



Economics of Small Broiler Units in Jammu District of Jammu and Kashmir State

Sudhakar Dwivedi^{1*}, Morup Dolma² and Pawan Kumar Sharma³

^{1*}*Division of Agril. Econ, ABM and Stats., Faculty of Agriculture, Sher-e-Kashmir University of Agricultural Sciences and Technology, Jammu, INDIA*

²*Division of Agril. Econ, ABM and Stats., Faculty of Agriculture, Sher-e-Kashmir University of Agricultural Sciences and Technology, Jammu, INDIA*

³*Krishi Vigyan Kendra Poonch, Sher-e-Kashmir University of Agricultural Sciences and Technology, Jammu, INDIA*

*Corresponding author: S Dwivedi; email: dwivedi.sudhakar@gmail.com

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ABSTRACT

The economic analysis of small broiler units was carried out in Jammu district of Jammu and Kashmir state of India. The majority of broiler farms were existed in and around Jammu city of Jammu district. The cost and returns were calculated by categorizing broiler farms into three sizes; less than 500 birds, 501-1000 birds and more than 1000 birds. The data were collected from 60 broiler producers, 20 from each category during the year 2013-2014. The cost of production, mortality rates and returns from broiler production were estimated in different categories of broiler farms under study. The cost of chicks constituted the highest item of variable cost in all categories of farms i.e. 40.47% which was followed by cost of feed (37.19%), cost of medicine, vaccination and veterinary fee (11.78%), cost of labour (5.49%), miscellaneous cost (2.71%), cost of flooring material (1.35%), cost of electricity (0.74%) and cost of fumigation (0.27%). The overall gross income in all the broiler farms was ₹ 12705.08, whereas net income was Rs. 4139.72. The overall benefit-cost ratio was 1.48. The analysis of benefit-cost ratio for 100 chicks signifies that large broiler farms were more profitable than the small farms due to the optimum utilization of both fixed and variable inputs involved in the broiler production. The ratios of Marginal Value Product (MVP) to Marginal Factor Cost (MFC) were positive and more than unity for chicks, human labour and vaccine, drugs and veterinary fee i.e. 1.4768, 1.3934 and 5.3531 respectively, indicating the under-utilization of these resources, whereas for feeds, the ratio although came positive but it was less than unity i.e. 0.5779, indicating that the resource was over-utilized.

Keywords: Broiler farms, mortality rate, benefit-cost ratio, resource use efficiency

Animal production constitutes an important and most crucial sub sector of agriculture keeping the production and supplementary income generated from it. In a country like India with large number of marginal and small farmers, animal husbandry is no different from agriculture as they manage to obtain surplus because of the complementary relationship among the two sectors. Poultry is one of the enterprises of animal husbandry sector, of which meat is the major component. Poultry meat (broiler) is an important source of high quality proteins, minerals and vitamins to balance the human diet. Depending on the farm size, broiler farming can be a main source of family income or can provide subsidiary income. Poultry can also provide gainful employment to rural youths throughout

the year. Poultry manure has high fertilizer value and can be used for increasing yield of crops. India is the fifth largest producer of poultry meat in the world after USA, China, Brazil and Mexico (Anonymous 2006). Poultry meat production increased from 81 thousand tonnes in 1961 to 1900 thousand tonnes in 2005 with an increase of 8.7% and 6% per annum during the eighties and nineties respectively (FAO 2008). The rate of growth in production of poultry is the highest when compared with ruminants and other monogastric animals (Braenkaert *et al.* 2002) and the cheapest, commonest and the best source of animal protein (Ojo 2002). In terms of economics, poultry and broiler production can be initiated on small piece of land with little resources and capital and can ensure a



regular flow of income through the marketing of poultry and broiler products (Singh *et al.* 2002). An increase in per capita consumption by one egg and 50 grams of poultry meat can create employment for about 26,000 persons per year (Kazi 2003). The broiler production in India has witnessed a continuous growth, as depicted in Figure 1 and is reached at 3900 thousand tonnes in 2014-15. Despite this achievement, the per capita availability of poultry meat in India is only 2.96 kg which is way below the 11 kg meat per capita per annum as recommended by the Indian Council of Medical Research (ICMR). The activity provides huge employment opportunities for the rural poor either under Backyard poultry production system or under small scale commercial broiler farming units. Over 5 million people are engaged in the poultry sector either directly or indirectly.

