Production Performance and Economic Appraisal of Broiler Farms in Ludhiana District of Punjab

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ABSTRACT

The present study was conducted to examine the costs and returns structure of different sized broiler farms in Ludhiana district of Punjab state. The primary data were collected from three different sized 60 broiler farmers for the period July 2013 to June 2014. The average number of birds per year on small, medium and large sized broiler farms were 21236, 63218 and 130000 respectively. The results of the study revealed that on an average per farm and per bird total cost of broiler production came out to be ₹ 3765557.93 and ₹ 86.49 respectively. The net returns per bird were estimated to be ₹ 10.86, ₹ 13.50 and ₹ 13.56 on small, medium and large sized broiler units respectively. On an average, the net returns per kg of live weight came out to be ₹ 8.19. Benefit cost ratio was estimated to be 1.12, 1.16 and 1.17 on small, medium and large farms respectively. It was further observed that the production efficiency of broiler farms increased with the farm size due to better utilization of inputs. Feed conversion ratio was found lower on large farms indicating higher efficiency on these farms. Meat-feed price ratio of greater than one on all the categories of broiler units indicated that broiler meat production was economically viable on all sized broiler farms, but large farms being the most efficient (1.90) which might be due to increase in the value of meat per bird and secondly due to decrease in the value of feed consumed per bird on large farms. High feed price, high price of chicks, short supply of chicks were the major production problems faced by the broiler farmers in the study area.

INTRODUCTION

Among the Indian livestock based vocations, broiler farming occupies pivotal position due to its enormous potential to bring about rapid economic growth with low investment. Poultry industry contributes about ₹ 600 billion accounting for about 0.77 per cent of the National Gross Domestic Product (GDP) and provides employment to over five million people in the country (Anonymous 2013a). The Indian poultry sector with 7.3 per cent growth in poultry population has witnessed one of the fastest annual growth of about 6 per cent in eggs and 10 per cent in meat production over the last decade amongst all animal based sectors. The high growth has placed India at 3rd position after China and U.S.A. with a production of 63 billion eggs and 5th after U.S.A, China, Brazil and Mexico with the production of 3.20 million metric tons (mmt) of chicken meat during 2011-12

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(Anonymous 2013b). Despite such progress the average per capita availability is still nearly 52 eggs and 2.3 kg of poultry meat, against the recommended levels of 180 eggs and 11 kg meat per annum recommended by the Nutritional Advisory Committee of the Government of India. . This offers a tremendous opportunity for further integration and growth in industry (Singh et al., 2010). The meat of broiler provides important nutrients like proteins, fat, calcium, iron, vitamins etc. One hundred gram of bird's flesh gives 165 calories (Cholan 2007). Ironically, India's 75 per cent of poultry produce is consumed by the 25 per cent population living in urban and semi-urban areas. It has been estimated that under moderate growth scenario of 6 per cent per annum in the country's GDP, by 2050, the demand for meat and eggs is likely to shoot up to 18 and 9.0 mmt, respectively. (Anonymous 2013a). Increase in population growth, changing life style, shifting of food habits, rapid urbanization, increased per capita income, awareness about health care etc. are contributing towards rising demand of poultry meat. Broiler industry can be adopted under a wide range of climatic conditions and it can be combined conveniently with other farm enterprises. However, the success and profitability of broiler farm largely depends on the selection of superior strains of broilers, feeding with well balanced, fresh good quality and economical feed, adoption of sound managerial practices and efficient marketing system (Elghouth et al., 2013). Organic farming has been gaining momentum these days because of ill effects of modern farming due to the use of chemical fertilizers, insecticides and pesticides etc. For this purpose, poultry waste is an excellent source of organic manure which can be utilized for growing field crops.

