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Production Performance and Economic Appraisal of Broiler Farms in Anand District of Gujarat[§]

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Abstract

The production performance of different sizes of broiler farms has been studied by collecting data from 60 broiler producers of Anand district during 2005. To examine production performance, the average feed conversion ratio, livability percentage, average body weight and age at marketing have been worked out. Though broiler production is capital-intensive, it has been found profitable. The average cost of production per broiler has been found to be ₹ 64 and per kilogram live weight of broiler as ₹ 32. The variable cost and fixed cost constitute 84.5 per cent and 15.5 per cent of total cost, respectively. The major cost components have been found as feed cost (58.6%), chick cost (21.5%) and depreciation on buildings (10.7%). The net profit per broiler as well as per kilogram body weight has been found as ₹ 7.20 and ₹ 3.59, respectively for the sample as a whole. The benefit-cost ratio has worked out to be 1.11 for the sample as a whole and it increases with increase in farm-size, indicating that as farm-size increases, the net margin over the rupee invested on broilers also increases. The break-even analysis has revealed that the producers have to maintain minimum of 1531, 2611 and 10437 broilers, respectively on small, medium and large farms to meet the cost incurred in production of broilers.

Key words: Broiler farms, Feed conversion ratio, Livability percentage, Benefit-cost ratio, Break-even analysis

JEL Classification: Q120, Q130

Introduction

Indian poultry industry has made rapid strides at the rate of about 15 per cent during the past two decades and presently provides employment to an estimated workforce of 1.5 million people. The poultry sector accounted for ₹ 95, 600 million, which was about 2 per cent of the total Indian GDP as on 2004-05 (Yadav, 2005). Broiler farming in India has emerged as the fastest growing segment of animal husbandry. However,

the success and profitability of a broiler farm largely depends on the selection of superior commercial strains of broilers, feeding with fresh, good quality, well-balanced and economical feed and adoption of sound managerial practices and efficient marketing system.

In Gujarat, the total number of poultry was about 5.2 million during the year 2003-04 (GoG, 2005). The major poultry farming districts of Gujarat are: Anand, Surat, Vadodra, Dahod, Panchmahal, Kheda and Banaskantha constituting about 67.61 per cent of the total number of poultry farms. Anand district had the highest number of poultry farms, i.e. about 11 lakhs (21.51 % of Gujarat). Therefore, the present study was conducted to evaluate the production performance and to find the cost of production of a broiler at marketing age, benefit-cost ratio and break-even number of broilers for production in the Anand district.

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Methodology

First of all, broiler farms of Anand district which had been in production continuously for at least one year were identified with the help of officials of the Training and Research Centre, Poultry Complex, AAU, Anand, hatchery personnel, feed manufacturers, poultry services representatives and dealers and a list of 125 such farms where proper basic records are being maintained, was prepared. The list was arranged in the ascending order of number of birds kept in a farm. Then, the list was stratified into three size groups, viz. small (below 3000 birds), medium (3000-5999 birds) and large (6000 and above birds) farms. Out of 125 farms, small, medium and large farms were 30, 45 and 50, respectively. Then, a sample of 60 farms was selected at random ensuring proportionate representation of the three strata. Thus, 14 farms from small group, 22 from medium group and 24 from large group were selected. The relevant data pertaining to the year 2005 were collected from the selected poultry farmers through personal interview using the pre-tested interview schedules.

The major analytical tools employed for the study were tabular analysis with the following mathematical techniques and economic concepts: Production performance, feed consumption, feed conversion ratio, livability, broiler age at marketing and body weight of broiler at marketing. For economic appraisal, data related to investment on building and equipment, expenditure on chicks, feed, labour, electricity, medicine and other miscellaneous items and income from sale of live broilers, manure and empty feed bags were obtained from the farmers for each batch. Finally gross returns, net returns, benefit-cost ratio and break-even analysis were carried.

Results and Discussion

Size of Broiler Unit — The details about the total number of broiler farms and average number of broilers

per farm under different farm-size groups are presented in Table 1. The average number of broilers worked out to be 9823 per farm and it varied from 2478 birds (23.3 %) for small farms to 18958 birds (40 %) for large farms.

Basic Stock — Broiler farmers in the study area reared different commercial broiler-breeds. The data in Table 2 indicate that Avion-34 was the most preferred breed of the broiler-farmers (33.3 %), followed by Marshall (26.7 %) and Hub chicks (20.0 %) as well as Cobb (20.0 %). The different breeds of chicks were purchased from the local traders of the study area.