Jammu and Kashmir State of India has favourable environment for promoting poultry in the state. Adequate funds are also provided by the central government under National Cooperative Development Scheme for poultry cooperative in the state. So far 5000 poultry units have been started under this scheme. Poultry population as per livestock census 2003 has been recorded as 55.68 lakhs in the state, out of which 29.71 lakhs are in Kashmir valley, with the per capita per month consumption of 1.7934 eggs and 0.0921 kg of poultry meat (Gandhi and Zhou, 2010). The actual data on per capita consumption for Jammu region was not found in any literature and needs to be estimated using proper statistical technique. The state on the whole is, however, deficit in poultry products as it imports ₹ 100 crore worth of poultry products from other states, which includes 10 million stable birds worth ₹ 66 crore and 35 million one-day chicks worth ₹ 37.5 crore (papaak.com, 2015). Several schemes in the poultry and broiler sectors have been initiated by the state to supplement the agricultural income. A large deficit in terms of broiler production in the state provides an opportunity for rural youths to adopt broiler farming for income and employment. The adoptions of any enterprise, however depends upon its feasibility and economic returns e.g. cost efficiency is one of the persuading factors of competitiveness in broiler business. That is why many studies have been conducted on economic analysis of broiler production and performance in India and abroad both for small and large scale broiler farms (Singh *et al.* 2010; Taru *et al.* 2010; Bano *et al.* 2011; Pardeshi 2011;

Shaikh and Zala, 2011; Ukwuaba and Inoni, 2012 and Rana 2012). Keeping in view the importance of such studies, a study has also been conducted in and around Jammu city of Jammu and Kashmir state to find out the economic viability of broiler production and to determine the resource use efficiency through its production function.

MATERIALS AND METHODS

Jammu district of Jammu and Kashmir has more conducive environment for broiler production compared to other districts of the state. The majority of broiler farms are existed in and around Jammu city of Jammu district. Therefore, an economic analysis of broiler farms in and around Jammu city were conducted through single broiler production cycle during the year 2013-14. A list of broiler producers was collected from State Department of Animal Husbandry and growers were categorized into three categories, presented as below:

| | | |
|--------------|---|----------------------|
| I category | : | less than 500 birds |
| II category | : | 501-1000 birds |
| III category | : | more than 1000 birds |

Twenty broiler farms were selected randomly from each of the mentioned categories, and thus data from 60 broiler farms were collected for fulfilling the objective of the study. Farm budgeting technique has been employed to analyze the cost and return structure of the broiler farm business, aimed at estimating the profitability of the enterprises. The cost concept as defined by Commission of Agricultural Costs and Prices (CACP) was also used. The Cobb-Douglas (CD) type of production function was used in this study. The marginal productivity of factors, marginal rate of substitution, factor intensity and the efficiency of production were calculated directly from the parameters. The form of CD production function fitted to examine the factors affecting the resource productivity of broiler production in and around Jammu city of Jammu and Kashmir is presented as below:

$$Y = aX_1b^1X_2b^2X_3b^3X_4b^4u$$

The Cobb-Douglas production function in the form expressed above was converted into a logarithmic function with a view to get a linear form amenable for practical purposes as expressed below.

$$\ln Y = \ln a + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + u$$

whereas, \ln = Natural logarithm; a = constant or intercept; u = error term; b_i ($i = 1$ to 4) = regression coefficient of factor inputs; Y = Gross returns from broiler production (₹/farm); X_1 = Expenditure on chicks (₹/farm); X_2 = Expenditure on human labour (₹/farm); X_3 = Expenditure on vaccines, drugs and veterinary fee (₹/farm); X_4 = Expenditure on feeds (₹/farm).

The results of the analysis were subjected to test by the coefficient of multiple determinations. The regression coefficients (b_i) were tested for their significance using 't' test at 5% level of significance.

$$t = \frac{b_i}{\text{Standard error of } b_i}$$

The Marginal Value Product (MVP) of each resource was compared with its Marginal Factor Cost (MFC) to compute the efficiency indicators. The ratio of the MVP to MFC was used to determine the resources efficiency as shown in the following equation.

$$r = MVP/MFC$$

Whereas, r = Efficiency ratio (ratio of the MVP of an input and unit price of the input); MVP = Marginal value product of a variable input; MFC = Marginal factor cost (price per unit input).

The efficiency of economic resources was estimated on the basis of conventional neo-classical test which states that the ratio of the MVP of an input to its unit price must equals unity.