About 40 adult birds raised on deep litter can produce about ten quintals of organic manure having three per cent nitrogen, two per cent phosphorus and two per cent potassium. Hence, poultry excreta have become a considerable source of income for poultry farmers these days. Application of one tonne of such poultry manure supply 27 kg of nitrogen, 22 kg of phosphate, and 17.7 kg of potash. This one tonne of poultry manure is equivalent to 66 kg of urea, 91 kg of super phosphate and 31 kg of potash, is sufficient to grow one acre of crop successfully (Nigam, 2007).

Broiler farming assumes special importance in the state of Punjab due to land fragmentation in rural areas. The productivity and production of food grains particularly of cereals in Punjab have already reached a plateau with little scope to increase, resulting in adoption of subsidiary occupations like broiler farming. Thus diversification of the state agriculture through allied activities like broiler farming has acquired added significance for solving the agrarian crisis of the state. Adoption of broiler farming, especially by marginal and small farmers will not only liberate them from debt trap but also meet the growing demand of poultry meat. Against this backdrop the present study was undertaken to analyse the costs and returns structure and production efficiency of different sized broiler farms in the Ludhiana district of Punjab state.

MATERIALS AND METHODS

The study was conducted in the Ludhiana district of Punjab state as the district has high concentration of poultry farms and the largest number of broilers. Information regarding the number of broiler farms, their location, addresses and number of poultry birds on each farm was obtained from the office of Deputy Director, Department of

Animal Husbandry, Ludhiana. Using cube root frequency method of stratification, the broiler farms were stratified into three strata i.e. small (below 6688 birds), medium (6689-14508 birds) and large (14508 and above birds) on the basis of number of birds. The selection of broiler farms was done on the basis of probability proportion to the number of broiler farms in each category. Consequently, 37 small, 16 medium and 7 large broiler farms were selected making total sample of 60. The data were collected during August 2014 for the agricultural year beginning from 1st July 2013 to 30th June, 2014 by personal interview method using a specially designed and pre tested schedule.

The average number of broilers per year on small, medium and large sized broiler farms was 21236, 63218 and 130000 respectively with an overall average of 45120.

The items of costs and returns were computed separately for different categories of broiler farms on per farm as well as on per bird basis for the given year. Total cost included fixed and variable costs. The fixed costs included depreciation on fixed assets and the interest on fixed capital whereas the variable costs included the items such as cost of day old chicks, expenditure on feed, labour cost, miscellaneous costs and interest on investment on working capital.

For measuring the production efficiency of different sized broiler farms, various ratios such as Feed conversion ratio, Meat-feed price ratio and Benefit-cost ratio were worked out as follows:

(i) Feed conversion ratio
Feed conversion ratio is an index of efficiency expressed in terms of kilograms of feed consumed per value of meat produced. Feed conversion efficiency is shown by lower input feed per unit of output. Lower the feed conversion ratio, higher will be the production efficiency.

$$\text{Feed conversation ratio} = \frac{\text{Feed consumed per bird in kgs}}{\text{Live weight per bird}}$$

(ii) Meat-feed price ratio
Meat feed price ratio is the ratio between value of meat produced per bird to the value of the feed consumed per bird. If the meat feed price ratio is more than one, the meat production is economically viable. Higher the meat feed price ratio, higher is the production efficiency in broiler farming.

$$\text{Meat-feed price ratio} = \frac{\text{Value of meat produced per bird}}{\text{Value of feed consumed per bird}}$$

(iii) Benefit-cost ratio
Benefit-cost ratio is the ratio between the gross returns from the meat, manures and gunny bags to the total cost of input used. It is also called revenue-cost ratio or output-input ratio. Benefit-cost ratio of one and greater than one means the meat production is economically viable. Higher the benefit-cost ratio, higher is the production efficiency on broiler farming.

$$\text{Benefit-cost ratio} = \frac{\text{Gross returns from sale of meat, manure and gunny bags}}{\text{Total cost of inputs used in the enterprises}}$$

To test the significance of difference of gross returns between different categories of broiler farms Analysis of Variance technique with one way classification was carried out using computer software. The pair wise critical difference (CD) was also obtained. When the difference between any two pairs of categories was greater than their respective critical difference, the pair was said to be significantly different from each other at 5 per cent level of significance.

