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Marketing channels, price spread and constraint in the commercial egg value chain: Evidence from Manendragarh Chirmiri Bharatpur District of Chhattisgarh

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Abstract

Layer poultry has become one of the fastest-growing components of India's livestock economy, yet producer welfare continues to hinge on the efficiency with which eggs move from farm to consumer. This paper examines the marketing channel structure, price spread and constraint for commercial egg producers in the newly carved Manendragarh–Chirmiri–Bharatpur (MCB) district of Chhattisgarh. Primary data were drawn from six commercial layer enterprises in Manendragarh block during 2024–25, recording channel-wise disposal of marketable surplus alongside farm-gate, wholesale and retail prices. Marketing margins were estimated using the absolute-margin method, and channel performance benchmarked through Shepherd's index and Acharya's modified marketing efficiency. Producer constraints were ranked using Garrett's technique and triangulated through a SWOT synthesis. Three channels were identified: a wholesaler-mediated Channel I absorbing 89.08 per cent of marketable surplus, a longer Channel II routed through village-level aggregators (10.37 per cent), and a direct producer-to-retailer Channel III (0.45 per cent). The producer's share in the consumer rupee ranged from 76.67 per cent in Channel II to 83.33 per cent in Channel III, with Acharya's MME varying from 3.21 to 4.80. Unstable price trends, transportation costs and the absence of cooperative marketing arrangements emerged as the binding marketing constraints, while feed prices, capital requirements and day-old chick costs dominated the production side. The findings make the case for FPO-led aggregation, decentralised cold storage and digital price-discovery as the most cost-effective entry points for value-chain reform in transitional districts.

Keywords: Egg marketing, value chain, producer's share, Acharya's marketing efficiency, Garrett ranking, Chhattisgarh

1. Introduction

India produced 142.77 billion eggs in 2023–24, placing it among the top three egg-producing nations of the world (DAHD, 2024). Behind the aggregate growth, however, lies a sector under tightening margin pressure. Feed costs account for roughly two-thirds of operating expenditure on commercial layer farms (ICAR-DPR, 2023) ^[7], while downstream realisation is shaped by the National Egg Coordination Committee's daily declared rates filtered through a chain of village aggregators, wholesalers and retailers. Producer share, therefore, depends as much on the efficiency of the marketing channel as on production economics.

Marketing efficiency in this sector is not a secondary concern. Because per-unit margins are thin, small improvements in channel architecture translate into meaningful gains in producer welfare. Two analytical traditions inform the assessment of such efficiency. Shepherd (1965) ^[10] defined it as the ratio of value moved through the system to the marketing cost incurred. Acharya and Agarwal (2019) ^[11] refined this by adding intermediary margins to the denominator, producing a more conservative measure that better reflects what producers actually receive. Together, the two indices map where producers gain and lose ground within the value chain.

Indian studies on egg marketing have largely concentrated

on the southern and western states. Anilbhai and Shaikh (2020) ^[2] studied Anand in Gujarat, and Neelima *et al.* (2023) ^[8] examined East Godavari in Andhra Pradesh, both reporting channel-wise differences in producer share and efficiency. Cross-national comparisons by Baagvere *et al.* (2023) ^[3] for northern Ghana confirm that disintermediated channels tend to be more efficient but logistically demanding. For Chhattisgarh, the available evidence is older and narrower: Dileshwar (2012) ^[5] and Sheikh (2022) ^[9] focused on Rajnandgaon, and Verma (2023) ^[11] on Raipur. None of these covers the newly constituted MCB district, and none benchmarks channel performance simultaneously through Acharya's and Shepherd's measures.

The MCB district, carved from erstwhile Koriya in 2022, lies in a transitional belt where the slow contraction of coal-mining employment is opening space for agribusiness diversification. Whether layer poultry can contribute to this transition depends partly on how efficiently the egg value chain functions on the ground. The present paper addresses three questions. First, how is marketable surplus distributed across channels, and does this vary with farm size? Second, how do the alternative channels compare on price spread, producer share and marketing efficiency? Third, what production and marketing constraints do producers perceive as binding, and how should these be prioritised for institutional response?