RESULTS AND DISCUSSION

Size of Broiler Units under different categories

The status of broiler produced in different categories for the present study has been presented in Figure 1. The average number of broilers worked out to be 1344.17 per farm which varied from 452.50 chicks per farm in category-I to 955 chicks per farm in category-II to 2625 chicks per farm in category-III.

Capital Investment on broilers farms

The pattern and magnitude of investment in fixed farm resources and variable resources in farm enterprise are the

important indicators of the income generating capacity of the farmers/entrepreneurs. Generally three types of farm resources are used in a poultry enterprise viz. Long term assets which includes dwelling house, cattle shed, poultry shed and storage house. Medium term assets include feeders, waters, electric motor, *bukhari*, light and others (fans, coolers etc.) and Current assets include sponger, screwdriver, hammer, buckets, jugs, small tubs, vessel with lid, nails and miscellaneous items. The Capital investment in different categories of broiler farms is presented in Table 1.

Cost of broiler production

Once the infrastructure has established, poultry farm owners brought the broiler chicks in batches/lots. The farm-wise cost of broiler production (variable as well as fixed cost) in different categories of broilers farms has been presented in Table 2. The cost of chicks constituted the highest item in terms of total cost of broiler farming. This was followed by cost of feed, interest on variable cost, cost of medicine, cost of labour, cost of vaccination, veterinary fee, miscellaneous, cost of flooring material, depreciation on fixed assets, interest on fixed capital, fumigation and rent.

Concept wise cost of production

The concept wise cost of production of broiler farms has been presented in Table 3. The table indicates that the per farm cost C_3 of broiler farm was ₹ 31741.62 on overall farms whereas, it was ₹ 10731.89 for category first farms, ₹ 30236.21 for category second farms and ₹ 54256.72 for category third farms respectively. Thus, all the cost concepts per farm for broiler production were highest for category third due to highest number of chicks. There was no case of leasing in or leasing out reported for broiler farms in study area. The cost per unit of broiler production can be reduced by increasing the number of birds per farm. The reduction in cost can be achieved by using the scarce resources like infrastructure and labour for growing higher number of birds.

Balamurugan and Manoharan (2013) assessed that the total cost of meat production per bird, returns per bird over the variable costs was highest on small broiler farms, followed by medium and large farms.

Mortality of chicks/birds by unit size

The reduction in mortality is an important indicator of increased efficiency in broiler production. The mortality rate of broiler chicks depend upon a number of factors which include climate, feeding, density, incidence of disease etc. Mortality also found to be increased linearly and significantly with number of days spent by birds in the house (Costa *et al.* 2001). The farm-wise mortality rates in different categories of broiler farms are presented in Table 4. The mortality rates were 10.40, 10 and 9.71% for category I, category II and category III respectively. Under the best management practices, it is assumed that mortality rate is 5 to 10%. In this context, it can be concluded that the category third farms were more efficient than first and second. The first and second category broiler farms were not inefficient, but still the mortality rate could be decreased by adopting more efficient practices on the farms. The mortality rates of broiler also dependent upon the type of breed as found by Awobajo *et al.* (2007).

Production and Returns of Broiler farms

The economics of any enterprise depends upon its productivity. A higher cost may results in higher productivity and a lower cost may results in lower productivity. The Table 5 reveals the production and value of both main-product and by-product on broiler farms. The overall average number of birds produced in all the categories was 1211.65. There is not much variation either in the average weight or in the average quantity of meat produced per bird among all the farm groups. The overall quantity of broiler meat produced was 16.56 quintal with an average weight of 1.37 kg per bird. The price of broiler obtained under three categories of broiler farms was different i.e. ₹ 8880 per quintal, ₹ 8872 per quintal and ₹ 8870 per quintal in Category I, Category II and Category III respectively. The by-products under broiler farming include generally the manure. However, a large number of gunny bags are also accumulated due to large quantity of feed brought for the broilers. The farmers generally sell these gunny bags and get some money in return. Therefore, in this study the money obtained after selling manure and gunny bags were put under the by-products category of the broiler production.

Income from broiler production (per farm/per lot)

The Table 6 depicts the category wise per farm per lot cost of broiler production, gross income, net income and

benefit-cost ratio. The per farm per lot gross income on overall farms was ₹ 153422.48 whereas the per farm per lot net income on overall farms came to be Rs. 41024.32. The benefit-cost ratio per farm per lot was 1:1.41 in third category farms followed by 1:1.32 in second category and 1:1.28 on third category.

