An economic analysis of broiler production in Bhagalpur district of Bihar, India

ABSTRACT

The present study was conducted to determine the cost of production, different costs, and the benefit-cost ratio incurred in broiler production in different farm size groups. The study was undertaken through a benchmark survey method by contacting 70 broiler farms, representing small, medium, and large farms. The average number of birds was 280 on small farms, 780 on medium farms, and 2970 on large farms. It was evident that the highest percentage was found on large farms, showing a strong correlation with farm size. Production costs per quintal reached their peak at Rs. 4426.00 in small farms, while large farms exhibited the lowest cost at Rs. 3606.00 per quintal. Medium-sized farms reported a cost of Rs. 3993.60 per quintal. On average, across the sample farms, the production cost per quintal stood at Rs. 4008.53. These figures underscore an inverse relationship between farm size and production costs per quintal, with smaller farms incurring higher costs per quintal compared to larger operations. The B.C. ratios were 1:1.44, 1:1.60, 1:1.77, and 1:1.60 for the small, medium, large, and sample averages, respectively. When all the inputs are combined, small, medium, and large farms are showing rising returns to scale.

KEYWORDS: Cost of production, Benefit-cost ratio, Different costs, Yield per quintal, Net return

Introduction

The broiler chicken industry in Bhagalpur district of Bihar has promising potential due to the growing demand for poultry products in the area. Enhancing visibility and sales can be achieved through creative spaces, outreach efforts, digital platforms, and collaborations with local businesses. Broiler chickens (Gallus gallus domesticus) are specifically raised for meat production. This meat is a crucial source of high-quality proteins, minerals, and vitamins that help balance the human diet. Based on 2023 production data from the Food and Agriculture Organization Corporate Statistical Database (Source: FAOSTAT), India is the fifth-largest meat producer in the world. From 6.69 million tonnes in 2014–15 to 9.29 million tonnes in 2021–22, the nation produced more meat. In 2023–2024, the domestic poultry sector is expected to rise by 8–10%. Chicken accounted for the majority of India's 9.29 million tonnes of meat production in 2022 (Source: DAHD, 2022). “In 2022, India produced over 4.2 million tonnes of poultry meat. The popularity of broiler meat has been rising over the past two decades, currently accounting for about 45% of total meat consumption and being the most popular meat from a single livestock species. Chicken dominates poultry meat production in India, with Haryana, West Bengal, and Uttar Pradesh leading in broiler meat production. The poultry industry in India has made considerable growth during the last few decades and successfully transformed itself from an age-old backyard farming into a dynamic agri-based industry. Its development has been not only in size but also in productivity, sophistication, and quality. High-yielding broiler (2.4–2.6 kg at 6 weeks) varieties, together with a standardized package of practices on nutrition, housing and management, and disease control, have contributed to spectacular growth rates in broiler production (8–10% per annum) in India during the last three decades”.[11-13]

The Indian government often implements various schemes and programs aimed at promoting the development of the livestock and poultry sector, including broiler production. These schemes may include subsidies, financial assistance, and training programs for broiler farmers. India has laws and regulations governing the welfare of animals, including those raised for food production. The Prevention of Cruelty to Animals Act, 1960, and the various rules and guidelines under it regulate the treatment of animals, including broiler chickens, in farms and slaughterhouses. (Source: Ministry of Fisheries, Animal Husbandry, and Dairying, 2023)

Government subsidies and support may be available for broiler farmers in the form of subsidized feed, equipment, infrastructure, or financial assistance for setting up or expanding broiler farms.

MATERIALS AND METHODS:

This study used multistage sampling to select districts, blocks, villages, and participants. A total of 70 farmers were selected from six villages in the Nathnagar block of Bhagalpur district through a random sampling technique. Farms are divided into three different size groups that is small (24), medium (33), and large (13); the average number of broilers per farm was 280, 780, and 2970 in the small, medium, and large farm groups, respectively. In the survey data, information included socio-economic profiles of producers and activities involved in broiler production. For economic analysis, benefit costs were used to estimate the profitability of broiler farmers. The cost of broiler production was calculated by incorporating all costs, such as different farm operation costs, chick costs, feeding costs, watering costs, electricity costs, and feeder costs, while secondary data were collected by reviewing various published and unpublished sources, such as related journals, books, and reports.