Fixed Capital Investment
Broiler farming requires a considerable quantum of initial investment funds, the investment made on different items across different sized categories of broiler farms has been presented in Table 1. As investment on buildings involves the major component

TABLE 1: FIXED INVESTMENT PATTERN ON DIFFERENT SIZED BROILER FARMS IN LUDHIANA, PUNJAB, 2013-14

(₹/annum/farm)

Particulars	Farm size category			Overall
	Small	Medium	Large	
Electricity fitting	3779.73	9700.00	15285.71	6700.83
	(17.50)	(19.06)	(16.80)	(17.86)
Equipments	17815.68	41171.88	75714.29	30798.83
	(82.50)	(80.94)	(83.20)	(82.14)
Total fixed investment	21595.41	50871.88	91000	37499.66
	(100.00)	(100.00)	(100.00)	(100.00)

Figures in parentheses indicate the percentages to the total

of fixed investment, but all the sampled broiler farmers were paying rent for their farms. The rest of the fixed investments made by broiler farmers were on the fitting of electricity and equipments used in the production process. It is revealed from the table that total fixed investments on small, medium and large farms were ₹ 21595.41, ₹ 50871.88 and ₹ 91000 respectively with an overall average of ₹ 37499.66.

Cost Structure

Per farm fixed costs were computed and are presented in the table 2. Since the sampled farmers had leased in land for broiler production, the rental value of shed was to tune of ₹ 20756.76, ₹ 47750.00 and ₹ 104428.60 on small, medium and large broiler farms respectively. On an average, the rental value of shed came out to be ₹ 37716.67. The expenditure on repairs and maintenance of buildings, the next major component of fixed costs was ₹ 7800, ₹ 20750 and ₹ 26714.29 on small, medium and large broiler farms respectively with an overall average of ₹ 13460. Depreciation on equipments and electricity fitting was ₹ 2139.54, ₹ 5087.18 and ₹ 9100 on small, medium and large broiler farms respectively, while on an average, depreciation was estimated to be ₹ 3737.63.The interest on fixed capital was ₹ 2375.49 (7.18 %) ₹ 5595.90 (7.07 %) and ₹ 10010 (6.66 %) on small, medium and large farms respectively with an overall average of

₹ 4124.96 (6.99%).

Variable costs are recurring costs and include the cost of chicks, feed, labour cost, vaccines and medicines, expenditure on electricity, transportation and other expenses. It can be seen from the table that feed was the major item in variable cost in broiler farming and accounts for about 62.95 per cent of the total variable cost. The cost of chicks was the other major component accounting for about 21.21 per cent of the whole variable costs. Labour cost was the next highest component of cost accounting for about 4.84 per cent of the total variable costs on an average farm situation. The interest on working capital was to the extent of ₹ 97553.83 (5.21%), ₹ 268159.50 (5.21%) and ₹. 527686.50 (5.21%) on small, medium and large farms respectively and on overall average, the figure came out to be ₹ 193230.82 (5.21%).

It was observed that the total cost of broiler production was the highest on large farms with ₹ 102.72 lakh followed by medium and small farms with ₹ 52.23 lakh and ₹ 19.04 lakh respectively with an overall average of ₹ 37.65 lakh. The total costs varied with the farm size, which may be due to better feeding, veterinary and management practices. The total costs per bird came out to be ₹ 89.62, ₹ 82.56 and ₹ 78.97 on small, medium and large farms respectively while the total cost per kg of

TABLE 2: COST STRUCTURE ON DIFFERENT SIZED BROILER FARMS IN LUDHIANA, PUNJAB, 2013-14

(₹/annum)