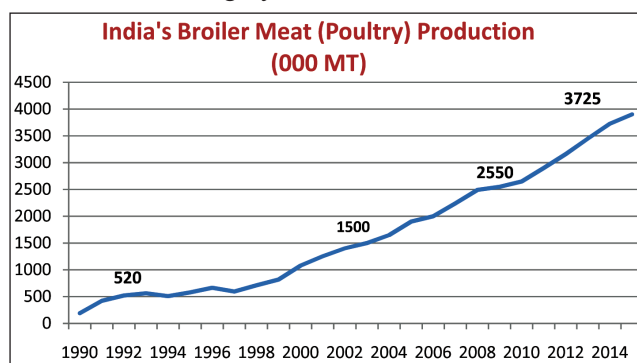


Fig. 1: India's Year wise Broiler Production

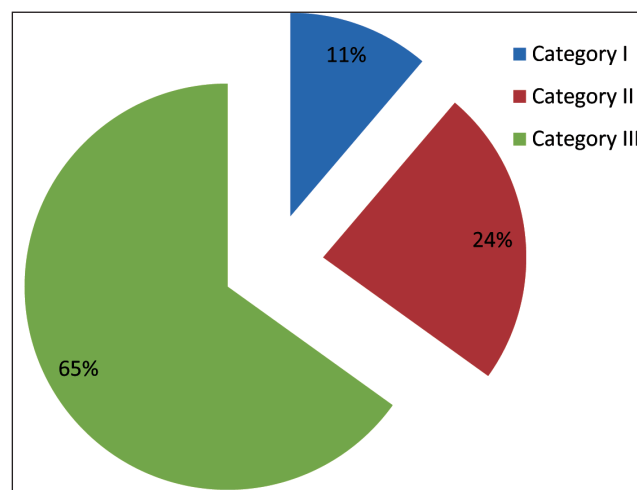


Fig. 2: Pie chart showing distribution of broilers under different categories

Resource Use Efficiency in Broiler Production

The allocation decisions must be concerned not only with productivity but with response to market demand. The manager must decide both how much should be invested in total, as determined by the market, as well as how resources should be divided between capital and labor. If the relationship is homogeneous, the two decisions may be treated as independent, but if it is not homogeneous an optimum allocation from the standpoint of productivity could be inconsistent with the optimum from the standpoint of market.

Table 1: Capital investment in different categories of broiler farms

| (₹ in '000/farm) | | | | | |
|------------------|---------------------------|-----------------|-----------------|-----------------|-----------------|
| S. No. | Particulars | Category-I | Category-II | Category-III | Overall |
| 1. | Long term assets | | | | |
| a. | Farm building | | | | |
| 1. | Dwelling | 90.85 (45.53) | 295.00 (52.65) | 507.50 (54.19) | 297.78 (52.66) |
| 2. | Cattle shed | 6.90 (3.46) | 25.05 (4.47) | 75.250 (8.03) | 35.73 (6.32) |
| 3. | Poultry shed | 41.00 (20.55) | 122.50 (21.86) | 187.75 (20.05) | 117.08 (20.70) |
| 4. | Storage house | 32.75 (16.41) | 64.00 (11.42) | 75.50 (8.06) | 57.42 (10.15) |
| | Total | 171.50 (85.95) | 506.55 (90.41) | 84.60 (90.33) | 508.02 (89.84) |
| 2. | Medium term assets | | | | |
| a. | Feeders | 2.44 (1.22) | 7.81 (1.39) | 16.47 (1.76) | 8.91 (1.58) |
| b. | Waters | 2.43 (1.22) | 9.49 (1.70) | 15.48 (1.64) | 9.13 (1.62) |
| c. | Electric motor | 3.29 (1.65) | 4.45 (0.80) | 6.05 (0.65) | 4.60 (0.81) |
| d. | Bukhari | 5.21 (2.61) | 6.87 (1.23) | 7.29 (0.78) | 6.46 (1.14) |
| e. | Light | 0.65 (0.34) | 0.80 (0.14) | 0.93 (0.10) | 0.79 (0.14) |
| f. | Others | 2.53 (1.27) | 3.44 (0.61) | 1.46 (0.16) | 2.48 (0.44) |
| | Total | 16.56 (8.30) | 32.88 (5.87) | 47.60 (5.09) | 32.382 (5.73) |
| 3. | Current assets | | | | |
| a. | Sponger | 0.90 (0.45) | 1.91 (0.34) | 5.25 (0.56) | 2.68 (0.48) |
| b. | Screw driver | 0.26 (0.13) | 0.26 (0.05) | 0.26 (0.03) | 0.26 (0.05) |
| c. | Hammer | 0.45 (0.23) | 0.95 (0.17) | 2.625 (0.28) | 1.34 (0.24) |
| d. | Buckets | 0.96 (0.48) | 1.00 (0.18) | 1.00 (0.11) | 0.99 (0.17) |
| e. | Jugs | 0.73 (0.37) | 0.75 (0.13) | 0.73 (0.08) | 0.73 (0.13) |
| f. | Small tubs | 3.61 (1.81) | 5.98 (1.07) | 8.73 (0.93) | 6.10 (1.08) |
| g. | Vessel with lid | 2.94 (1.47) | 6.20 (1.11) | 17.06 (1.82) | 8.73 (1.55) |
| h. | Nails | 0.28 (0.14) | 1.43 (0.26) | 3.94 (0.42) | 1.88 (0.33) |
| i. | Miscellaneous | 1.31 (0.66) | 2.36 (0.42) | 3.25 (0.35) | 2.30 (0.41) |
| | Total | 11.46 (5.75) | 20.86 (3.72) | 42.85 (4.58) | 25.06 (4.43) |
| | Grand total | 199.53 (100.00) | 560.29 (100.00) | 936.55 (100.00) | 565.46 (100.00) |

