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PROFITABILITY AND COST EFFICIENCY ANALYSIS OF OPEN SHED BROILER FARMERSIN PUNJAB, PAKISTAN

ALI, SALAMAT[a], ALI, SHAHID[b], ASIF, RIZWAN[c] and NAWAZ, MADEEHA[d]

[a]Department of Agricultural & Applied Economics, The University of AgriculturePeshawar, Pakistan.
[b]Department of Agricultural & Applied Economics, The University of AgriculturePeshawar, Pakistan.
[c,d]Department of Horticulture, The University of Agriculture, Peshawar, Pakistan.

Abstract

Every business is grossly dependent on how best productive resources are tie together to achieve profit maximization. This study of profitability and cost efficiency was conducted of open shed broiler farmers in Punjab, Pakistan. Data was collected from 60 broiler respondents using proportional allocation sampling technique during February, 2014. Stochastic cost frontier function was used for analysis of data. Profitability analysis revealed that net profit in study area was PKR. 30,830.49 (1 USD = 99.7 PKR). Net profit margin was 3.99 percent and Rate ofreturn on investment 4.16 percent while Shepherd Futeral coefficient was 24.06, Revenue per rupee of input cost 1.01 and Cost benefit ratio was 1.04. Maximum likelihood estimation revealed that cost efficiency range from 0.425 to 0.972 with mean efficiency of 0.741 implies that on average farmer was 74 percent efficient in cost saving. In other words that if the most inefficient broiler farmer in the sample was to achieve the technical efficiency level of its most frontier counterpart could realize 54.7% per cent cost savings. Results further showed that day old chicks, feed and labor, vaccination/medication cost and rent of building was positively and significantly affected broiler production cost. Results of technical inefficiency effect model revealed that with the increase in age and experience, cost efficiency of broiler farmers increased. Based upon these findings it is suggested that government and extension workers should trained open shed broiler farmers for cost savings technology.

Keywords: Open Shed Broiler Farmers, Technical Efficiency, Stochastic Frontier, Cost Function, MLE, Pakistan

INTRODUCTION

As the population grows which lays more burden on natural resources, therefore more people will definitely become food insecure, lacking access to sufficient amount of nutritious food for healthy growth, development and normal and an active life (Pretty, 1999) Food has fundamental role to examine country economic condition, society's health. Recently chicken (broiler + layer) meat has been extensively used for human nutrition and protein requirements. Nourishment of chicken meat has certain advantages due to rich of animal protein, low-fat food resources with relatively affordable price, easily available in market, quick menu of services and the lowconversion density and coefficient compared to other protein containing products so that several past decades nourishment of poultry has been changed to a large and profitable business (Dashti and Yazdani, 1995).

In Pakistan, as a developing country, the agricultural sector assumes greater importance while poultry subsector is vibrant segment within the agriculture industry. It has economic importance such as short period of production, higher rate of capital revenue, ease of management, and quick return on investment (Ahsan and Maqsood).

The major objective of broiler farmers is to produce meat efficiently at economic rate. In broiler production as well as other agricultural sectors, the hub of economic efficiency is the costuse efficiency which refers as given a certain level of inputs cost; broiler growers should be able to achieve maximum profit (Steven, 2003). It is obvious proved for business

perspective that if growers spend less on resources and achieved a given amount of output leads greater its profitability. This implies that for producers to attain their goals in make more profit the available resource's cost used in production process should be utilized efficiently. In spite of the great potentials of broiler farming in the Punjab, factors such as low technical knowledge of farmers and the high cost of production inputs have important constrained its contribution to increased food supply and demand. However, there was no previous study conducted in broiler meat production to measure cost efficiency for resources used in Pakistan. Cost efficiency of resources use will endow with practical tackle for policy makers to apply production policies needed to improve broiler meat production with minimizing cost.

Objectives of the study

1. To estimate profitability analysis of broiler meat producer in study area
2. To compute cost efficiency as well as factor of inefficiency

METHODOLOGY

This study was carried out in Rawalpindi division in febuary, 2013. Rawalpindi division contains four districts namely Rawalpindi, Chakwal, Jehlum and Attock. Cross sectional data for sixty broiler producers were selected through proportional allocation technique from four districts and was collected by comprehensive interview schedule.

Profitability analysis

Cost and revenue of broiler production was estimated by using the formula as follows (Debertin, 1986 and Varian, 1992):

$$NR = TR - TC \quad (1)$$

Where

$$TR = P_q * Q \quad (2)$$

$$TC = P_i * X_i$$

By putting the value in equation 1 we will get

$$NR = P_q * Q - P_i * X_i \quad (3)$$

Where

P_q = Price of output in Rs per farm

Q = Quantity of output produced in Kg per farm

P_i = Prices of inputs in Rs per unit

X_i = Quantities of inputs used per farm

Shepherd Futrel Efficiency Model.

