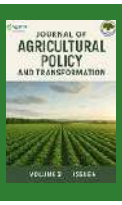

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Market Channels, Marketing Margins, and Post-Harvest Losses in Pakistan's Mango Value Chain: Evidence from Multan

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ABSTRACT
Mango moves from orchards to consumers through a layered and largely informal marketing system in Pakistan, yet the distribution of costs and returns across market actors remains insufficiently documented at the district level. This study identifies marketing channels in Multan and describes purchase prices, marketing costs, sale prices, and margins reported by major actors. Primary data were collected during the 2023 mango season from 95 purposively selected respondents, including 20 producers, 20 pre-harvest contractors, 20 wholesalers, and 35 retailers. Actor-specific averages were analyzed separately because the data did not link the same consignments across successive transactions. The dominant channel, used by 85% of sampled producers, was Producer → Pre-harvest Contractor → Commission Agent/Wholesaler → Retailer → Consumer. Producers received a gross receipt of Rs 15.66/kg, equivalent to 16.2% of the final consumer price, although this is not a profit measure because production costs were unavailable. Retailers recorded the highest net marketing margin (Rs 18.48/kg; 46.3%), followed by wholesalers (Rs 13.26/kg; 33.2%) and contractors (Rs 8.16/kg; 20.5%). Quantity-loss costs were highest among retailers and wholesalers. Key constraints included market information, finance, storage, transport, grading, packing, and debt recovery. The findings identify cost and margin concentrations without establishing causality between losses and margins.

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1. INTRODUCTION

Fruit and vegetable value chains in South Asia are characterized by perishable, seasonally concentrated output that passes through several intermediaries before reaching consumers. The share retained by each actor reflects the services performed, the costs incurred, bargaining conditions, access to finance and market information, and exposure to physical losses. Marketing margins therefore cannot be interpreted as market power alone: they combine payments for coordination, handling, storage, transport, risk-bearing, and unsold or damaged produce (Aujla et al., 2007; Thakur et al., 2023).

Mango is one of Pakistan's major fruit crops and is especially important in Punjab, where Multan is a recognized production and trading center (Government of Pakistan, Ministry of National Food Security & Research [MNFSR], 2025). Its short and heat-sensitive marketing window places a premium on timely harvesting, grading, packaging, transport, and sale. Weaknesses at any stage can reduce the quantity and quality that reaches domestic or export markets. Market pressure in a perishable chain is experienced through more than price variation. Seasonal gluts can compress sale prices, high temperatures can accelerate deterioration, delayed payments can constrain working capital, and weak grading can prevent quality from being rewarded. These conditions can reinforce one another: limited finance restricts investment in packaging or short-term storage, physical losses increase the quantity that must be

handled to sell one kilogram, and incomplete information weakens contract negotiation. Actor-level accounting is useful because it identifies where these linked pressures appear in reported costs and constraints, while stopping short of attributing them to a single cause.

Pakistan's mango trade includes growers, pre-harvest contractors, commission agents, wholesalers, retailers, exporters, input suppliers, and market institutions. Pre-harvest contracting is common: growers sell standing orchards, transferring harvesting and initial marketing responsibilities to contractors. National and multi-region research distinguishes traditional, modern, and export chains and emphasizes information flows, governance, quality management, and post-harvest handling as areas for upgrading (Badar et al., 2019; Ayyaz & Hussain, 2025).

Existing studies provide valuable chain typologies and policy context but do not provide a recent, transparent, district-level accounting of reported purchase prices, marketing costs, sale prices, and margins across ordinary commercial actors in Multan. This paper addresses that descriptive gap. It identifies the channels used by sampled producers, reports actor-specific cost and margin accounts for the dominant domestic channel, documents selected cost components and constraints, and draws bounded policy implications. The analysis does not identify causal effects, and independently reported actor averages are not treated as a transaction-linked price decomposition

2. LITERATURE REVIEW

Marketing margins and price spread

The Acharya accounting framework remains widely used in South Asian agricultural marketing studies to describe total marketing cost, intermediary margin, producer share, and price spread (Acharya, 1988; Thakur et al., 2023). A larger margin may indicate bargaining advantage, but it may also compensate for handling services, financing, storage, spoilage, or inventory risk. Interpretation therefore requires transparent definitions and disaggregated costs rather than a presumption that every margin is an economic rent.

Pakistani mango marketing institutions

Badar et al. (2019) show that Pakistan's mango chains differ in product flows, market orientation, governance, and information exchange. Traditional chains carry most volume and remain relatively long and weakly coordinated, while modern and export chains apply more demanding quality and logistics practices. Aujla et al. (2007) likewise identify incomplete market information, infrastructure constraints, and post-harvest losses as limitations on fruit marketing and export performance. More recent work continues to emphasize pre- and post-harvest losses and coordination problems in Punjab and Sindh mango chains (Ayyaz & Hussain, 2025). These studies are national or multi-district in scope, and none of them report a disaggregated, actor-specific cost and margin account for a single production and trading district such as Multan.