Note: Figures in parentheses indicate percentage.

In the present study, the variable inputs used in the broiler production were classified into four major groups namely chicks, human labour, vaccine drugs and veterinary fee and feed, whereas the dependent variable was broiler production. The ANOVA table along with the results of regression analysis in broiler production of sample farms is presented in the Table 7 which indicates that the regression coefficient of chicks was 0.38558 and is significant at 1% level of significance i.e. p-value is 0.0050.

The estimates of Cobb-Douglas Production Function are presented in Table 7 along with the ratios of marginal value product (MVP) to marginal factor cost (MFC) for various resources. The regression coefficient of human labour was positive and non-significant at both 1% and 5% levels of significance (0.4233915). The regression coefficients for vaccine, drugs and veterinary fee and feeds were both significant at 1% level of significance. The coefficient of multiple determination (R^2) was 0.94,

**Table 2:** Cost of Broiler Production per farm per lot and per 100 chicks (₹ in '000)

| Sl. No. | Particulars | Category I (Lot = 452.50) | Per 100 Chicks | Category II (Lot =955) | Per 100 chicks | Category III (Lot = 2625) | Per 100 chicks |
|----------------------|---------------------------------------|------------------------------|-------------------|----------------------------|-------------------|------------------------------|-------------------|
| Variable cost | | | | | | | |
| a. | Chicks | 13.57 (33.92) | 3.00 | 28650.00 34.50) | 3.00 | 78750.00 (36.77) | 3.00 |
| b. | Starter | 0.68 (1.70) | 150.00 | 1.12 (1.35) | 117.28 | 2.95 (1.38) | 0.12 |
| c. | Grower | 2.94 (7.35) | 0.65 | 5.98 (7.20) | 0.62 | 17.80 (8.31) | 0.68 |
| d. | Finisher | 9.79 (24.46) | 2.16 | 18.89 (22.75) | 1.98 | 51.04 (23.84) | 1.94 |
| | Total Feed | 13.41 (33.51) | 2.96 | 25.955 (31.30) | 2.72 | 71.80 (33.53) | 2.73 |
| e. | Vaccination | 1.69 (4.22) | 0.37 | 1.43 (1.73) | 0.15 | 3.93 (1.84) | 0.15 |
| f. | Medicine | 1.92 (4.81) | 0.42 | 6.20 (7.48) | 0.65 | 17.062 (7.97) | 0.65 |
| g. | Hired labour | 0.73 (1.83) | 0.16 | 2.89 (3.48) | 0.30 | 4.74 (2.21) | 0.18 |
| h. | Family labour | 0.96 (2.41) | 0.21 | 3.09 (3.72) | 0.32 | 3.99 (1.86) | 0.15 |
| | Total labour | 1.69 (4.24) | 0.37 | 5.98 (7.20) | 0.62 | 8.73 (1.95) | 0.33 |
| i. | Electricity | 0.73 (1.83) | 0.16 | 0.75 (0.90) | 0.08 | 0.73 (0.34) | 0.028 |
| j. | Veterinary fee | 0.96 (2.41) | 0.21 | 1.00 (1.20) | 0.10 | 1.00 (0.47) | 0.04 |