Table 2. Distributions of broiler-farms according to different commercial broiler-breeds

Broiler-Breeds	Farm-size groups			Overall
	Small	Medium	Large	
Hub chicks	3 (21.43)	5 (22.73)	4 (16.67)	12 (20.00)
Marshall	5 (35.71)	6 (27.27)	5 (20.83)	16 (26.67)
Cobb	2 (14.29)	4 (18.18)	6 (25.00)	12 (20.00)
Avion - 34	4 (28.57)	7 (31.82)	9 (37.50)	20 (33.33)
Total	14	22	24	60

Note: Figures within the parentheses indicate percentage to total.

Production Performance

The data regarding average feed conversion ratio, livability percentage, and age and body weight at marketing are presented in Table 3.

Feed Conversion Ratio — It is clear from Table 3 that the feed conversion ratio was 1.97 on overall basis whereas farm-size-wise, it was 2.01, 1.99 and 1.96 in

Table 1. Average number of broilers under different farm-size groups

Farm-size groups	Farms		Broilers		Average No. of broilers per farm
	Number	Per cent to total farms	Number	Per cent to total broilers	
Small (below 3000 birds)	14	23.33	34700	5.89	2478.6
Medium (3000-5999 birds)	22	36.67	99700	16.91	4531.8
Large (6000 and above birds)	24	40.00	455000	77.20	18958.3
All farms	60	100.00	589400	100.00	9823.3

Table 3. Mean feed conversion ratio, age and body weight at marketing and livability percentage of broilers

Parameters	Farm-size groups			Overall
	Small	Medium	Large	
Feed conversion ratio	2.01	1.99	1.96	1.97
Age at marketing (days)	42.57	42.38	42.05	42.21
Body weight at marketing (kg)	2.03	2.01	1.98	2.00
Livability (%)	94.42	94.54	94.72	94.63

Table 4. Pattern of fixed investment

Per farm investment (₹)	Farm-size groups			All farms
	Small	Medium	Large	
On broiler house	188123 (94.05)	309976 (93.02)	1228500 (92.48)	673880 (93.21)
On equipments	11897 (5.95)	23248 (6.98)	99910 (7.52)	49117 (6.79)
Total	200020	333224	1328410	722997

Note: Figures within the parentheses indicate percentage to total.

small, medium and large broilers farms, respectively. It shows that feed requirement is higher in small than medium and large farms to obtain one kg body weight. In other words, feed efficiency is lower in small farms as compared to medium and large farms, as lower the feed conversion ratio, the higher is the feed efficiency. Rajendran (1998) in his study in and around Coimbatore has recorded feed conversion ratio of 2.09, 2.07 and 2.05 in small, medium and large broiler farms, respectively. However, Devarajan (1981) had obtained a higher feed conversion ratio, 3.19, 3.09 and 2.94 in small, medium and large broiler farms, respectively.

Livability — The livability percentage of broilers in the study area was 94.42, 94.54 and 94.72 in small medium and large farms, respectively. Thus, irrespective of the farm size, the livability percentage was almost same in the study area. Rajendran (1998) has recorded livability of 92.91 per cent in small and 93.26 per cent in large farms. Aggarwal *et al.* (1981) had observed a lower livability when the birds were marketed at eighth week (88.6 %) than at sixth week (91.3 %).

Age at Marketing — The average age at marketing was 42.57 days, 42.38 days and 42.05 days in small medium and large farms, respectively. It also indicated that average age at marketing, irrespective of farm size, was more or less the same in the study area. The age at marketing observed in the present study was

found to be lower than the findings of Rajendran (1998) and Saravanan (1998) but similar with the results of Raghavan (1997).

Body Weight at Marketing — The average body weight at marketing was 2.03 kg, 2.01 kg and 1.98 kg in small, medium and large farms, respectively. It revealed that body weight at marketing age slightly decreased as the farm-size increased. The body weight at marketing recorded in this study is better than the weights reported by Verma and Pillai (1989) and Rajendran (1998), but it was nearly the same as recorded by Raghavan (1997). The overall improvement in body weight in this study might be due to good quality feed, better management and improved genetic potential of the birds.

Economic Appraisal

Pattern of Fixed Investment — The investment on fixed items, presented in Table 4, revealed that, the cost on broiler house was the major component constituting 94.05 per cent, 93.02 per cent and 92.48 per cent in small, medium and large farms, respectively. It was followed by investment on equipment.

