Economics of poultry egg production in Manendragarh Chirmiri Bharatpur district of Chhattisgarh

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Abstract
An investigation was conducted at Manendragarh Chirmiri Bharatpur district of Chhattisgarh during 2024–25. The data was collected by primary and secondary methods where, six poultry farms in Manendragarh block was selected to analyze egg production and marketing performance. The average number of layers per farm was 19,953, ranging from 8,000 on small farms to 33,111 on large farms. The average feed conversion ratio per dozen eggs was better in larger farms (1.11) compared to small farms (1.38). Fixed investment per layer decreased with farm size, averaging ₹380.97. The average production cost per layer was ₹1,016.49, with variable costs accounting for 98.14%. Egg production per layer was highest on large farms (300 eggs), with an average of 295 eggs across all farms. Gross return averaged ₹38.76 lakh per farm, primarily from egg sales (89.08%), followed by meat (10.37%) and by-products (0.45%). The overall cost of egg production was ₹3.45 per egg, and net returns per layer averaged ₹405.53. The benefit-cost ratio ranged from 1.37 to 1.42, while the input-output ratio remained around 1.02. Large farms were more efficient and profitable due to higher productivity, lower investment per unit, and better market access. Smaller farms can improve through cost control, better management, and training. Overall, layer farming is a sustainable and economically viable enterprise.

Keywords: Poultry farms, layers, feed conversion ratio, gross return, benefit cost ratio, input output ratio

Introduction
Poultry production has rapidly moved from small-scale, indigenous breeds to intensive commercial systems with hybrid birds bred for meat or eggs. While these exotic strains are less hardy, they offer higher productivity when supported by quality feed, housing, management, and veterinary care. Their introduction has driven large-scale operations, improved efficiency, and encouraged investment in modern farming. This shift has boosted overall output, transformed market dynamics, and laid the groundwork for continuous technological advancement.

Poultry farming involves the rearing of domesticated birds such as chickens, ducks, and turkeys primarily for meat and eggs. It is a vital segment of agriculture, providing protein-rich food and contributing significantly to global food security and national economies. Farms range from large-scale commercial units to small and free-range setups. In India, the poultry market was valued at INR 2,304 billion in 2024 and is projected to reach INR 8,430 billion by 2033, growing at a CAGR of 12.60%. Growth is driven by rising population, increased demand for poultry products, changing dietary habits, higher incomes, and a booming food service industry. (www.imarcgroup.com).

In 2024, egg production in Chhattisgarh reached 2,387.55 million units (eggs), up from 2,210.15 million in 2023, as reported by the Department of Animal Husbandry and Dairying. As of May 5, 2025, the state has 662 poultry farms, marking a 7.29% increase from 2023. Of these, 99.09% are single-owned, while only 0.91% belong to corporate entities. Durg, Takhatpur, and Pithora host the highest number of farms. The average age of farms is 2 years and 11 months. Although digital presence is growing, only 25 farms have websites, with limited activity across social media platforms. (www.rentechdigital.com)

Materials and Methods
Manendragarh–Chirmiri–Bharatpur district was purposively selected for the investigation. Manendragarh, located in northern Chhattisgarh near the Madhya Pradesh border, is the administrative headquarters of the Manendragarh-Chirmiri-Bharatpur district. Known for its rich coal reserves, it is a key mining hub. The district comprises three blocks—Manendragarh, Khadgawan, and Bharatpur—of which Manendragarh block was purposively selected for the present study. Layer farms in Manendragarh block with a minimum of three years of consistent egg production and proper records were shortlisted. These farms were arranged by flock size, and six were selected based on availability. The selected farms were categorized by size following (Verma S.K.) (2023): small (≤10,000 birds), medium (10,001–20,000 birds), and large (>20,001 birds). Among them, 1 was small, 2 were medium, and 3 were large farms. Considering the nature of the study, data were obtained through personal interviews using a structured questionnaire. Details on production, marketing, investment, costs, and returns were collected from selected layer farmers through a survey. The information was systematically organized and analyzed using tabular methods and

production function analysis, employing tools such as averages, percentages, gross and net income, benefit–cost ratio, and input–output ratio.