Shepherd Futrel efficiency model was used to analyze resources use efficiency which is depicted below:

Resources use efficiency coefficient = $\frac{\text{cost of resources used}}{100}$ x 100 (4)

Net profit 1

Shepherd-Futrel model of accurate measurement of resource use efficiency gives the productivity of resources cost invested in the production process in quantitative terms (Arene, 2003)

Cost efficiency measurement

To measure efficiency level two types of efficiency concepts are commonly used i.e. profit efficiency and cost efficiency. In this paper cost efficiency measured which was define as how well a firm perform best practice relative to minimum cost producing same output while the environmental condition remain constant (Berger et a., 2009). The general stochastic frontier cost function was used by Coelli, Praasada Rao, O' Oonell, and Battese (2005) which isexpressed as following

$\ln TC_i = c(X_i, \beta) + Vi + Ui$ (5)

where;

TC_i = denotes observed total cost of i-th broiler farm

x_i = (1 x k) vector of inputs cost

β = (k x 1) vector of unknown parameter to be estimated

c = is a suitable function form

Vi = is a stochastic error term measures noise beyond the control of farmer and has normal distribution

Ui = is also stochastic error term which capture inefficiency factors of farmer andhas half normal distribution.

Functional form of model

The estimated stochastic cost function for poultry egg producer explicitly was used by W.M. Ashagidigbdi, (2011). We used this model for broiler producers which are expressed as following;

$\ln C_i = \beta_0 + \Sigma\beta 1 \ln P_{ij} + Vi + Ui$ (6)Where;

lnCi = total cost of production for broiler production

P_{ij} = prices of inputs =(j = 1,2,3…….6)

P_{i1} = total price of Day old chicks (Rs)

P_{i2} = total price for feed used (Rs)

P_{i3} = total price for labor used for production period (Rs)

P_{i4} = total price for vaccination and drug (Rs)

P_{i5} = rental value of farm (Rs)

P_{i6} = amount for other variable cost like (electricity, litter and burning wood)

P_{i7} = depreciation value of equipment (Rs)

Vi + Ui = as define above

While inefficiency factors was estimated inefficiency model used by (Coelli, 1996) The model is given as follows:

$\mu_i = \alpha_0 + \alpha_1 Z_1 + \alpha_1 Z_2 + \alpha_3 Z_3 + \alpha_4 Z_4 + \alpha_5 Z_5 + \alpha_6 Z_6 + \omega i$ (7) Where;

μ_i = Technical inefficiency error term

α_i = Unknown coefficients to be estimated

Z_1 = Farm size (numbers of day old chicks)

Z_2 = Mortality rate (numbers of dead chicks)

Z_3 = Age of the broiler farming farmers (years)

Z_4 = Farming experience of the broiler farming farmers (years)

Z_5 = Education level of the broiler farming farmers (years)

ω_i = Random error term

RESULTS AND DISCUSSION

Budgetary analysis

Table 1 shows summary of cost of production of broilers for open shed farms. Average initialsflock size of day old chicks was 3,395 in numbers.

Table 1 Average cost of production of broilers of open shed farms

Variables	Units	Quantity	Unit cost(Rs/unit)	Total cost	%
Day old chicks	No	3,395.00	36.10	122,559.50	16.52
Feed	Kg	12,061.67	42.10	507,796.00	68.44
Vaccination	Rs			30,723.32	4.14
Family labor	M Days	29.75	450	13387.50	
Hired labor	M Days	23.77	450	10696.526	
Total labor	M Days	53.52	450	24084.00	3.25
Managerial cost	Rs			3395.00	
Electricity bills	Month	2.00	1,202.88	2,405.77	
Wood (for brooding)	Mounds	69.82	376.42	2,6281.64	
Litter	Trolley*	1.32	3,806.67	5,024.8	
OVC(electricity, burning wood, litter, managerial cost)	Rs			37,107.21	5.00
I. TVC	Rs			722,270.03	
II. Rent of building	Rs			16,566.67	
III. Equipment**	Rs			3,117.44	
IV. TFC (II + III)	Rs			19,684.11	2.65
V. TC (I + IV)	Rs			741,954.14	100

Note: 1 USD = 99.7 PKR (Rs) *1 trolley = 150 mounds; ** 20 percent value taken from the totalvalue of equipment for two month