Cost Analysis of Broiler Production

The different components that constitute the total cost per broiler and per kilogram live weight are

Table 5. Breakup of the total cost of production per broiler in Anand district

(₹ /bird)

Particulars	Farm-size groups			All farms
	Small	Medium	Large	
Fixed cost				
Depreciation on building	7.59 (11.5)	6.84 (10.6)	6.48 (10.3)	6.86 (10.7)
Depreciation on equipment	0.67 (1.0)	0.72 (1.1)	0.73 (1.2)	0.70 (1.1)
Interest on capital investment	2.08 (3.1)	1.94 (3.0)	1.86 (3.0)	1.93 (3.0)
Miscellaneous fixed cost	0.26 (0.4)	0.34 (0.5)	0.67 (1.1)	0.46 (0.7)
Total fixed cost	10.60 (16.0)	9.84 (15.2)	9.74 (15.6)	9.95 (15.5)
Variable cost				
Chick cost	13.94 (21.1)	13.87 (21.5)	13.81 (22.1)	13.84 (21.5)
Feed Cost	38.66 (58.4)	37.96 (58.9)	36.21 (57.9)	37.76 (58.6)
Litter cost	0.54 (0.8)	0.49 (0.8)	0.43 (0.7)	0.48 (0.7)
Electricity charges	0.69 (1.0)	0.65 (1.0)	0.61 (1.0)	0.64 (1.0)
Health cover	0.72 (1.1)	0.74 (1.2)	0.80 (1.3)	0.78 (1.2)
Labour cost	0.79 (1.2)	0.73 (1.1)	0.68 (1.1)	0.71 (1.1)
Miscellaneous cost	0.23 (0.4)	0.23 (0.3)	0.23 (0.3)	0.23 (0.4)
Total variable cost	55.57 (84.0)	54.67 (84.8)	52.77 (84.4)	54.44 (84.5)
Total cost	66.17	64.51	62.51	64.39

Note: Figures within the parentheses indicate percentage to total.

presented in Tables 5 and 6, respectively. The average total cost was ₹ 64.39 per broiler and ₹ 32.20 per kilogram live weight of broiler for the sample as a whole. It was also observed that on an average variable cost formed 84.5 per cent and fixed cost 15.5 per cent of total cost. On reviewing the size-wise total average cost per broiler, it can be seen that it was highest, ₹ 66.17 on small farms, followed by ₹ 64.51 on medium farms and ₹ 62.51 on large farms. This finding shows that the cost of production per bird decreased with increase in farm size.

On studying the factor-wise cost on an average, it is observed that the feed cost accounted for the maximum share (58.6 %) of the total cost, followed by chick cost (21.5 %) and depreciation on building (10.7 %). Thus, these three major components constituted 90.8 per cent of the total cost of broiler production. This is in agreement with the findings of Rajendran (1998) who reported that feed cost, chick cost and depreciation on building constituted 93.8 per cent of total cost of broiler production.

Table 6. Breakup of the total cost of production per kg live weight in Anand district

(₹ / kg)

Particulars	Farm-size groups			All farms
	Small	Medium	Large	
Fixed cost				
Depreciation on building	3.74 (11.5)	3.40 (10.6)	3.27 (10.3)	3.43 (10.7)
Depreciation on equipment	0.33 (1.0)	0.36 (1.1)	0.37 (1.2)	0.35 (1.1)
Interest on capital investment	1.02 (3.1)	0.97 (3.0)	0.94 (3.0)	0.97 (3.0)
Miscellaneous fixed cost	0.13 (0.4)	0.17 (0.5)	0.34 (1.1)	0.23 (0.7)
Total fixed cost	5.22 (16.0)	4.90 (15.2)	4.92 (15.6)	4.98 (15.5)
Variable cost				
Chick cost	6.87 (21.1)	6.90 (21.5)	6.97 (22.1)	6.92 (21.5)
Feed cost	19.04 (58.4)	18.89 (58.9)	18.29 (57.9)	18.88 (58.6)
Litter cost	0.27 (0.8)	0.24 (0.8)	0.22 (0.7)	0.24 (0.7)
Electricity charges	0.34 (1.0)	0.32 (1.0)	0.31 (1.0)	0.32 (1.0)
Health cover	0.36 (1.1)	0.37 (1.2)	0.40 (1.3)	0.39 (1.2)
Labour cost	0.39 (1.2)	0.36 (1.1)	0.34 (1.1)	0.35 (1.1)
Miscellaneous cost	0.11 (0.4)	0.11 (0.3)	0.12 (0.3)	0.12 (0.4)
Total variable cost	27.38 (84.0)	27.19 (84.8)	26.65 (84.4)	27.22 (84.5)
Total cost	32.60	32.09	31.57	32.20

Note: Figures within the parentheses indicate percentage to total.