Particulars	Farm size category			Overall
	Small	Medium	Large	
Per farm cost				
Fixed Price				
Rental value of shed	20756.76	47750	104428.6	37716.67
	(62.76)	(60.30)	(69.50)	(63.88)
Depreciation on fixed assets (equipments and electricity fitting)	2159.54	5087.18	9100	3737.63
	(6.47)	(6.42)	(6.06)	(6.33)
Repairs and maintenance of buildings	7800	20750	26714.29	13460
	(23.59)	(26.21)	(17.78)	(22.80)
Interest on fixed capital investment @11 per cent	2375.49	5595.9	10010	4124.96
	(7.18)	(7.07)	(6.66)	(6.99)
Total Fixed Cost	33091.79	79183.08	150252.89	59039.26
	(100.00)	(100.00)	(100.00)	(100.00)
Variable costs				
Feed Cost	1188312	3250231	6290000	2333354
	(63.50)	(63.19)	(62.14)	(62.95)
Day old chicks	369097.3	1102938	2265000	785976.8
	(19.72)	(21.44)	(22.38)	(21.21)
Labour Cost	102454	229275	473142.9	179519.97
	(5.48)	(4.46)	(4.47)	(4.84)
Litter cost	49956.76	134425	261428.6	97153.34
	(2.67)	(2.61)	(2.58)	(2.62)
Veterinary cost	25301.35	58925	112757.1	44470.83
	(1.35)	(1.15)	(1.11)	(1.20)
Medicine Cost	15004.59	41887.5	73171.43	28959.5
	(0.80)	(0.81)	(0.72)	(0.78)
Electricity Charges	10532.43	15450	22000	13181.67
	(0.56)	(0.30)	(0.22)	(0.36)
Miscellaneous expenses	7394.59	25484.38	57800	18099.17
	(0.40)	(0.50)	(0.57)	(0.49)
Transportation cost	5652.7	17012.5	39000	12572.5
	(0.30)	(0.33)	(0.39)	(0.34)
Interest on working capital @11 per cent for six months	97553.83	268159.5	527686.5	193230.82
	(5.21)	(5.21)	(5.21)	(5.21)
Total variable cost	1871259.55	5143788	10121987	3706518.67
	(100.00)	(100.00)	(100.00)	(100.00)
Total cost (fixed + variable)	1904331.34	5222971.08	10272239.89	3765557.93
Per bird costs				
Total Fixed Cost	1.54	1.24	1.15	1.41
Total variable cost	88.08	81.32	77.82	85.08
Total cost per bird	89.62	82.56	78.97	86.49
Live weight per bird	1.47	1.43	1.4	1.45
Total cost per kg of live weight	60.97	57.73	56.41	59.65

Figures in parentheses indicate the percentages to the total.

live weight was estimated to be ₹ 60.97, ₹ 57.73 and ₹ 56.41 on small, medium and large sized farms respectively. Total fixed per bird also showed a decreasing trend with farm size. It was highest on small farms with ₹ 1.54 followed by medium and large farms with ₹ 1.24 and ₹ 1.15 respectively with an overall average of ₹ 1.41.

It was found that total fixed cost and total cost of broiler production on bird basis were higher on small farms followed by medium and large farms. Hence, the total cost per bird decreased with increase in the size of the farm indicating the existence of economies of scale.

Returns from Broiler Farming

The level of turnover and profitability of broiler farm business have been studied by means of gross returns and net returns. The returns from any particular process are determined by factor costs and output prices. The income from various sources and the gross returns per farm on different categories of broiler farms is presented in table 3. The perusal of the table revealed that the gross returns per farm were the highest on the large farms with ₹ 120.30 lakh followed by medium and small farms with ₹ 60.72 lakh and ₹ 21.33 lakh respectively with an overall average of ₹ 43.38 lakh. Thus, the gross returns showed an increasing trend with the