The statistical tools were employed for the analysis of data

To full fill the specific objectives of the study, based on the nature and extent of data, the following analytical tools and techniques were adopted.

Cost and returns per quintal of the broiler farms in different size group:

Cost A_1 = This gives the total cash expenses incurred by the owner or operator. This includes the cost of the following items:

a. Cost of electrical items, saw dust and other items.

b. Cost of chicks.

c. Cost of feed.

d. Cost of medicine and vaccination charges.

e. Cost of hired labours.

f. Cost of electricity and water charges.

g. Depreciation on fixed capital.

h. Interest on working capital.

i. Miscellaneous charges.

Cost A2: Cost A1 + rent paid for leased in land

Cost B1: Cost A1 + interest on value of owned fixed capital assets (excluding land)

Cost B2: Cost B1 + rental value of owned land (net of land revenue) and rent paid for leased-in land

Cost C1: Cost B1 + imputed value of family labor

Farm business income = Gross income – Cost A1 or A2

Family labor income = Gross income – B1

Net income = Gross income – Cost C

Farm investment income = Farm business income – imputed value of family labor

$$\mathbf{B:C} = \frac{Gross\ Revenue}{Total\ Cost}$$

Where;

Gross Revenue = number of goods sold × the price of goods sold

Total Cost = Total Fixed Cost + Total Variable Cost

RESULT AND DISCUSSION

Average size of broilers per farms in different sizes of farms

Table 1 revealed that average number of broilers per farm were 280, 780 and 2970 in small, medium and large size farm groups respectively and the sample average is 1343.

Table 1: Average size of broilers per farms in different sizes of farms

Particulars	Size of farm Group			Total
	Small	Medium	Large	
Size of farm group (in number)	24	33	13	70

Average number of broilers per farm	280	780	2970	1343

Cost of production of broiler per quintal in different farm size groups (in Rupees)

Table 2 revealed that the actual cost of production was highest in small farms (Rs. 4426.00), followed by medium farms (Rs. 3993.60) and large farms (Rs. 3606.00). The sample average cost of production and maintenance was Rs. 4008.53. The cost of hired labor was higher in large farms (Rs. 880), followed by medium farms (Rs. 769.2) and small farms (Rs. 714). The cost of chicks was higher in small farms (Rs. 900), followed by medium farms (Rs. 820), and large farms (Rs. 800). Medicine and vaccination charges were higher in small farms (Rs. 240), followed by medium farms (Rs. 200), and large farms (Rs. 120). Cost of feeds was higher in small farms (Rs. 480), followed by medium farms (Rs. 380), and large farms (Rs. 200). Electricity charges were higher in small farms (Rs. 100), followed by medium farms (Rs. 80), and large farms (Rs. 48).

Table 2: Cost of production of broiler per quintal in different farm size groups (in Rupees)

Total number of respondents = 70

S. NO.	**Particular**	**Different size farm groups**			**Sample average**
		Small	Medium	Large	
A	**Variable cost**				
1	Cost of hired labour	714 (16.13)	769.2 (19.25)	880 (24.40)	787.73 (19.61)
2	Cost of chick	900 (20.33)	820 (20.57)	800 (22.18)	840.00 (20.97)
3	Cost of feeds	480 (10.84)	380 (9.51)	200 (5.54)	353.33 (8.80)
4	Cost of litter	240 (5.42)	220 (5.50)	120 (3.32)	193.33 (4.81)
5	Medicine & vaccination charge	240 (5.42)	200 (5.00)	120 (3.32)	186.67 (4.65)
6	Electricity charge	100	80	48	76.00