Day old chick cost grasp the cost of newly borne chicks from hatchery. Day old chicks cost account for nearly PKR. 122,287.90 Which was about 16.52 percent while average feed incurred was about PKR. 507,796.00, Which accounts for nearly 68.44 percent of the total costof production in broiler meat production process. Vaccination and medication is another cost component in broiler meat production process which is about PKR. 30,723.32 which account for

4.14 percent. Labor cost includes family labor and hired labor cost, which account for 3.25

percent with PKR. 24,084.00. Other variable cost (OVC) was PKR. 37107.21 which captures the share of 5.00 percent in cost of production process of broiler meat. OVC represent othervariable cost rather than day old chicks, feed, labor and vaccination & medication like aselectricity cost for 2 month was PKR. 2405.77, wood for brooding stage hold cost of PKR. 26,281.64, average cost of litter was PKR. 5,024.80, managerial cost of one farmer for 80,000 broilers is PKR.40, 000 per month so for 3,395.00 broilers and two month it was about PKR. 3,395.00. Total variable cost (TVC) was PKR. 721,998.43. Fixed cost (FC) includes rent of building and depreciation cost of equipment with value of PKR. 16,566.67 and PKR. 3,117.44 respectively with combined share of 2.65 percent. Sum of total variable cost and fixed cost (TC) is total cost of broiler production which was PKR. 741,682.54.

Profitability Analysis

Table 2 describe that number of broilers sold in the market were 3,002.17 with average weight of 1.615 kg so total quantity sold was 4849.50 kg at the rate of PKR. 158 per kg. Revenue obtained from quantity of broiler was PKR. 766, 221.00 while revenues obtained from broiler manure and empty bags were PKR. 4,151.34 and PKR. 2,412.27 respectively. Sum of these three types of revenues (Gross Revenue) was PKR. 772,784.63. Average net revenue ofobtained from broiler of open shed farms was PKR. 30,830.49.

Profitability analysis shows that rate of return o investment was 4.16 which are little bit greater than net profit margin which was 3.99, analysis further shows that cost benefit ratio and revenue per rupee of input cost was almost same with value of 1.01 and 1.04. Shepherd futeral coefficient shows that farmer were (100 — 24.06 = 75.94%) efficient in their resource's cost. These results also support viability and profitability.

Table 2 profitability analysis

Particulars	Unit	Quantity	Rate (Rs/unit)	Total value (Rs)
I. Broiler (No)	No	3,002.17 *	158	766,221
II. Manure (Trolly)	Trolly	1.51	2,741.00	4,151.34
III. Empty bags (No)	No	246.15	9.80	2,412.27
IV. Gross revenue (I+II+III)	Rs			772,784.63
V. TVC	Rs			722,270.03
VI. TFC	Rs			19,684.11
VII. TC (V+VI)	Rs			741,954.14
VIII. Net revenue (IV-VII)	Rs			30,830.49
Net profit margin	%			3.99
Rate of return on investment	%			4.16
Cost benefit ratio				1.01
Revenue per rupee of input cost				1.04
Shepherd Futeral coefficient				24.06

Note: 1 US Dollar = 99.7 PKR (Pakistani Rupee, Rs)

* 1 broiler = 1.61533 kilograms; 3,002.17 broilers = 4,849.50 kilogram

Cost efficiency

Cost efficiency of inputs use in the broiler meat production is main business objective i.e. how to maximize profit output and minimize cost. These objectives can be achieved through productive resources are optimally combined in their usage and at a minimum cost

combination. The productive inputs of a typical broiler meat business are found in study area; the initial stock (day old chicks), labor, feed, vaccination & medication, litter, electricity and burning woods etc.

All the variables used in stochastic cost function were positive and significant effect on total cost except depreciation cost had negative effect but insignificant. These results was similar to Afolabi et al, (2013) while contrast to Akinbodee et al, (2011). The cost efficiency index of broiler meat produced farmers ranged between 0.425 and 0.972 with a mean value of 0.741. This implies that if the average farmer was to attain the cost efficiency level of his most efficient counterpart, the farmer could recognize a cost saving of about 23.1% while the most cost inefficient farmer could realize a cost saving of about 54.7%. Table 3 represents the Maximum Likelihood estimates of the stochastic Frontier Cost function for broiler producers in Punjab (Dependent variable = production) as well as factors of inefficiency.

