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Assessing the production and marketing aspects of small-scale sonali chicken farming in rural Bangladesh: insights from Jamalpur district

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ABSTRACT

This study was conducted to evaluate the financial viability of small-scale poultry production in Jamalpur district of Bangladesh, where Sonali chicken, a crossbreed of Rhode Island Red and Egyptian Fayoumi, is well suited to the rural production system. Semi-structured interviews were conducted with 60 farmers and 60 market actors to gather primary data. The production cost of 100 chickens was Tk. 19,128, with variable cost being the largest, 63.88%, and fixed cost being 36.1%. The gross income obtained on the sale of live birds and by-products was Tk. 24,980, which gave a net return of Tk. 5,851 per 100 chickens. The benefit-cost ratios were calculated as 1.72 and 1.31, respectively, for variable and total costs representing profitability. Marketing analysis showed that Channel II (Farmer - Bepari - Consumer) has the highest production cost (Tk./kg 37.84) and is efficient in the market (6.68), and that Channel III (Farmer - Faria - Bepari - Retailer - Consumer) had the highest marketing costs and lowest efficiency (1.31). Channel I had a profit margin of Tk. 4.10 per kg, and Channel III had a profit margin of Tk. 0.73 per kg. The results highlight the efficiency gains from reducing intermediaries. Key challenges included high input costs, feed shortages, and limited market information. Policy measures such as subsidizing input, regulating feed prices, and improving market access and information flow are recommended to enhance sustainability and scale. These strategies are critical for strengthening Sonali chicken farming's role in advancing food security and rural livelihoods in Bangladesh.

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Introduction

As of May 2024, the global population stood at 8.1 billion and is projected to reach 10 billion by 2060, posing a formidable challenge to ensuring global food security (Worldometer, 2024). The poultry sector is poised to play a pivotal role in addressing this challenge (Istiak and Khaliduzzaman, 2022). In 2019, the global poultry population—comprising chickens, ducks, geese, guineafowl, and turkeys—was approximately 27.9 billion, with chickens accounting for 93% of that total. Since 1990, the global chicken population has more than doubled, with Asia housing the majority (15.8 billion), followed by the Americas (5.8 billion) (FAOSTAT, 2023).

Bangladesh, with a population of 17.47 million (World Population Review, 2024), continues to face critical challenges such as poverty, hunger, and unemployment, despite its rich natural resources, including the world's largest delta. The poultry industry has emerged as a vital sector for national economic development, food security, and employment generation (Alam *et al*., 2012). Poultry alone contributes roughly 35.25% of the country's total meat supply (DLS, 2021), directly and indirectly employing nearly six million individuals (Raihan and Mahmud, 2008). Over the last two decades, commercial poultry production in Bangladesh has expanded rapidly, driven by population growth, rising incomes, urbanization, and the sector's income elasticity. The industry supports a wide range of production systems—from backyard flocks to large-scale commercial farms—providing livelihood opportunities for marginalized groups, especially women and youth (Huq *et al*., 2015).

Chicken farming has proven to be a powerful tool for poverty alleviation, especially among poor, unskilled, and landless populations (Mamun *et al*., 2011). The sector contributes 5.33% to Bangladesh's agricultural GDP and 1.85% to the national GDP (BBS, 2021; BER, 2023). However, a persistent gap between demand and supply remains, exacerbated by limited land availability and rapid population growth (Islam, 2003).

One notable development in the sector is the introduction of the Sonali chicken breed, a cross between the Rhode Island Red (♀) and Egyptian Fayoumi (♂), first introduced between 1996 and 2000. Known for their adaptability and low maintenance, Sonali chickens have become ideal for small-scale farmers. Their growing popularity has spurred the establishment of private hatcheries to meet the increasing demand for day-old chicks. This breed's success underscores its potential to expand smallholder poultry production and contribute meaningfully to poverty reduction and socio-economic development.

A broad body of literature has examined poultry farming both globally and within Bangladesh, focusing on profitability, production systems, socio-economic impacts, and sector constraints. Internationally, poultry's role in sustainable meat production is well-documented (Ullah *et*

al., 2019; Ahiale *et al*., 2019), with additional research addressing cost-benefit analyses, employment generation, nutritional impacts, and challenges such as infrastructure and feed costs (Adeyonu *et al*., 2021; Grzinic *et al*., 2023). In Bangladesh, studies have explored Sonali chicken productivity and profitability (Akter, 2022; Howlader *et al*., 2022), along with technical efficiency and economic viability (Akter, 2013; Islam *et al*., 2012). The Sonali chicken sector, in particular, has proven critical in enhancing food availability and creating employment (Hossain, 2021).

Despite the existing body of work on poultry and its marketing systems (Ahmed *et al*., 2022), there remains limited research specifically evaluating the market performance of Sonali chickens across various supply chains. This study aims to fill that gap by analyzing the socio-economic profile of Sonali chicken producers, assessing profitability, and identifying key constraints within the supply chain. The findings are expected to inform strategies for improving system efficiency and guiding policy decisions.

