiency Index
1	Intercept	-	-
2	Feed Cost (Rs./unit)	0.27	Over utilized
3	Day old chicks cost(Rs./unit)	3.48	Under utilized
4	Veterinary Expenses (Rs./unit)	2.43	Under utilized
5	Transportation Cost (Rs./unit)	2.89	Under utilized
6	Human Labour (Rs./unit)	1.72	Under utilized

Conclusion

The regression coefficients of expenditure on poultry feed, chicks, labour, transportation cost and veterinary services were found to be positive and significant for per farm return and revealed the increasing returns to scale. The MVP/MFC ratio which defined as resource use efficiency indicated that feed cost was over utilised and it must be minimized through the proper and rational use of feed for the birds. The cost of labour, transportation cost, veterinary cost and cost of chicks were underutilized and can be productive through the more investment on these.

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