Returns from Broiler Enterprises

Gross Returns

The returns realized from various sources, presented in Table 7, revealed that on an average the returns from sale of broilers amounted to ₹ 70.25 (98.13 %) per broiler. The next source of income was sale of empty gunny bags (1.02 %) and sale of manure (0.85 %). The gross returns per broiler decreased with increase in farm size, which might be due to lowered body weight and reduced age at marketing in medium and large farms than in small farms. These observations

are in agreement with the earlier report of Moorti *et al.* (1990) and Rajendran (1998). On the contrary, Chhikara and Chidha (1989) had observed higher gross returns in large farms, followed by medium and small farms.

Net Returns, Benefit-Cost Ratio and Break-even Analysis

Net returns per broiler and per kilogram of broiler, benefit-cost ratio as well as break-even quantity were calculated and are furnished in Table 8. A perusal of Table 8 revealed that as farm-size increased, the net

Table 7. Gross returns from different sources per broiler

(₹/bird)

Source of income	Farm-size groups			All farms
	Small	Medium	Large	
Sale of broiler	71.21 (97.91)	70.39 (98.10)	69.18 (98.16)	70.25 (98.13)
Sale of empty gunny bag	0.81 (1.11)	0.74 (1.03)	0.71 (1.01)	0.73 (1.02)
Sale of manure	0.71 (0.98)	0.62 (0.87)	0.59 (0.83)	0.61 (0.85)
Total	72.73	71.75	70.48	71.59

Note: Figures within the parentheses indicate percentage to total.

Table 8. Net returns, benefit-cost ratio and break-even quantity in broiler farms in Anand

Particulars	Farm-size groups			All farms
	Small	Medium	Large	
Net returns (₹/bird)				
Total returns	72.73	71.75	70.48	71.59
Total cost	66.17	64.51	62.51	64.39
Net returns	6.56	7.24	7.97	7.20
Net returns (₹/ kg live weight)				
Total returns	35.83	35.70	35.60	35.79
Total cost	32.60	32.09	31.57	32.20
Net returns	3.23	3.61	4.03	3.59
Benefit-cost ratio	1.10	1.11	1.13	1.11
Break-even quantity (No.)	1531	2611	10437	5699

returns per broiler as well as per kg live weight also increased, which could be due to lower production cost in larger farms. This is in agreement with the earlier observations of Roy and Broadway (1990) and Rajendran (1998). It was also observed that the benefit-cost ratio increased with increase in farm-size, which indicated that as the size increases, the net margin over the rupee invested on broilers also increased. It could also be noticed from Table 8 that the producer had to maintain a minimum of 1531, 2611 and 10437 broilers, respectively in small, medium and large farms to meet the cost incurred in production of broilers

Conclusions

The study has revealed that irrespective of the farm-size, the livability percentage is almost same in the study area. The average body weight and age at marketing, irrespective of farm-size, have been found

as 2.0 kg and 42.2 days, respectively. The average cost of production per broiler has been found to be ₹ 64 and per kilogram live weight of broiler as ₹ 32. It has also been found that variable cost forms 84.5 per cent and fixed cost 15.5 per cent of the total cost. The study has revealed that the cost of production per bird decreases with increase in farm-size. The feed cost has been found to be the highest (58.6%), followed by chick cost (21.5%), depreciation on buildings (10.7%) and others (9.2%).

The gross return per broiler has been worked out to be ₹ 71.59 for the sample as a whole and it decreases with increase in farm-size. The net profit per broiler has been observed as ₹ 6.56, ₹ 7.24 and ₹ 7.97 in small medium and large farms, respectively with an overall of ₹ 7.20 for the sample as a whole. Similarly, the net return per kilogram of broiler has been worked out as ₹ 3.23, ₹ 3.61 and ₹ 4.03 in small, medium and

large farms, respectively with an overall of ₹ 3.59 for the sample as a whole. As the farm-size increases, the net return per broiler as well as per kg live weight basis also increases. The benefit-cost ratio has been found 1.11 for the sample as a whole and it increases with increase in farm-size, indicating that as the size increases, the net margin over the rupee invested on broilers also increases. The break-even analysis has revealed that the producers have to maintain a minimum of 1531, 2611 and 10437 broilers, respectively on small, medium and large farms to meet the cost incurred in production of broilers.

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