2. Materials and Methods

2.1 Study area and sampling

The MCB district lies in northern Chhattisgarh between 23°10'–23°57' N and 81°56'–82°50' E, sharing its northern boundary with Madhya Pradesh. Of its three administrative blocks, Manendragarh block was purposively selected on grounds of poultry concentration and accessibility to the MP consumption corridor. The sampling frame consisted of commercial layer enterprises that had operated for at least three continuous years and maintained auditable records. From this frame six enterprises were drawn, stratified following Verma (2023) [11] into three categories: small (≤10,000 birds; n = 1), medium (10,001–20,000 birds; n = 2) and large (>20,000 birds; n = 3). Mean flock strength was 19,953 birds per enterprise, ranging from 8,000 on the smallest farm to 33,111 on the largest.

2.2 Data collection

Primary data covered the year 2024–25 and were captured through a pre-tested structured schedule administered to farm operators between July 2024 and February 2025. The schedule recorded channel-wise disposal of egg output, transaction prices at each level of the value chain, marketing costs borne by producers, and rank-ordered perceptions of production and marketing constraints. Secondary references were drawn from DAHD publications, NECC daily price archives, ICAR-DPR reports, and the 20th Livestock Census.

2.3 Analytical tools

The marketing margin of the *i*-th intermediary was computed as $M_i = P_i - (P_{i-1} + C_i)$, where P_i is the selling price, P_{i-1} the buying price, and C_i the marketing cost borne by the intermediary. Price spread is the absolute difference between consumer purchase price and producer sale price. The producer's share in the consumer rupee was estimated as $PS = (P_p / P_c) \times 100$.

Shepherd's marketing efficiency was estimated as $ME_S = (V/I) - I$, where V is the value of goods sold and I the total marketing cost (Shepherd, 1965) [10]. Acharya's modified marketing efficiency was calculated as $MME = FP / (MC + MM)$, where FP denotes the net price received by the farmer, MC the total marketing cost, and MM the total net margins of intermediaries (Acharya and Agarwal, 2019) [1]. Higher values of either index indicate greater efficiency. Constraint analysis followed Garrett's (1969) [6] technique. Producers ranked constraints from most to least binding; the percentage position of each rank was computed as $100 (R_{ij} - 0.5) / N_j$, where R_{ij} is the rank assigned by the *j*-th respondent to the *i*-th constraint and N_j the total number of

constraints ranked. Percentage positions were converted into Garrett scores via the standard conversion table, averaged across respondents, and used to order the constraints. The quantitative findings were triangulated through a qualitative SWOT synthesis.

3. Results and Discussion

3.1 Marketable surplus and channel structure

Table 1 reports marketable surplus across farm-size strata. Total egg output rose from 23.12 lakh on the small farm to 98.32 lakh on the large stratum, a 4.25-fold differential reflecting the wide flock-size range. Home consumption was uniformly 0.51 per cent across strata, suggesting that all sampled enterprises were strongly commercially oriented. Aggregate marketable surplus stood at 1.61 crore eggs per annum.

Table 1: Production, home consumption and marketable surplus of eggs by farm-size category (numbers per annum)

Farm size	Total production	Home consumption	Marketable surplus
Small	23,12,000 (100.00)	11,789 (0.51)	23,00,211 (99.49)
Medium	40,84,800 (100.00)	20,832 (0.51)	40,63,968 (99.49)
Large	98,31,900 (100.00)	50,143 (0.51)	97,81,757 (99.49)
All farms	1,62,28,700 (100.00)	82,764 (0.51)	1,61,45,936 (99.49)

Source: Primary survey (2024–25). Figures in parentheses are percentages of total production.