| k. | Flooring material | 0.45 (1.13) | 0.01 | 0.95 (1.15) | 0.01.00 | 2.62 (1.23) | 0.01 |
| l. | Fumigation | 0.26 (0.65) | 0.057 | 0.26 (0.32) | 0.027 | 0.26 (0.12) | 0.010 |
| m. | Miscellaneous | 0.90 (2.26) | 0.20 | 1.91 (2.30) | 0.20 | 5.25 (2.45) | 0.20 |
| | Total cost | 35.61 (89.00) | 7.87 | 73.14 88.09) | 7.66 | 190.15 (88.80) | 7.24 |
| n. | Interest on variable cost @ 10% | 3.56 (8.90) | 0.78 | 7.31 (8.81) | 0.76 | 19.01 (8.88) | 0.72 |
| | Total variable cost | 39.17 (97.90) | 8.65 | 80.46 (96.90) | 8.42 | 209.17 (97.68) | 7.968 |
| Fixed cost | | | | | | | |
| a. | Rent for 35 days | 0.31 (0.76) | 0.06 | 1.49 (1.80) | 0.156 | 2.65 (1.24) | 0.10 |
| b. | Depreciation on fixed assets | 0.45 (1.13) | 0.10 | 0.86 (1.03) | 0.09 | 1.94 (0.91) | 0.073 |
| c. | Miscellaneous | 0.021.08 (0.05) | 0.004 | 0.03 (0.03) | 0.003 | 0.01 (0.01) | 0.0005 |
| | Total Cost | 0.78 (1.95) | 0.17 | 2.38 (2.87) | 0.25 | 4.60 (2.15) | 0.17 |
| d. | Interest on fixed cost @ 8% | 0.062 (0.16) | 0.013 | 0.190 (0.23) | 0.019 | 0.37 (0.17) | 0.014 |
| | Total fixed cost | 0.84 (2.10) | 0.19 | 2.57 (3.10) | 0.27 | 4.97 (2.32) | 0.19 |
| | Total cost | 40.01 (100.00) | 8.84 | 83.033 (100.00) | 8.69 | 214.14 (100.00) | 8.16 |

Table 3: Cost Concepts of Broiler production under different categories of broiler farms

| Cost concept | (₹ in thousands) | | | |
|----------------|------------------|-------------|--------------|---------|
| | Category I | Category II | Category III | Overall |
| A ₁ | 10.41 | 29.25 | 52.59 | 30.75 |
| A ₂ | 10.42 | 29.33 | 52.72 | 30.82 |
| B ₁ | 10.53 | 29.57 | 53.17 | 31.09 |
| B ₂ | 10.54 | 29.65 | 53.30 | 31.16 |
| C ₁ | 10.61 | 29.87 | 53.60 | 31.36 |
| C ₂ | 10.63 | 29.94 | 53.74 | 31.44 |
| C ₃ | 10.73 | 30.23 | 54.25 | 31.74 |

Table 4: Mortality of chicks/birds by unit size

| Broiler farms | Chicks installed | | Mortality (No.) | | Mortality rate (%) | Birds produced |
|---------------|------------------|------------------|-----------------|-----------------|--------------------|----------------|
| | Total | Per farm | Total | Per farm | | |
| Category I | 9050 | 452.50 (11.22) | 941 | 47.05 (11.83) | 10.40 (33.12) | 8109 (11.18) |
| Category II | 19100 | 955.00 (23.68) | 1910 | 95.50 (24.02) | 10.00 (33.28) | 17190 (23.69) |
| Category III | 52500 | 2625.00 (65.10) | 5100 | 255.00 (64.14) | 9.71 (33.59) | 47400 (65.13) |
| Total | 80650 | 4032.05 (100.00) | 8101 | 397.55 (100.00) | 29.77 (100.00) | 72549 (100.00) |
| Average | 26883.33 | 1344.02 | 2700.33 | 132.52 | 9.92 | 24183.00 |