Methodology

Study area

The study took place in Melandah Upazila of Jamalpur District, Bangladesh—a region known for its many Sonali chicken farms, easy accessibility, and similar land and soil conditions. A preliminary visit confirmed it as a strong and reliable location for collecting accurate data.

Sample Selection

A purposive random sampling method was used to ensure statistical validity while remaining logistically feasible. Following consultations with the Department of Livestock Services in Melandaha, Jamalpur, a total of 60 *Sonali* chicken farmers and 60 traders were selected. The traders were categorized into *faria* (a market participant who acts closely with farmers), *bepari* (a market actor who acts after *faria* and acts closely with wholesalers), wholesalers, retailers, and consumers. Farmers were classified as small, medium, or large based on the number of birds they reared: 100-500, 501-1000, and over 1001 birds per farm, respectively (Badhon, 2017).

Period of data collection

Primary data were collected via face-to-face interviews during July–September 2022. Relevant secondary data from 2010 to 2022 were also incorporated to contextualize the findings.

Analytical techniques

Descriptive statistics (means, percentages) were used to summarize farm and market characteristics. A cost-return analysis was employed to evaluate the profitability and market performance of Sonali chicken production across various marketing channels.

Cobb-Douglas production function

The Cobb-Douglas is a homogeneous function that provides a scale factor enabling one to

measure the return to scale and to interpret the elasticity coefficients with relative ease (Henderson and Quandt, 1971). In consideration of the above fact, the Cobb-Douglas type functional form was applied in this study. The functional form:

$$\ln Y = \ln a + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + b_7 \ln X_7 + Ui$$

Where, Y= Gross return from *Sonali* chicken production (Tk.), X_1=Day old chick cost (Tk.), X_2=Electricity cost (Tk.), X_3= Litter cost (Tk.), X_4= Feed cost (Tk.), X_5= Expenses on medicines/vaccines cost (Tk.), X_6= Tools and equipment cost (Tk.), X_7= Maintenance Cost (Tk.), b_1 - $b_{7=}$ Regression co-efficient of the relevant variables, ln= Natural logarithm, Ui= Error term, a= Intercept.

Total cost (TC)

The total cost (TC) included all variable and fixed costs associated with the production process. The total cost was calculated using the following equation:

> Total Cost (TC)= Total fixed cost (TFC) + Total variable cost (TVC)Depreciation = (Original value – salvage value) / Life-time of the house

Fixed cost items include land use cost, depreciation on housing, family labor cost, and interest on operating capital cost. On the other hand, variable cost items are feed cost, hired labor cost, and related costs of production.

Gross return (GR)

Gross returns were comprised of the values of live *Sonali* chickens, used litter, and excreta. The value of live *Sonali* chickens was determined by multiplying the weight (in kilograms) of live *Sonali* chickens sold by their average price. Similarly, the value of used litter and excreta was calculated by multiplying the quantity of waste litter and excreta (measured in sacks per batch) by the average price per unit of used litter and excreta. The gross return was calculated as follows:

$$GR = P_m Q_m + P_l Q_l$$

Where, GR= Gross Return (Tk. /batch); P_m= Per unit price of output (Tk./kg); Q_m= Number/ Quantity of output (Tk./batch); P_l= Per unit price of used litter (Tk./kg); Q_l= Quantity of waste litter and excreta (Kg/batch).

Gross margin (GM)

Gross margin analysis is extensively employed for short-term as well as farm planning purposes. The computation of Gross Margin (GM) is outlined as follows:

$$GR = GR - TVC$$

Where, GM= Gross Margin (Tk./batch); GR= Gross Return (Tk./batch); TVC= Total Variable Cost.

Net return (NR)

The calculation of net return is detailed as follows:

$$NR \text{ or profit } (\pi) = GR - TC$$
$$NR = GR - (TVC + TFC)$$

Where, NR= Net Return (Tk./batch); GR= Gross Return (Tk./batch); TVC= Total Variable Cost; TFC = Total Fixed Cost

Benefit Cost Ratio (BCR)

To evaluate the profitability of *Sonali* farming, the Benefit-Cost Ratio (BCR) was calculated. The calculation of BCR is as follows:

$$BCR = \frac{\text{Gross Return}}{\text{Total Cost}}$$

Benefit cost ratio is a relative measure that is used to compare benefits per costs. It helps to analyze the financial efficiency of the farms (Chowdhury, 2015).

Existing marketing channels and associated costs of Sonali Chicken

The marketing chain refers to the sequential arrangement of various marketing intermediaries involved in the movement of products from producers to consumers. The total marketing cost incurred by the farmers and intermediaries in a channel was estimated by the following formula:

$$C = C_f + C_{m1} + C_{m2} + C_{m3} + \ldots\ldots\ldots + C_{mi}$$

Where, C = Total cost of *Sonali* chicken marketing in a channel, C_f= Cost paid by the producer when the commodity moves, C_{mi}= Cost incurred by the i^{th} middleman in the process of buying and selling of chicken in a channel. (i = 1,2,3……n).