Factors affecting cost efficiency

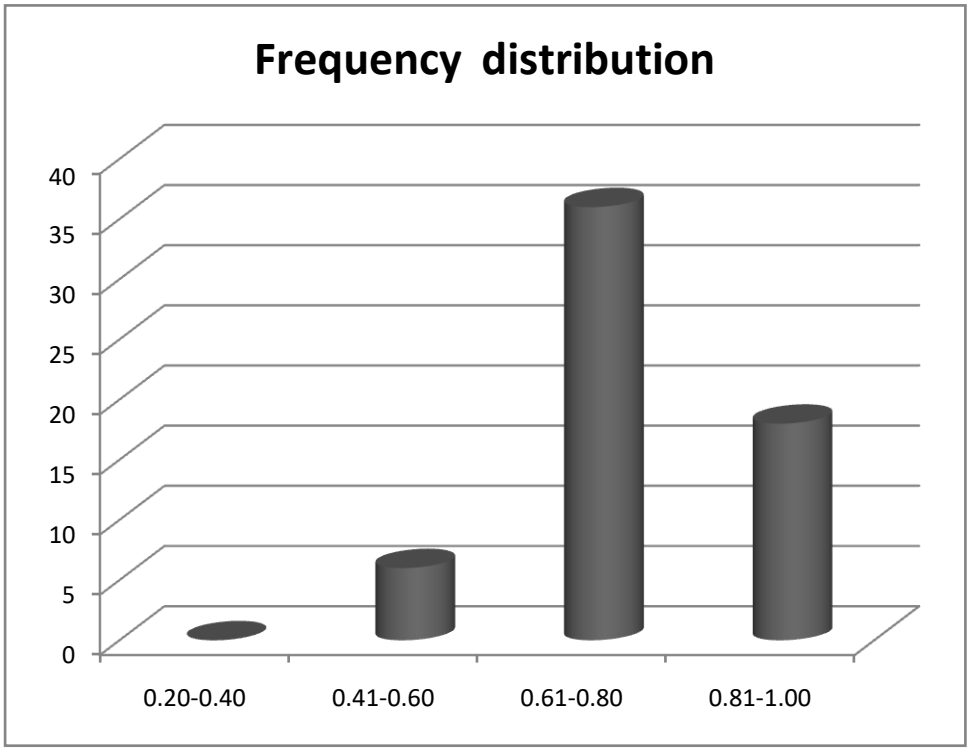
In this study age and experience had negative effects on while farm size had positive effect on cost inefficiency and statistically significant at 5% level of significance. These results magnify that farmer had more age and experience were efficient in their cost minimizing techniques in relative to allocation of production resources and input price differentials and huge initial stock increase the cost inefficiency. Mortality, farmer's education had positive but statistically insignificant.

Table 3 Maximum Likelihood estimates of the stochastic Frontier Cost function for broilerproducers in Punjab (Dependent variable = production)

Variables	Parameters	Coefficients	Standard error	T- ratios
Constant	β_0	1.1107	0.1113	9.98*
Day old chicks	β_1	0.1470	0.0116	12.64*
Feed	β_2	0.6665	0.0509	13.09*
Vaccination& medication	β_3	0.0349	0.0038	9.20*
Labor	β_4	0.0412	0.0123	3.36*
OVC	β_5	0.0809	0.0069	11.61*
Rent of Building	β_6	0.0351	0.0105	3.33*
Depreciation cost	β_7	-0.0047	0.0082	-0.57
Technical Inefficiency Effects Model				
Constant	α_0			
Age	α_1	-0.3821	0.1526	-2.50**
Experience	α_2	-0.1295	0.0653	-1.98**
Education	α_3	0.0764	0.1023	0.75
Farm size	α_4	0.0863	0.0335	2.57**
Mortality	α_5	-0.0102	0.0189	-0.54
Sigma^2	σ^2	.0000638		
Gamma	.γ	0.999		
Minimum CE	X_{min}	0.425		
Maximum CE	X_{max}	0.972		
Mean CE	X_{mean}	0.741		

*significance level α = 1%, ** significance level α = 5%

Table 4 Frequency distribution of cost efficiency index for broiler farmers



CONCLUSION

Budgetary and profitability analysis revealed that broiler production was a profitable business in study area. Total cost of production was PKR. 741,954.14 While net profit was PKR. 30,830.49. Cost efficiency score was range from 0.425 to 0.972 with mean efficiency was 0.741. Following recommendations was concluded from the results

1. Researchers in broiler production should focus more on inventing affordable and effective resources.
2. Training program should be provided to farmers in the form of production technology with minimize cost and achieve more profit.

LIMITATION OF THE STUDY

There are following limitations of study

1. This study was carried out in only Punjab province of Pakistan so, such type of study should conduct in all Pakistan to aware broiler farming farmers to enhance production with counter cost saving
2. This work focus on broiler farming business not for other items of poultry (layer, breeder, turkey, etc.)

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