Note: Figures in bracket indicate percentage

Table 5: Production and Returns of broiler farms

| Particular/ Farm size | Category I | Category II | Category III | Overall |
|-----------------------|-------------------|--------------------|--------------------|--------------------|
| MAIN PRODUCT | | | | |
| No. | 405.45 | 859.50 | 2370 | 1211.65 |
| Average wt.(kg) | 1.40 | 1.34 | 1.37 | 1.37 |
| Qt.(q) | 5.68 | 11.52 | 32.47 | 16.56 |
| Price/q (₹) | 8880 | 8870 | 8872 | 8874 |
| Value (₹) | 50438.40 (95.57) | 102182.40 (95.85) | 288073.84 (95.74) | 146898.21 (95.75) |
| BY-PRODUCTS | | | | |
| Manure | | | | |
| Qt.(q) | 9.85 | 18.25 | 54.20 | 27.43 |
| Price/q (₹) | 200 | 200 | 200 | 200 |
| Value (₹) | 1970 (3.73) | 3650 (3.42) | 10840 (3.60) | 5486.67 (3.58) |
| Gunny Bags | | | | |
| No. | 30.65 | 64.15 | 164.60 | 86.47 |
| Price/bag (₹) | 12 | 12 | 12 | 12 |
| Value (₹) | 367.80 (0.70) | 769.80 (0.72) | 1975.20 (0.66) | 1037.60 (0.68) |
| Value of By-products | 2337.80 (4.43) | 4419.80 (4.146) | 12815.20 (4.259) | 6524.27 (4.252) |
| Gross Income | 52776.20 (100.00) | 106602.20 (100.00) | 300889.04 (100.00) | 153422.48 (100.00) |

**Table 6:** Income from broiler production (Per farm/per lot)

| Broiler farms | Variable Cost | Fixed cost | Total Cost | Gross Income (Per lot) | Net Income (Per lot) | B.C Ratio |
|---------------|---------------|------------|------------|------------------------|----------------------|-----------|
| Category I | 39175.40 | 842.04 | 40017.44 | 52776.20 | 12758.76 | 1.32 |
| Category II | 80461.15 | 2572.52 | 83033.67 | 106602.20 | 23568.53 | 1.28 |
| Category III | 209169.40 | 4973.98 | 214143.38 | 300889.04 | 86745.66 | 1.41 |
| Overall | 109601.98 | 2796.18 | 112398.16 | 153422.48 | 41024.32 | 1.34 |

Table 7: ANOVA and Estimates of Cobb-Douglas Production function and ratios of MVP to MFC for broiler production

ANOVA F value: 261.4677***

| Particulars | Intercept | Chicks | Human Labour | Vaccine, drugs and Veterinary fee | Feeds | R ² | Adjusted R ² |
|-------------------------|-----------|---------------------|-------------------|-----------------------------------|-----------------------|----------------|-------------------------|
| Regression Coefficients | 0.86265 | 0.38*** (0.0050) | 0.053 (0.4466) | 0.423*** (0.0044) | 0.1363*** (0.0027) | 0.95 | 0.94 |
| MVP | | 44.31 | 236.883 | 401.479 | 6.934 | | |
| MFC | | 30.00 | 170.00 | 75.00 | 12.00 | | |
| r=MVP/MFC | | 1.47 | 1.394 | 5.353 | 0.577 | | |
| Interpretation | | Under-Utilized | Under-Utilized | Under-Utilized | Over-Utilized | | |

***Significant at 1% level of significance

which indicates that 94% of variation in broiler production was explained by the four independent variables included in the model, remaining 6% of variation was explained by error term. The overutilization of chicks, feed and labour was also identified in broiler farming by Taru *et al.* (2010).

CONCLUSION

The study on economic analysis of small broiler units in and around Jammu city of Jammu and Kashmir state revealed that categories of broiler growers range from as small as 500 birds per farm to 5000 birds per farm. Among the various components of variable costs, chicks constitute the major share followed by feed expenses, medical expenses, labour charges and sanitation charges. The percentage share of variable cost to total cost varies between 96.90% and 97.90% whereas that of fixed cost varies from 2.10% to 3.10% on different categories of broiler farms. The cost of production per 100 broilers decreases with increase in size of broiler farms, as the variable cost decreases with increase in size of the broiler farms. The mortality rate of chicks and birds over one entire period of farming was 9.92%. The net return from broiler production per hundred broilers on overall farms was estimated to be ` 4139.72

with overall benefit-cost ratio of 1:1.48. The inputs like chicks, human labour and vaccine, drugs and veterinary fee were underutilized, whereas the input 'feed' was found to be over-utilized.

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