The marketing margin and net marketing margin of different value chain actors were estimated by the following formula:

- Marketing Margin (Tk/kg) = Sales price (Tk/Kg) – Purchase price (Tk/Kg)
- Net marketing margin (Tk/kg) =Marketing margin (Tk/Kg) – Marketing cost (Tk/Kg)
- % Share of marketing margin = (Marketing margin/ Selling price) × 100
- Profit margin= Net profit/Return

Marketing efficiency (ME)

Marketing efficiency was calculated using Acharya's modified marketing efficiency (Acharya & Agarwal, 2011).

$$ME = \frac{\text{Net price received by the producer}}{\text{Total marketing cost + Net marketing margin}}$$

The following formulas were used to calculate price-spread and producers' shares:

Price-spread = *Price paid by consumer (Tk./kg) – Price received by the farmer (Tk./kg)*

$$\text{Producer's share (\%)} \quad \frac{\text{Price Received by the Producer (Tk/Kg)}}{\text{Consumer's Price (Tk/Kg)}} \times 100$$

Results and Discussion

The demographic analysis (Figure 1) indicated that *Sonali* chicken producers were predominantly middle-aged (31–60 years),

with a male-to-female ratio of 4:1. Educational attainment among respondents was generally low, with 40% having only primary education and 23.33% being functionally illiterate. Notably, 48.34% of farmers belonged to large households, a factor that may contribute positively to on-farm labor availability and overall production efficiency.

Agriculture remains the principal livelihood for 75% of *Sonali* chicken farmers, with the majority operating medium-sized (51.67%) and large-scale (30%) poultry farms. Most producers have 1–5 years of experience in Sonali chicken rearing, with 45% relying on personal savings for financing. Institutional training was reported by 61.67% of respondents, indicating moderate exposure to technical knowledge. Marketing is primarily conducted through on-farm sales (56.67%) using cash transactions (58.33%), and market intelligence is predominantly obtained from the local business community (58.33%) (Figure 1). These socio-economic and operational characteristics significantly shape production decisions and marketing practices, consistent with patterns observed in previous studies (Chowdhury *et al*., 2015; Hossain *et al*., 2012; Sumy *et al*., 2014). Farmers were categorized (Table 1) into small, medium, and large-scale operations based on flock size, following the classification framework of Badhon (2017).

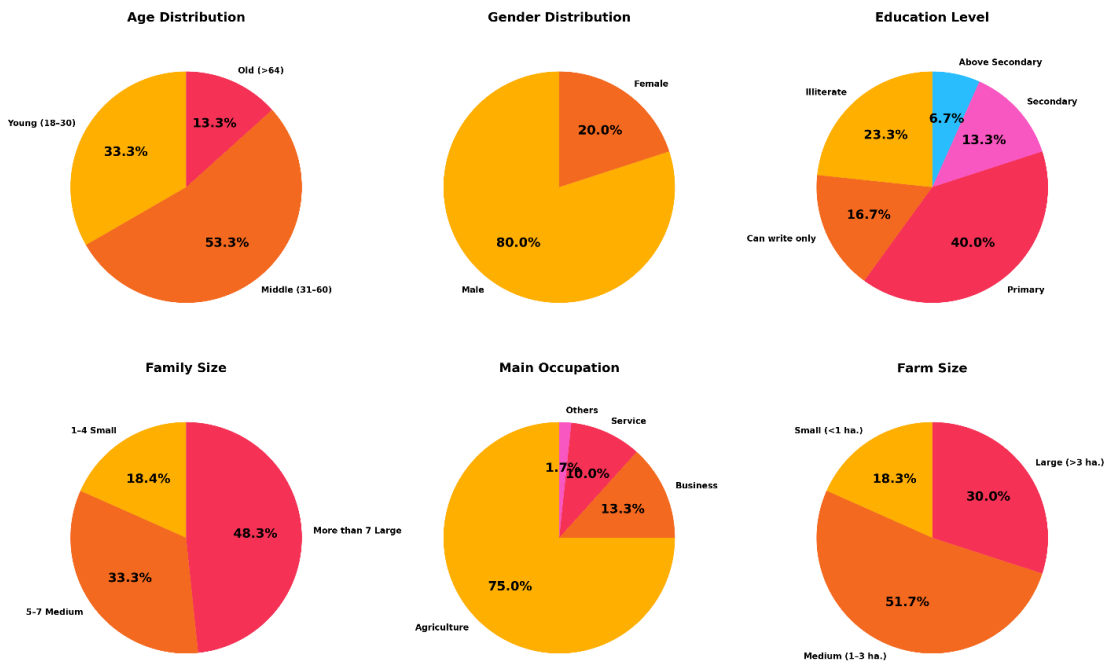

Fig.1. Socio-economic characteristics of *Sonali* chicken farmers

Table 1. Distribution of Sonali chicken farmers according to farm category

Farm Category	No. of birds	Frequency (n)
Small	100-500	11
Medium	501-1000	31
Large	above 1001	18

Production Function Analysis

Multicollinearity Diagnostics

Variance Inflation Factor (VIF) was estimated to check for multicollinearity among the explanatory variables of the Cobb-Douglas production function.