Results and Discussion

Data pertaining to cost analysis of egg production, egg production, cost-price relationship, gross returns, net return, benefit: cost ratio and input: output ratio influenced by various treatment has been given in table 1, 2, 3, 4, 5, 6 & 7 and fig. 1, 2, 3, 4 & 5.

average feed conversion ratio per dozen eggs was 1.38, 1.25, and 1.11 for small, medium, and large farms, respectively, while the corresponding average egg–feed price ratios were 1.78, 1.82, and 1.90. Fixed investment per layer was estimated at ₹422.00 for small farms, ₹369.49 for medium farms, and ₹351.42 for large farms, with an overall average of ₹380.97. The mean production cost per farm stood at ₹2,02,75,503.67, averaging ₹1,016.49 per layer. Variable costs accounted for 98.14% of the total cost, leaving fixed costs at 1.86%. The highest production cost per layer was ₹1,019.19 on medium farms, followed by ₹1,017.25 on large farms, and ₹1,014.09 on small farms.

Egg production per layer was 289, 296, and 300 on small, medium, and large farms, respectively, averaging 295 overall. Average gross return per farm was ₹3,87,63,885.00, comprising ₹3,47,44,698.02 (89.08%) from eggs, ₹40,44,368.37 (10.37%) from meat, and ₹1,76,076.45 (0.45%) from by-products. Cost of production per egg was ₹3.52, ₹3.44, and ₹3.38 on small, medium, and large farms, respectively, with an overall ₹3.45. Gross return per layer was ₹1,396.12, ₹1,426.61, and ₹1,444.38, averaging ₹1,422.37, while net return per layer was ₹378.87, ₹407.42, and ₹430.29, averaging ₹405.53. The benefit–cost ratio was 1.37, 1.40, and 1.42, and the input–output ratio was 1.02,

1.02, and 1.01 for small, medium, and large farms, respectively.

Table 1: Feed conversion ratio and egg feed price ratio

Particulars	Farm size			
	Small	Medium	Large	Overall
Feed conversion ratio (per dozen)	1.38	1.25	1.11	1.24
Egg-feed price ratio	1.78	1.82	1.90	1.83

Table 2: Distribution of production expenses

Particulars	Farm size			
	Small	Medium	Large	Overall
Different cost (Rs./farm)				
Variable cost	7942600.00 (97.60)	18720000.00 (97.96)	33195000.00 (98.86)	19945866.67 (98.14)
Fixed cost	195450.00 (2.40)	390501.00 (2.04)	382960.00 (1.14)	322970.33 (1.86)
Total cost	8138050.00 (100.00)	19110501.00 (100.00)	33577960.00 (100.00)	20275503.67 (100.00)
Different cost (Rs./layer)				
Variable cost	992.82 (97.60)	998.37 (97.96)	1002.53 (98.86)	997.56 (98.14)
Fixed cost	24.43 (2.40)	20.82 (2.04)	11.56 (1.14)	18.94 (1.86)
Total cost	1017.25 (100.00)	1019.19 (100.00)	1014.09 (100.00)	1016.49 (100.00)

Table 3: Production of eggs according to farm size

Category of farms	No. of eggs produced	
	Per farm	Per layer
Small	2312000	289
Medium	5550000	296
Large	9933300	300
Overall	5886341	295