		(2.25)	(2.00)	(1.33)	(1.89)
7	Expenses of water	100 (2.25)	80 (2.00)	80 (2.21)	86.67 (2.16)
8	Miscellaneous charge	220 (4.97)	200 (5.00)	180 (4.99)	200.00 (4.98)
9	Interest on working capital @10%	361.6 (8.16)	332.4 (8.31)	330.8 (9.17)	341.60 (8.52)
B	**Fixed cost**				
1	Depreciation on fixed resource @8%	36.8 (0.83)	28 (0.70)	10.4 (0.28)	25.07 (0.62)
2	Rental value of owned land	200 (4.51)	200 (5.00)	200 (5.54)	200.00 (4.98)
3	Land revenue paid to govt.	-	-	-	-
4	Interest on fixed resources & equipment's	211.2 (4.77)	110.8 (2.77)	36.8 (1.02)	119.60 (2.98)
5	Cost of family labour	622.4 (14.06)	573.2 (14.34)	600 (16.63)	598.53 (14.92)
	Total cost of production	4426.00 (100)	3993.60 (100)	3606.00 (100)	4008.53 (100)

Cost concept of broiler per quintal in different size of farm groups (in Rupees)

Table 3 revealed the cost concepts of broilers per farm on different size farm groups. Cost A1 was highest in small farms (Rs. 3392.40), followed by medium farms (Rs. 3111.60) and large farms (Rs. 2769.20). Cost A2 was highest in small farms (Rs. 3392.40), followed by medium farms (Rs. 3111.60), and large farms (Rs. 2769.20). Cost B was highest in small farms (Rs. 3603.6), followed by medium farms (Rs. 3222.4), and large farms (Rs. 2806). Cost C was highest in small farms (Rs. 4226.00), followed by medium farms (Rs. 3993.60) and large farms (Rs. 3606.00). The sample average of Cost A1, Cost A2, Cost B, and Cost C was Rs. 3091.07, Rs. 3210.67, and Rs. 3941.87 for different sizes of farm groups.

Table 3: Cost concept of broiler per quintal in different size of farm groups (in Rupees)

Total number of respondents = 70

S. No.	Cost Concepts	Different size farm group			Sample Average
		Small	Medium	Large	
1	Cost A1	3392.40	3111.60	2769.20	3091.07
2	Cost A2	3392.40	3111.60	2769.20	3210.67
3	Cost B	3603.6	3222.4	2806	3210.67
4	Cost C	4226.00	3993.60	3606.00	3941.87

Measures of farm profitability of broiler per quintal farm in different size of farm groups (in Rupees)

Table 4 revealed that the gross income obtained by small, medium, and large farm groups was Rs. 6,400. The net income obtained was highest in large farms (Rs. 2994), followed by medium farms (Rs. 2715.2) and small farms (Rs. 2174). Sample average of net income was Rs. 2627.73. Farm business income was highest in large farms (Rs. 3630.8), followed by medium farms (Rs. 3288.4) and small farms (Rs. 3007.6). Sample average of farm business income was (Rs. 3308.93). Family labour income was highest in medium-sized farms (Rs. 3277.6), followed by large farms (Rs. 3594) and small farms (Rs. 2796.4). Sample average of family labor income was Rs. 12722.13. Farm investment was highest in medium-sized farms (Rs. 2715.2), followed by large farms (Rs. 2688.4) and small farms (Rs. 2385.2). Sample average of farm investment income was Rs. 2596.27. B.C ratio was highest in the large farm group (1:1.77), followed by medium farms (1:1.60) and small farms (1:1.44).

Table 4: Measures of farm profitability of broiler per quintal farm in different size of farm groups (in Rupees)

Total number of respondents = 70

S. No.	Particulars	Different size farm group			sample average
		Small	Medium	Large	

1	Gross income	6400	6400	6400	6400
2	Net income	2174	2715.2	2994	2627.73
3	Farm business income	3007.6	3288.4	3630.8	3308.93
4	Family labour income	2796.4	3177.6	3594	12722.13
5	Farm investment income	2385.2	2715.2	2688.4	2596.27
6	B.C ratio	1:1.44	1:1.60	1:1.77	1:1.60

CONCLUSION:

The present study concluded that broiler farming stands as a profitable business. It provides good returns within a short timeframe. Broiler production is most profitable in the case of large size farm groups (having more than 2000 birds).

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