The results indicated that the VIF values ranged from 1.6 to 3.8 with a mean VIF of 2.44, suggesting no serious multicollinearity problem in the model.

The result in Table 3 shows the relationship of various factors with a dependent variable. Cost of day-old chicks has a very negative effect with coefficient = -0.218 where an increase in chick cost by 1 percent will decrease the profitability by -0.218 percent. Conversely, the most positive impact is on the feed cost, as its coefficient is 1.905, which means that a 1 percent increase in the amount spent on feed will raise profitability by almost 1.91 percent. Maintenance is also positively contributing but with a smaller number since the coefficient of this is 0.272, indicating that the better upkeep of housing and facilities increases returns.

Table 2. Diagnostics of multicollinearity

Variable	VIF
Day-old chick	3.5
Electricity	1.8
Litter	2.2
Feed Cost	3.8
Medicine and Vaccine Cost	1.6
Tools and Equipment Cost	1.7
Maintenance	2.5
Mean VIF	2.44

Table 3. Estimated values of coefficient and related statistics of Cobb-Douglas production function of Sonali chicken production

Variable	Coefficient	Std. Err.	T value
Constant	-6.930	8.433	-0.82
Day-old chick	-0.218***	0.041	-5.26
Electricity	0.060	0.082	0.73
Litter	0.181	0.149	1.21
Feed Cost	1.905**	0.751	2.54
Medicine and Vaccine Cost	-0.048	0.144	-0.34
Tools and Equipment Cost	-0.040	0.233	-0.17
Maintenance	0.272*	0.144	1.89
R^2		0.616	
Returns to scale		2.19	

Note: ***, **, and * indicate significant at 1, 5, and 10 % level, respectively.

The other inputs do not have such strong effects or even neutral effects. The coefficient of electricity cost is very low, 0.060 and litter cost has also a coefficient of 0.181, which are not statistically significant. Medicine and vaccines expenditure has a small negative coefficient of -0.048, and tools and equipment expense also have a small negative impact of -0.040 which does not have a significant impact on profitability. The model yielded an R^2 of 0.616, indicating that approximately 61.6% of the variation in profitability could be explained by the included variables. A return to scale of 2.19 indicates that output increases at a rate more than proportional to the increase in inputs.

Profitability of Sonali chicken production

Cost of Sonali chicken production

Cost accounting was employed to determine the costs involved, including variable and fixed expenses. Variable costs, fluctuating with production scale, encompass feed, day-old chicks, veterinary services, electricity, labor, litter, and repairs. Fixed costs, constant regardless of output, include depreciation on housing and equipment, family labor, and land value are depicted in Figure 2.

For 100 *Sonali* chicken annually, as Figure 3 illustrates, total costs amounted to Tk. 19,128.96. Variable costs, such as feed

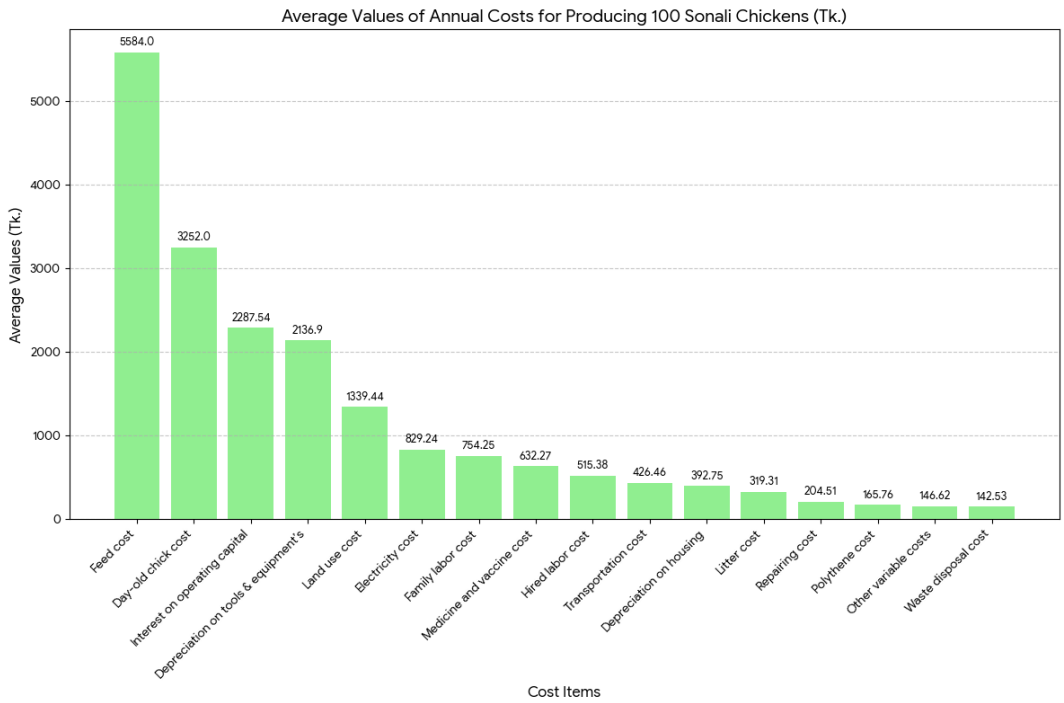

Fig. 2. Average values (Tk.) of annual costs for producing 100 Sonali Chickens in the study area