Three channels were identified through stakeholder mapping. Channel I (Producer → Wholesaler → Retailer → Consumer) absorbed 89.08 per cent of the marketable surplus. Channel II added a village-level aggregator at the farm gate (Producer → Village aggregator → Wholesaler → Retailer → Consumer) and handled 10.37 per cent. Channel III bypassed the wholesaler altogether (Producer → Retailer → Consumer) and accounted for the residual 0.45 per cent, mostly to local hotels, bakeries and school hostels. Figure 1 maps the chain.

Channel choice in the district is sharply scale-dependent (Table 2). Large farms route 95 per cent of their surplus through Channel I, exploiting volume-based pricing arrangements with wholesalers. The small farm, by contrast, channels 40 per cent of its surplus through Channel II. This dependence on village aggregators among smaller producers reflects the lower transaction frequencies, smaller load sizes and weaker bargaining position that characterise sub-scale enterprises. Direct retail through Channel III stays marginal across every stratum, indicating that producer-led branded or retail marketing has not yet emerged in MCB.

Table 2: Channel-wise disposal of marketable surplus by farm-size category (numbers per annum)

Farm size	Channel I	Channel II	Channel III	Total
Small	13,34,122 (58.00)	9,20,084 (40.00)	46,004 (2.00)	23,00,211 (100.00)
Medium	30,07,336 (74.00)	10,15,992 (25.00)	40,640 (1.00)	40,63,968 (100.00)
Large	92,92,669 (95.00)	4,69,524 (4.80)	19,564 (0.20)	97,81,757 (100.00)
All farms	1,43,84,127 (89.08)	16,75,000 (10.37)	86,808 (0.45)	1,61,45,936 (100.00)

Source: Primary survey (2024–25). Figures in parentheses are percentages within each farm-size category.

3.2 Price spread and marketing efficiency

Table 3 disaggregates the consumer price across the three channels at a reference retail price of ₹6.00 per egg, broadly

aligned with the NECC Raipur zone-rate during the study period. The producer's net price varied from ₹4.50 per egg in Channel II to ₹4.80 in Channel III. The total price spread

widened from ₹1.00 in Channel III to ₹1.40 in Channel II, with the additional ₹0.40 per egg in Channel II absorbed mainly by the village-aggregator margin.

Table 3: Price spread, marketing margin and producer's share in alternative egg-marketing channels (₹ per egg)

Item	Channel I	Channel II	Channel III
Consumer purchase price (P_c)	6.00	6.00	6.00
Producer sale price (P_p)	4.80	4.60	5.00
Producer's marketing cost	0.10	0.10	0.20
Net price received by producer (FP)	4.70	4.50	4.80
Village aggregator margin	—	0.25	—
Wholesaler margin (net)	0.30	0.30	—
Retailer margin (net)	0.50	0.45	0.80
Total marketing margin (MM)	0.80	1.00	0.80
Total marketing cost (MC)	0.40	0.40	0.20
Total price spread ($P_c - P_p$)	1.20	1.40	1.00
Producer's share in consumer rupee (%)	80.00	76.67	83.33
Shepherd's marketing efficiency	14.00	14.00	29.00
Acharya's modified marketing efficiency	3.92	3.21	4.80

Source: Authors' computation from primary survey (2024–25).

Note: Shepherd's ME = $(P_c/MC) - 1$; Acharya's MME = $FP / (MC + MM)$

The producer's share follows the expected disintermediation gradient. It is lowest in Channel II at 76.67 per cent, where the village aggregator extracts an additional ₹0.25 per egg over and above the regular wholesale-retail spread; intermediate in Channel I at 80.00 per cent; and highest in Channel III at 83.33 per cent, where the producer transacts directly with the retailer. The ₹0.40 per egg differential between Channel II and Channel III, scaled to the aggregate marketable surplus, represents about ₹25.7 lakh of annual value currently absorbed by intermediation that could potentially accrue to producers under a more disintermediated architecture.