TABLE 3: RETURNS STRUCTURE ON DIFFERENT SIZED BROILER FARMS IN LUDHIANA, PUNJAB, 2013-14

Particulars	Farm size category			(₹/annum)
	Small	Medium	Large	Overall
Per farm returns from sale of				
Broilers	2116567.57 (99.19)	6023063 (99.18)	11928000 (99.15)	4302966.8 (99.17)
Empty gunny bags	4449.19 (0.21)	11894.38 (0.20)	23800 (0.20)	8692.17 (0.20)
Manure	12899.46 (0.60)	37768.75 (0.62)	78428.57 (0.65)	27176.33 (0.63)
Gross returns	2133916.22 (100.00)	6072726.13 (100.00)	12030228.57 (100.00)	4338835.3 (100.00)
Per bird returns from sale of				
Broilers	99.66	95.27	91.75	97.57
Empty gunny bags	0.21	0.19	0.18	0.2
Manure	0.61	0.6	0.6	0.6
Gross returns	100.48*	96.06*	92.53*	98.37
Gross returns per kg of live weight	68.35	67.17	66.09	67.84
Per farm				
Gross returns	2133916.22	6072726.13	12030228.57	4338835.3
Total fixed Cost	33071.79	79183.08	150252.89	59039.26
Total variable cost	1871259.55	5143788	10121987	3706518.67
Total cost	1904331.34	5222971.08	10272239.89	3765557.93
Net returns over total cost	229584.88	849755.05	1757988.68	573277.37
Net returns over variable cost	262656.67	928938.13	1908241.57	632316.63
Per bird				
Total Fixed Cost	1.54	1.24	1.15	1.41
Total variable cost	88.08	81.32	77.82	85.08
Total cost	89.62	82.56	78.97	86.49
Net Returns over total cost	10.86	13.5	13.56	11.88

*Denotes significant difference between different categories at 5 percent level of significance.
Figures in parentheses indicate the percentages to the total.

increase in the size of the farm. Per bird gross returns were ₹ 100.48, ₹ 96.06 and ₹ 92.53 on small, medium and large farms respectively. On an average, income from empty gunny bags and manure accounted for 0.20 and 0.63 per cent respectively.

There was significant difference between small and medium; small and large category; and between medium and large category. Gross returns per kg of live weight were the highest on small farms with ₹ 68.35 followed by medium and large farms with ₹ 67.17 and ₹ 66.09 respectively. It is clear that the income from sale of broilers showed a decreasing trend with the size of the farm. The net returns over total costs were estimated to be ₹ 229584.88, ₹ 849755.05 and ₹ 1757988.68 on small, medium and large broiler farms respectively with an overall average of ₹ 573277.37. The net returns over variable costs were found to be highest on large farms ₹ 1908241.57 followed by ₹ 928938.13 and ₹ 262656.67 on medium and small farms respectively. It is evident from the table that the net returns per bird increased with the increase in the size of the farm. On the large, medium and small farms, the net returns per bird over the total costs were ₹ 13.56, ₹ 13.50 and ₹ 10.86 respectively with overall average of ₹ 11.88. Further, net returns over total cost per kg of live weight were found to be ₹ 7.39, ₹ 9.44, ₹. 9.69 on small, medium and large broiler farms respectively. This

increasing trend of net income with the farm size could mainly be attributed to the economies of scale on the large farms. Thus, it can be concluded on the basis of the foregoing discussion that the broiler farming is a more profitable venture on the large scale basis.

Production Efficiency on Different Sized Broiler Farms

Feed conversion ratio, meat feed price ratio and benefit-cost ratios on different sized broiler farms were worked out and are presented in Table 4. The perusal of the table reveals that feed conversion ratio was highest on small broiler farms with 1.44, followed by medium and large farms with 1.34 and 1.33 respectively with an overall average of 1.40. Thus, feed conversion ratio declined with the size of broiler farm indicating higher efficiency on large farms. The higher efficiency on large farms was on the account of increase in meat production per bird and fall in feed consumption per bird. The higher meat production was due to use of superior strains of poultry birds on large farms.