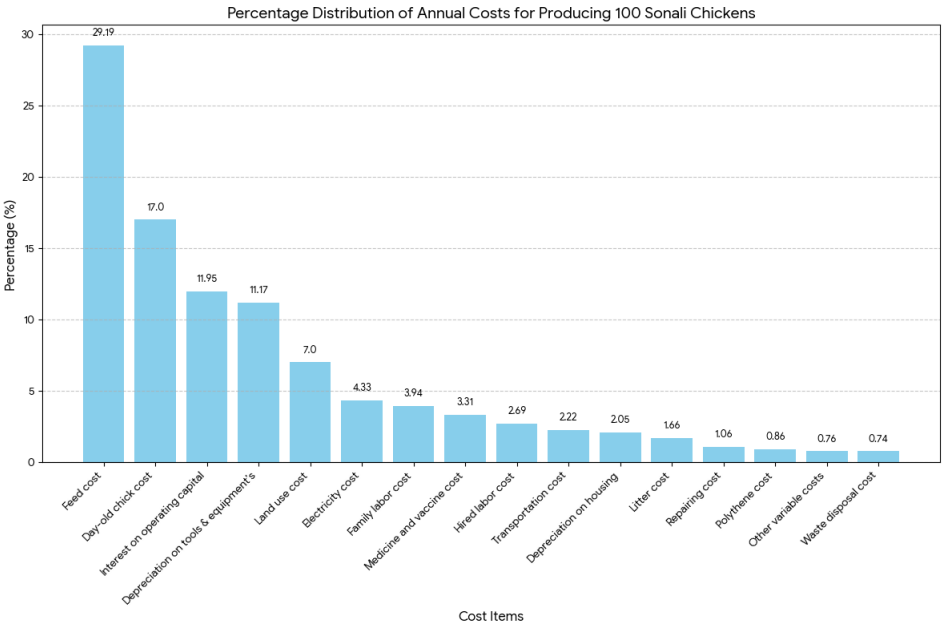

Fig. 3. Percentage distribution of annual costs for producing 100 *Sonali* Chickens in study area

(29.19%) and day-old chicks (17.00%), constituted a significant portion. Fixed costs contributed 24.16% of the total cost, including depreciation of housing (2.05%) and family labor (3.94%). Understanding these cost breakdowns is vital for farmers' decision-making and financial planning in *Sonali* chicken production. It is vital to optimize resources, manage risks, and set competitive prices, ensuring financial sustainability. It aids informed decision-making and efficient resource allocation (Ahmed *et al*., 2015).

Return of Sonali chicken production

The financial evaluation of *Sonali* chicken farming revealed an annual gross return of Tk. 24,980 per 100 birds. This figure includes revenue from both the sale of live birds and secondary by-products such as litter and excreta (Table 4). Gross return estimation implies that farmers were able to diversify their sources of income. As much as the sale of live chicken provided the main income, the sale of litter/excreta also provided a secondary source of revenue, which assisted farmers in meeting costs and enhancing overall profitability (Hossain & Rahman, 2017).

The metrics mentioned in Table 5 provide insights into the profitability and viability of *Sonali* chicken farming enterprises.

Gross margin of Tk. 10,474 signifies the amount remaining after incurring variable costs, while the net return of Tk. 5,851 represents total profitability. The benefit-cost ratios (BCR) of 1.72 (variable cost basis) and

Table 4. Per year gross return from 100 Sonali chickens in the study area (per farm)

Items	Unit	Unit price	Per farm/per year	
			Quantity (Kg.)	Value (Tk.)
i. Live	Kg	220	110	24,200
ii. Litter and excreta	Sack	52	15	780
Total Gross Return (i+ii)				24,980

1.31 (total cost basis) signify that for every Tk. 1 invested, the profit is Tk. 1.72 and Tk. 1.31, respectively.

Table 5. Gross margin, net return, and benefit cost ratio of 100 Sonali chickens per year

Margin and Return	Average Cost
A) Gross Return	24,980
B) Total Variable Cost	14,505.62
C) Total Cost	19,128.96
D) Gross Margin (A-B)	10,474.38
E) Net Return (A-C)	5,851.04
F) BCR (undiscounted variable cost basis) (A/B)	1.72
G) BCR (undiscounted) (A/C)	1.31

Existing marketing channels and associated costs of Sonali chicken

A supply chain is essential for estimating profit margins because it provides a comprehensive view of the entire process from production to distribution. By analyzing each step in the supply chain, including production inputs, processing, distribution, and marketing, businesses can identify costs incurred at each stage. This allows for a more accurate assessment of the total cost of production and distribution, enabling businesses to calculate profit margins more effectively. A tangible poultry volume is moved from its production fields to markets by different intermediaries and consumed by final beneficiaries.

The figures (4 and 5) appear to show the marketing costs of different market players in the research area, where transport is the greatest expense for local traders (*Faria)* and retailers.