Acharya's modified marketing efficiency reinforces this hierarchy. Channel III registers the highest score (4.80), Channel I follows at 3.92, and Channel II is the least efficient at 3.21. Shepherd's index produces the same

ordering with sharper contrast, registering 29.0 for Channel III against 14.0 for the longer channels. The pattern echoes the wider literature: Neelima *et al.* (2023) [8] for East Godavari and Baagyere *et al.* (2023) [3] for northern Ghana both report that direct or near-direct egg-marketing channels deliver higher producer share but absorb only small volumes, constrained by producer-side logistics. Figure 2 makes the contrast visible.

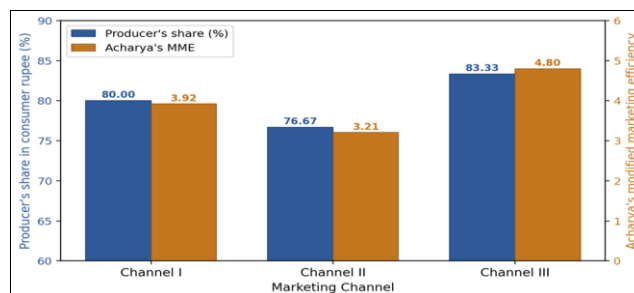


Fig 1: Producer's share in consumer rupee (%) and Acharya's modified marketing efficiency, by channel.

3.3 Constraint in production and marketing: Garrett ranking

Table 4 presents the major production and marketing constraints faced by egg producers. Among production constraints, high input costs ranked first (Garrett score 80), followed by high farm establishment costs (68) and expensive day-old chicks (59), indicating significant pressure on production expenses. Shortage of skilled labour, high electricity charges, and disease outbreaks were of moderate importance, while storage and veterinary medicine costs were ranked lower.

In marketing, unstable price trends emerged as the most serious constraint (Garrett score 73), followed by high transportation costs (57). Lack of cooperative marketing facilities (43) and low wholesale-price realization (27) were also important concerns. Overall, producers face challenges from both rising production costs and market-related uncertainties, resulting in reduced profitability and weaker bargaining power.

Table 4: Garrett ranking of production and marketing constraints in commercial layer farming

S. No.	Constraint	% Position	Garrett Score	Rank
A. Production constraints				
1	High cost of inputs (feed, supplements)	6.25	80	I
2	Expensive farm-setup / capital requirement	18.75	68	II
3	High cost of day-old chicks	31.25	59	III
4	Shortage of skilled labour	43.75	53	IV
5	High electricity charges	56.25	47	V
6	Disease outbreaks and mortality	68.75	40	VI
7	Insufficient storage facility	81.25	32	VII
8	High cost of veterinary medicines	93.75	20	VIII
B. Marketing constraints				
1	Unstable price trends / volatility	12.50	73	I
2	High transportation charges	37.50	57	II
3	Lack of cooperative marketing facilities	62.50	43	III
4	Lower wholesale egg prices / weak bargaining	87.50	27	IV

Source: Primary survey (2024–25). **Note:** % position = $100(R_{ij} - 0.5) / N_j$; Garrett scores derived from the standard conversion table.