Meat feed price ratio increased with size of broiler farms. It ranged from 1.78 on small sized farms to 1.85 and 1.90 on medium and large sized broiler farms respectively again indicating higher production efficiency on large farms with an overall average of 1.81. Meat feed price ratio of greater than one on all size broiler

TABLE 4: PRODUCTION EFFICIENCY ON DIFFERENT SIZED BROILER FARMS IN LUDHIANA, PUNJAB, 2013-14

Particulars	Farm size category			Overall
	Small	Medium	Large	
Feed (kg/Bird)	2.12	1.92	1.87	2.03
Live weight per bird	1.47	1.43	1.40	1.45
Feed Conversion ratio	1.44	1.34	1.33	1.40
Value of live weight (₹/bird)	99.66	95.27	91.75	97.57
Value of live weight (₹/kg)	67.80	66.62	65.54	67.29
Value of Feed (₹/bird)	55.96	51.41	48.38	53.86
Meat-feed Price Ratio	1.78	1.85	1.90	1.81
Benefit-cost Ratio (BCR)	1.12	1.16	1.17	1.14

farms indicate that meat production is economically viable on all sized broiler farms, large farms being most efficient. The higher meat feed price ratio on large farms is due to two reasons. Firstly, due to increase in value of meat per bird and secondly due to decrease in the value of feed consumed per bird on large farms. The increase in the value of meat per bird was due higher prices received by large farmers while the reduction in the value of feed consumed per bird was due the bulk purchases of feed ingredients, mixing at farm, discount on the purchase of medicines and concentrates. .

Further, benefit-cost ratio was greater than one on all sized broiler farms indicating the economic viability of meat production. Benefit-cost ratio increased with the size of the broiler farm. It ranged from 1.12 on small broiler farms to 1.16 and 1.17 on medium sized and large farms respectively with an overall average of 1.14. Thus, viewed from all angles, the production efficiency of broiler farms increased with the size due to better utilization of inputs.

Constraints in Production of Broilers

It is clear from the Table 5 that in the production process, 76.66 per cent of farmers reported the problem of high feed price followed by seasonal fluctuation in price (73.33 %) and high price of chicks (70.00 %). Size category wise, 83.78 per cent of small farmers reported the problem of high feed price, followed by seasonal fluctuation in price (78.37 %) and high price of chicks (72.97 %). Similar trends were found in medium and large sized categories.

CONCLUSION

It is evident from foregoing discussion that the fixed and variable costs in respect of broiler production declined with the increase in size of broiler farms, which depicts the inverse relationship between per unit costs and size of farm due to prevalence of economies of scale. Gross returns in respect of broiler production varied directly with the farm size. The large farms were found to be more efficient as compared to other farm categories as their feed conversion ratio was found to be less as compared to medium and small farms. Meat-feed price ratio and benefit-cost ratio increased with increase in farm size indicating that broiler production is more viable on large farms. In nutshell it may be concluded that broiler farming is found a profitable enterprise, however, there is still enough scope in reducing the cost of production and increasing the profitability by motivating the farmers to adopt scientific management through effective training and technology transfer programmes.

REFERENCES

TABLE 5: OPINION REGARDING PRODUCTION PROBLEMS ON DIFFERENT SIZED BROILER FARMS IN LUDHIANA, PUNJAB, 2013-14

(Multiple Response)

Particulars	Farm size category			Overall
	Small	Medium	Large	
High feed price	31 (83.78)	12 (75.00)	3 (71.42)	46 (76.66)
Seasonal fluctuation in price	29 (78.37)	11 (68.75)	4 (57.14)	44 (73.33)
High price of chicks	27 (72.97)	11 (68.75)	4 (57.14)	42 (70.00)
Short/irregular supply of chicks	22 (59.46)	9 (56.25)	2 (28.57)	33 (55.00)

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