In the case of small-scale traders (*Bepari*), labor is the biggest percentage in the overall expenses. Wholesalers have high house rent and transport costs.

Different marketing channels of Sonali chicken

Channel I: *Farmer→ Bepari→ Consumer*

Channel II: *Farmer→ Wholesaler→ Retailer→ Consumer*

Channel III: *Farmer→ Faria→ Bepari→ Retailer→ Consumer*

Channel IV: *Farmer→ Bepari→ Retailer→ Consumer*

Channel V: *Farmer→ Bepari→ Wholesaler→ Retailer→ Consumer*

Often, it is assumed that if a channel is short and includes minimum market

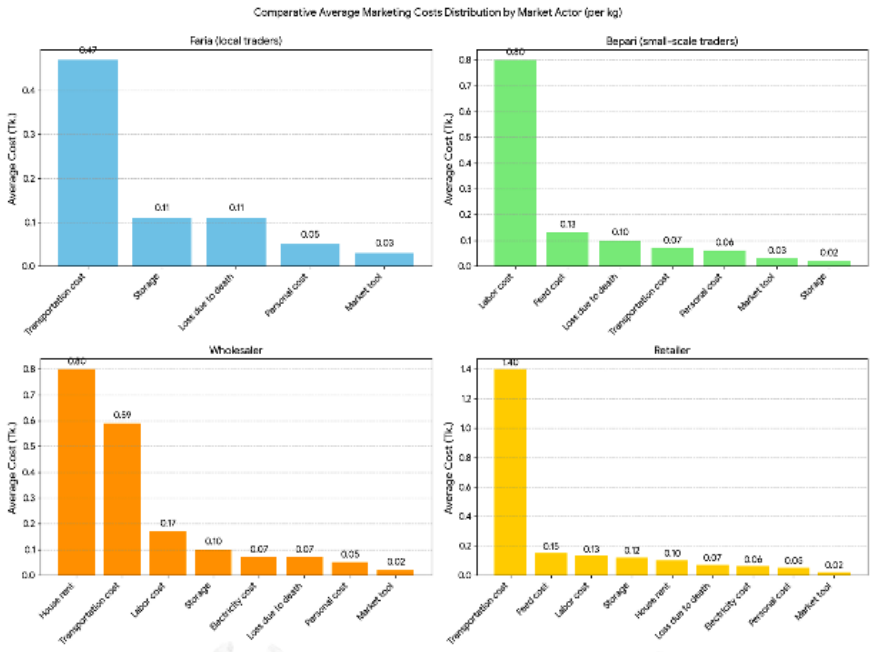

Fig. 4. Comparative Average Marketing Costs Distribution by Market Actor (per kg)

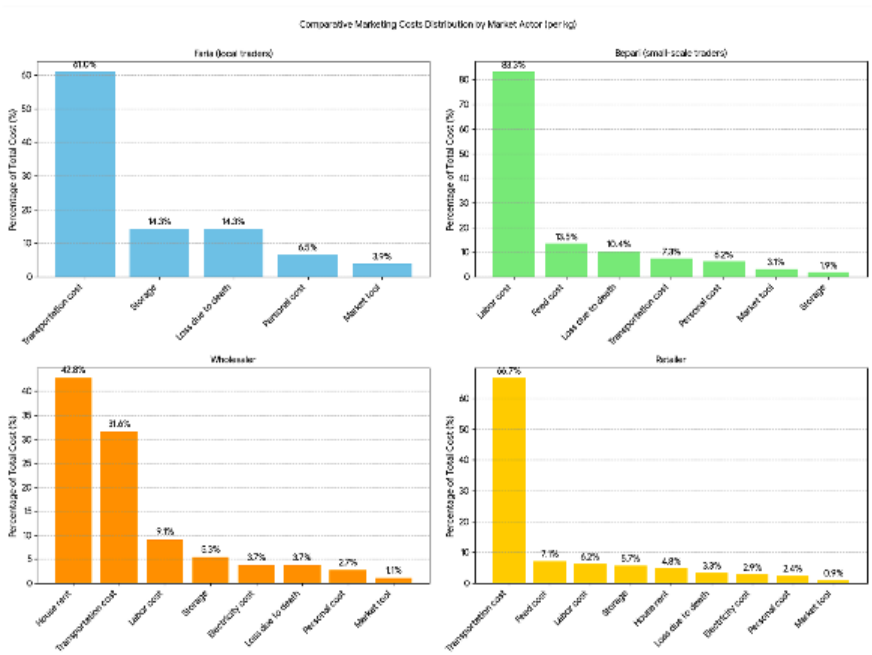

Fig. 5. Comparative Marketing Costs Distribution by Market Actor (per kg)

participants, the channel could be an efficient one. The result from Table 6 validates the assumption. It shows how marketing costs through the above channels contribute to the profit margin of *Sonali* chicken farming. Employing the marketing costs obtained in Figure 4 and 5, the profit margin in different channels is illustrated as below (Table 6).