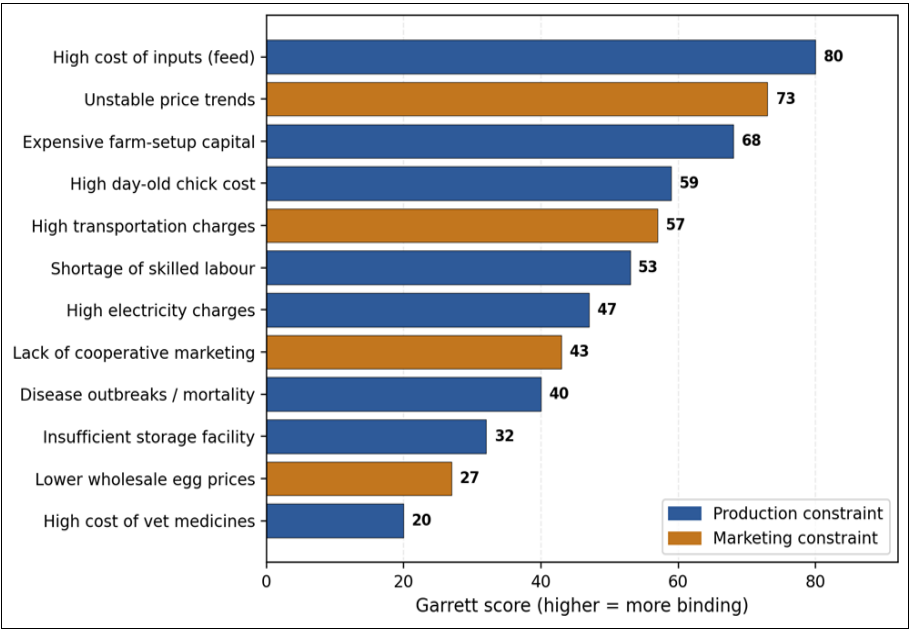


Fig 3: Garrett scores for production and marketing constraints, sorted in descending order.

3.4 SWOT synthesis

Triangulating the quantitative findings with stakeholder consultations yields the SWOT mapping in Table 5. The principal strengths of the MCB layer cluster lie in its high commercial orientation, favourable sub-humid climate and proximity to MP consumption markets. The key weaknesses are its 89 per cent reliance on wholesaler-mediated Channel I, the absence of FPO infrastructure and the fragility of small-farm margins. Opportunities arise from the state's

agribusiness diversification push for mining-transition districts, rising demand for branded and fortified eggs in tier-2 urban markets, and NABARD-supported credit for cold-chain and biosecurity investment. Threats are dominated by feed-price volatility, sporadic avian-influenza outbreaks and entry of vertically integrated players from neighbouring states that may compress non-integrated producer margins.

Table 5: SWOT synthesis for commercial layer poultry enterprises in MCB district

Strengths High commercial orientation (99.49% marketable surplus) Favourable sub-humid agro-climate Proximity to MP consumption corridor Improving egg yield per layer with scale	Weaknesses 89.08% dependence on wholesaler-driven Channel I Negligible direct marketing (0.45%) Fragile small-farm margins Absence of FPO / cooperative structures
Opportunities Agribusiness policy thrust in mining-transition districts Rising demand for branded, omega-3 and free-range eggs NABARD-backed credit for cold-chain and biosecurity Government nutrition schemes (POSHAN 2.0, PM-POSHAN)	Threats Maize and soybean price volatility Avian-influenza outbreaks and biosecurity risks Vertical integrator entry from neighbouring states Climate-stress-induced productivity dips

Source: Authors' synthesis from primary survey, secondary data and stakeholder consultations (2024–25)

4. Conclusion and Suggestions

Three key findings emerged from the analysis of the egg value chain in MCB district. First, marketing channel choice is strongly influenced by farm size, with large farms selling mainly through wholesalers, while small farms rely on village aggregators who capture part of the margin. Second, the direct producer-to-retailer channel is the most efficient, but its use remains very limited due to inadequate storage, transport, and credit facilities at the producer level. Third, rising input costs and price fluctuations are the major constraints faced by producers, along with the absence of cooperative marketing infrastructure. These findings suggest the need to promote Farmer Producer Organisations (FPOs) to strengthen aggregation, storage, and market access. Establishing local egg-grading and cold-storage facilities can help producers obtain better prices and reduce marketing losses. Improved market

information through platforms such as NECC and AgmarkNet can reduce information gaps, while subsidized poultry insurance can protect farmers from price risks. The study is limited by its small sample size and cross-sectional nature; future research should cover larger areas and assess the long-term impact of FPOs on producer welfare.

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