Table 4: Return from different sources per farm

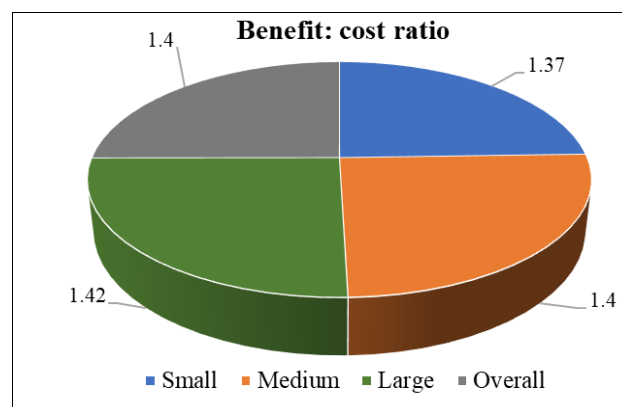| Farm size	Egg	Meat	By product	Total
Small	10404000.00 (93.15)	720000.00 (6.45)	45000.00 (0.40)	11169000.00 (100.00)
Medium	24975000.00 (93.40)	1687500.00 (6.30)	86400.00 (0.30)	26748900.00 (100.00)
Large	44699850.00 (93.47)	2979990.00 (6.23)	145000.00 (0.30)	47824840.00 (100.00)
Overall	38763885.00 (93.37)	1795830.00 (6.33)	92133.00 (0.33)	28580913.30 (100.00)

**Table 5:** Net return per farm per layer (In Rs.)

Particulars	Farm size			
	Small	Medium	Large	Overall
Production cost				
Per farm	8138050.00	19110501.00	33577960.00	20275503.67
Per layer	1017.25	1019.19	1014.09	1016.49
Per egg	3.52	3.44	3.38	3.45
Gross return				
Per farm	11169000.00	26748900.00	47824840.00	28580913.30
Per layer	1396.12	1426.61	1444.38	1422.37
Per egg	4.50	4.50	4.50	4.50
Net return				
Per farm	3030950.00	7638399.00	14246880.00	8305409.67
Per layer	378.87	407.42	430.29	405.53
Per egg	0.98	1.06	1.12	1.05

Table 6: Benefit: Cost Ratio (BCR)

S. No.	Particulars	Farm size			
		Small	Medium	Large	Overall
1.	Gross return per farm (Rs.)	7942600.00	18720000.00	33195000.00	19945866.67
2.	Total variable cost per farm (Rs.)	8138050.00	19110501.00	33577960.00	20275503.67
3.	Input: Output Ratio	1.02	1.02	1.01	1.02

Table 7: Input: Output Ratio

S. No.	Particulars	Farm size			
		Small	Medium	Large	Overall
1.	Gross return per farm (Rs.)	11169000.00	26748900.00	47824840.00	28580913.30
2.	Total cost of production per farm (Rs.)	8138050.00	19110501.00	33577960.00	20275503.67
3.	Benefit: Cost Ratio	1.37	1.40	1.42	1.40
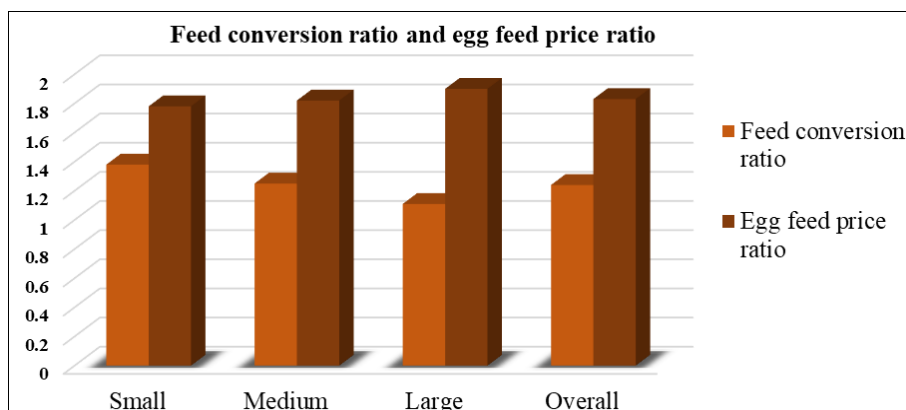
Fig 1: Feed conversion ratio and egg feed price ratio
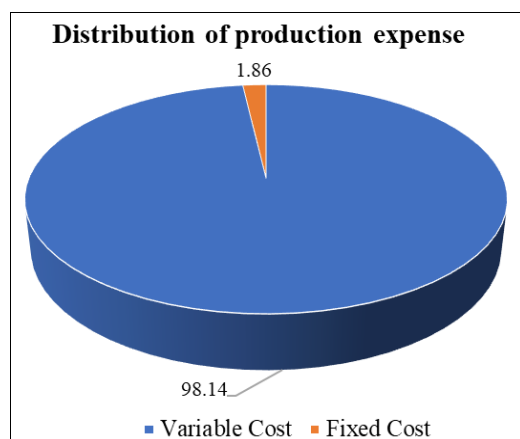
Fig 2: Distribution of production expense
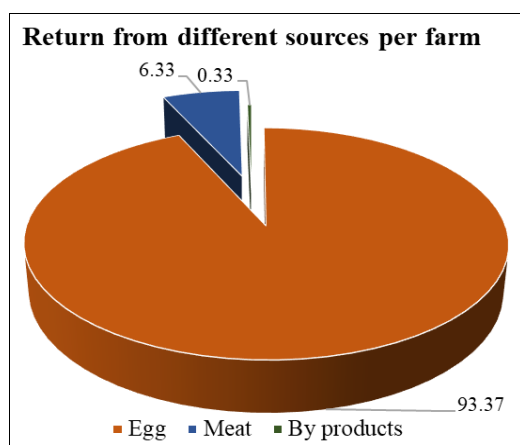
Fig 3: Return from different sources per farm