Table 6 presents the variations in the profit margins and marketing performance across the channels to which Sonali chicken marketing is done in the study area. In Channel I (Farmer to Bepari) the Bepari bought at Tk. 35.0/kg and sold at Tk. 40.2. The value addition was 14.9 at a marketing cost of only Tk. 1.1. The marketing margin was Tk. 5.2 and the Bepari had a profit margin of Tk. 4.1 with a profit share of 11.4. The purchase price of the wholesaler in Channel II (Farmer → Wholesaler) was Tk. 38.1, and selling price was Tk. 41.3. Here the lowest cost of marketing was Tk. 0.5 and the value addition was 8.6. The marketing margin stood at Tk. 3.3 and a profit margin of Tk. 2.8 was left which was 7.8 percentage of the overall profit share. Channel III (Farmer → Faria → Bepari → Retailer → Consumer) was more mediated. Farias were bought at Tk. 28.9 and sold at Tk. 28.9 at a mark-up cost of Tk. 3.0 and 12.9 percent value added. Beparis in this chain sold at Tk. 40.2 and Beparis at Tk. 35.0 and retailers sold at Tk. 51.5 and Tk. 44.2 respectively. The retailers had the maximum cost of marketing at Tk. 3.7, but with the maximum value addition of 16.4. Their marketing margin stood at Tk. 7.3, which gave them a profit margin of Tk. 3.6, and this margin

Table 6. Profit margins and Sonali chicken marketing via all marketing channels in the study area (per kg)

Items	Channel (Ch.)										
	Ch. I	Ch. II		Ch. III			Ch. IV		Ch. V		
	Bepari	*Wholesaler*	*Retailer*	*Faria*	*Bepari*	*Retailer*	*Bepari*	*Retailer*	*Bepari*	*Wholesaler*	*Retailer*
Purchase price (Tk)	35.0	38.1	44.2	28.9	35.0	44.2	35.0	44.2	35.0	38.0	44.2
Selling price (Tk)	40.2	41.3	51.5	28.9	40.2	51.5	40.2	51.5	40.2	41.3	51.5
Total marketing cost (Tk)	1.1	0.5	3.7	3.0	1.1	3.7	1.1	3.7	1.1	0.5	3.7
Total cost (Tk)	1.13	0.47	3.7	3.0	1.1	3.7	1.1	3.7	1.1	0.5	3.7
Value added (%)	14.9	8.6	16.4	12.9	14.9	16.4	14.9	16.4	14.9	8.6	16.4
Marketing margin (Tk)	5.2	3.3	7.3	3.8	5.2	7.3	5.2	7.3	5.2	3.3	7.3
% Share of marketing margin	8.7	5.4	12.1	6.3	8.7	12.1	8.7	12.1	8.7	5.4	12.1
Profit margin (Tk)	4.1	2.8	3.6	0.73	2.9	3.6	4.1	3.6	4.1	2.8	3.6
% Share of profit margin	11.4	7.8	9.9	2.0	8.2	9.9	11.4	9.9	11.4	7.8	9.9

gave 9.9 percent of the total profit share. In Channel IV (Farmer → Bepari → Retailer → Consumer), marketing expenses were Tk. 1.1 in case of Beparis and Tk. 3.7 in the case of retailers. Value additions were 14.9 percent and 16.4 percent, respectively. Beparis made a profit margin of Tk. 4.1 (11.4% share) and retailers made Tk. 3.6 (9.9% share). Lastly, in Channel V (Farmer - Wholesaler - Retailer - Consumer), the wholesaler bought at Tk. 38.0 and sold at Tk. 41.3 with a very low marketing cost of Tk. 0.5 and a value addition of 8.6%. The retailer bought again at Tk. 44.2 and sold at Tk. 51.5 and had a cost of Tk. 3.7 and a value addition of 16.4. Wholesalers had Tk. 2.8 profit margins (7.8 share) and retailers, Tk. 3.6 profit margins (9.9 share).

Channel II (Farmer to Wholesaler) is the least expensive to market through, and the chain is relatively simple, so it is a relatively cost-effective method, but the profit margins are lower. Channel III (via multiple intermediaries) is the most expensive to market and the least efficient in general. The retailers in all channels enjoy the maximum value addition and profit margins, and wholesalers always receive the lowest. Channel I (Farmer → Bepari) and Channel IV (Farmer → Bepari → Retailer) are comparatively balanced channels, where both value addition and profit margins are much higher than those of the other channels.

Table 7 shows the marketing efficiency of Sonali chicken in the study area through the various channels. Channel I had a producer price of Tk. 34.84 per kg and this was equivalent to 87.05 percent of the consumer price. The cost of marketing was very low at Tk. 1.13 and the net marketing margin is Tk. 4.08. This was the most efficient system of transferring value between producer and consumer, with a price spread of Tk. 5.21 and a market efficiency of 6.68. The producer in Channel II made Tk. 37.84 per kg, which is 78.29 percent of the price paid by the consumer. The marketing costs went up to Tk. 4.2, and net marketing margin went up to Tk. 6.68. The price dispersion was Tk. 10.54, and market efficiency decreased to 3.47; this is moderate efficiency against Channel I. Channel III was the worst in terms of efficiency. The producers were paid the lowest of all channels, Tk. 28.78 per kg, and their share was decreased to 64.07 percent. Tk. 7.8 was the highest cost of marketing, and the net marketing margin increased to Tk. 14.13. The price dispersion was increased to Tk. 16.24, and the market efficiency was reduced to a low of 1.31, the lowest in the study. In Channel IV, producers were paid Tk. 35.84 per kg, which constituted 74.27 percent of the consumer price. The marketing expenses amounted to Tk. 4.8, and the net marketing margin was Tk. 10.4. The price dispersion was Tk. 12.48, and the market efficiency was 2.47, which was not as strong as that of Channel III, but still quite low. The producers in the Channel V also made Tk. 35.84 per kg, which is 70.43 percent of the price paid by the consumer. The marketing costs were up to Tk. 5.5, and the net marketing margin stands at Tk. 13.46. The price dispersion was Tk. 15.12, which means that it was efficient in the market

Table 7. Marketing efficiency of Sonali chicken (per kg) via all marketing channels in the study area

Items	Channel (Ch.)				
	Ch. I	Ch. II	Ch. III	Ch. IV	Ch. V
Net price received by the producer (Tk.)	34.84	37.84	28.78	35.84	35.84
Total Marketing Cost (Tk.)	1.13	4.2	7.8	4.8	5.5
Net Marketing margin (Tk.)	4.08	6.68	14.13	10.4	13.46
% Share of Producer's share	87.05	78.29	64.07	74.27	70.43
Price Spread (Tk.)	5.21	10.54	16.24	12.48	15.12
Market Efficiency	6.68	3.47	1.31	2.47	1.89

in 1.89, marginally better than Channel III, but equally the least efficient system.

In general, the results indicate that the most effective way of marketing Sonali chicken is through Channel I because producers will have the largest share and at the lowest cost. Channel II is efficient, whereas Channels IV and V are not so effective because they are more expensive and spread their prices broader. Channel III is the most inefficient of all channels and has the least producer share, highest marketing cost, and largest price spread.

Finally, from this perspective it can be said that governments' action and support in controlling input price and policy associated with such issues are crucial for the development of this industry. Moreover, a participatory market system could help all market participants significantly (Table 8).

Table 8. Major constraints and possible measures for improving Sonali chicken production

Problems	Possible measures
High cost of inputs	Government support for easy access to inputs
Shortage of quality feed	Strengthen linkage between input suppliers and producers.
Higher price of feed	Government should fix the price of the feed.
High cost of labor	Use of more family labor instead of hired labor
Lack of capital	Interest–free agricultural loans should be made available for farmers and intermediaries.
Low market price	Improve producers' bargaining power by supporting producers' co-operatives.
Lack of market information	Keep frequent contact with the market.

Conclusions

The findings from this study decisively affirm the economic viability of small-scale Sonali chicken farming in rural Bangladesh, particularly in the Jamalpur district. Cost-recovery analysis demonstrates that rearing 100 birds yields a gross return of Tk. 24,980 and a net return of Tk. 5,851.04 annually, confirming the profitability of Sonali poultry under smallholder conditions. The benefit-cost ratios (BCR) of 1.72 (based on variable costs) and 1.31 (based on total costs) indicate that for every Tk. 1 invested, farmers earn Tk. 1.72 and Tk. 1.31, respectively—clear evidence of strong economic performance.

The cost structure highlights that variable costs dominate the production expenditure, with feed accounting for 29.19% and day-old chicks 17.00% of the total cost (Tk. 19,128.96 per 100 birds). Fixed costs, including depreciation on housing (2.05%) and imputed family labor (3.94%), comprise approximately 24.16% of total costs. These cost dynamics suggest that targeted cost management in feed and input procurement could significantly improve farm-level profitability. Marketing analysis reveals substantial variation across distribution channels. Channel I (Farmer → Bepari → Consumer) demonstrates the highest producer profit margin (Tk. 4.10), equivalent to 11.4% of the retail price, and the most favorable net price to producers (Tk. 34.84). Additionally, Channel I exhibits the greatest market efficiency index (6.68), underscoring the benefits of minimal intermediary involvement. In contrast, Channel III (Farmer → Faria → Bepari → Retailer → Consumer) exhibits the lowest efficiency (1.31), highest marketing costs, and reduced producer share (64.07%). A similar trend is evident on Channel IV. These results reinforce the notion that shorter marketing chains enhance both efficiency and farm profitability.

Despite these promising returns, several challenges constrain the full potential of Sonali chicken farming. High input prices, particularly feed, limited labor availability, and volatile market prices remain significant obstacles. Strategic policy interventions—including price regulation for key inputs, subsidies or credit access, and improved access to market information—could substantially enhance profitability and resilience within the sector.

In sum, the study provides compelling evidence that Sonali chicken farming, when supported by efficient market linkages and enabling policy environments, holds considerable promise for improving rural livelihoods and strengthening the national poultry industry.

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Conflict of Interest

The authors declare no conflict of interest in this work.

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