Fig 4: Benefit: cost ratio
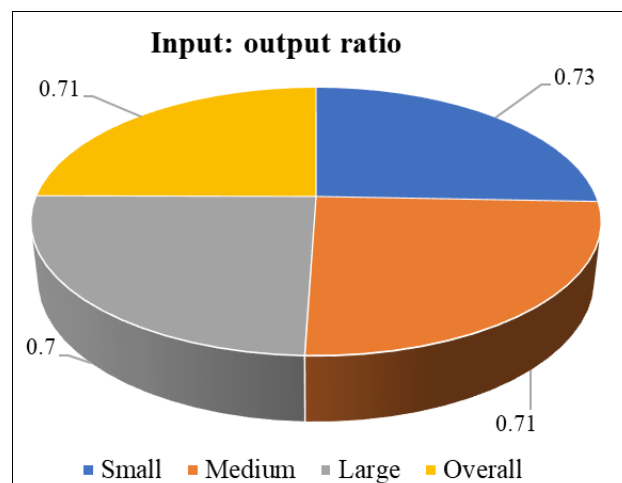
Fig 5: Input: output ratio

Conclusion

The analysis reveals that large farms are more efficient in egg production with better feed conversion (1.11), lower production cost per egg (₹3.38), and highest net returns per layer (₹430.29). Gross returns and benefit-cost ratios improved with farm size, indicating economies of scale. Fixed investments and production costs per layer were lowest in large farms, while returns from eggs formed the major share (89.08%) of income. Overall, the input-output ratio remained nearly uniform (1.02), suggesting consistent operational efficiency across farm sizes.

References

1. Ingweye JN, Kalio GA, Ologbose FI. Egg quality and production constraints in smallholder egg value chain of Greater Port Harcourt City. Journal of Bioscience and Agriculture Research. 2021;27(01):1-9.
2. Islam R, Islam S, Mustafizur R, Nath BR. Economic Analysis of Production Cost and Returns of Small Scale Kamrupa Chicken Farming under Different Systems of Management. Journal of Animal Research. 2022;12(6):973-978.
3. Jat GR, Kutty IC, Giggin T, Smitha S. Layer poultry farming in Kerala: Current status, emerging trends, and future prospects. International Journal of Veterinary Sciences and Animal Husbandry. 2025;10(5):14-20.
4. Soumya P, Reddy PB. Financial Feasibility of Poultry Layer Farms in Chittoor District, India. Asian Journal of Agricultural Extension, Economics & Sociology. 2021;39(5):120-145.
5. www.imarcgroup.com
6. www.rentechdigital.com