Losses, channel choice, and policy response

Across perishable-crop markets, farmers' outlet choices are associated with income, experience, market distance, infrastructure, and access to information (Divyanshu et al., 2024; Thakur et al., 2023; Villacis et al., 2024). These findings support policies that improve information and marketing options, but they do not imply that reducing an intermediary margin automatically improves producer welfare. In Punjab, the Agriculture Marketing Information Service provides daily market-price and arrival information, while the provincial marketing framework assigns market institutions responsibilities for transparent auctions, market information, grading, training, and alternative channels (Agriculture Marketing Information Service [AMIS], n.d.). The present study assesses where descriptive evidence suggests priorities for piloting and evaluation.

The literature also highlights a measurement distinction that is often obscured in value-chain accounts. Producer share is normally calculated from the price received relative to the consumer price, whereas an intermediary margin deducts both purchase price and marketing expenditure. Treating the producer price as profit makes the measures appear comparable when they are not. A second problem arises when surveys collect separate actor-group averages rather than following matched consignments. Adjacent sales and purchase means can then differ because respondents trade different varieties, grades, dates, or destinations. The present analysis applies these distinctions to prevent an accounting description from being interpreted as a linked or causal model.

Positioning of the present study

Although Badar et al. (2019) and Ayyaz and Hussain (2025) document chain structures and post-harvest loss problems for Pakistani mango broadly, and Aujla et al. (2007) reports early evidence on fruit marketing margins and export potential, none of these studies provides a district-level, actor-specific accounting of purchase prices, marketing costs, sale prices, and net margins for Multan, which is among the country's principal mango-producing and trading districts. Comparable actor-level margin accounting has been undertaken for other high-value or perishable crops and in other countries for example, potato marketing channels in Himachal Pradesh (Divyanshu et

al., 2024), garden pea marketing in India (Thakur et al., 2023), and mango-specific economic and value-chain analysis in Bangladesh (Barmon et al., 2025) but disaggregated evidence of this kind has not previously been assembled for Multan's domestic mango trade. This leaves two related gaps that the present study addresses. First, existing Pakistani mango studies describe chain structure and loss problems in general terms but do not report the magnitude of costs and margins retained by each domestic actor. Second, margins and losses are frequently discussed together in the literature without being jointly measured for the same chain, so it remains unclear where, within a specific and currently operating domestic channel, costs and margins are concentrated. Actor-specific descriptive accounting of the kind applied here is a necessary first step before any causal or efficiency claim can be evaluated, because it establishes a transparent, disaggregated baseline against which future matched-consignment or experimental studies can be compared.

3. MATERIALS AND METHODS

Study area

The study was conducted in Multan District, Punjab, Pakistan, a major mango-producing and trading area with a hot, semi-arid climate. Mango production in the district supports a network of producers, pre-harvest contractors, commission agents, wholesalers, retailers, and exporters. The study-area description is restricted to information supported by the retained study materials.

Sample, sampling procedure, and fieldwork

The analytical sample contains 20 producers, 20 pre-harvest contractors, 20 wholesalers, and 35 retailers, for a total of 95 domestic-chain respondents. Respondents were identified purposively from registers maintained by the Multan wholesale fruit and vegetable market committee (mandi committee) and by orchard and contractor associations active in the district. Producers and pre-harvest contractors were drawn from the district's principal mango-growing tehsils, and wholesalers and retailers were drawn from the main wholesale (mandi) and retail markets in Multan city. Actors were included if they had traded mango for at least one full season and were willing to report price and cost information for that season; actors who traded only occasionally, or who declined to disclose transaction-level information, were excluded. Because selection relied on registers and willingness to participate rather than a full random frame, the sample should be read as representative of registered, actively trading participants rather than of all informal or occasional traders in the district. Fieldwork was carried out during the 2023 mango season (May–August), the period to which the reported prices, costs, and margins apply. Information was collected using a structured questionnaire covering channel participation, purchase and sale prices, marketing expenditures, quantity losses, and operational constraints. Exporter information was available in the source manuscript, but the exporter sample size was not recorded; exporter figures are therefore excluded from the main comparative tables and treated only as exploratory context.

Commission agents and wholesalers

Commission agents were not sampled as a category separate from wholesalers. Respondents recorded as “wholesalers” in this study typically also perform the commission-agent function common in Punjab's mandis, in which the agent arranges or negotiates the sale of an incoming consignment on the contractor's behalf and retains a commission before passing on the balance. The wholesaler category used throughout the results and tables should therefore be read as a combined commission-agent/wholesaler operator, and the label “Commission Agent/Wholesaler” used to describe the dominant marketing channel refers to this same combined actor rather than to an additional, separately surveyed stage. This has a direct bearing on the interpretation of the price gap between the contractor's and the wholesaler's reported prices, discussed in the Results and Discussion sections.

Measures and analytical framework

All cost and margin measures below are expressed on a per-kilogram basis and are calculated as the mean across respondents within each actor category, rather than for individual, transaction-linked consignments. For intermediary i, marketing cost was defined as the sum of reported handling and marketing expenses, excluding the purchase price of mangoes:

$$MCi = \Sigma j\ Cij$$

where Cij is cost component j reported by intermediary i. Total cost was defined as purchase price plus marketing cost:

$$TCi = PPi + MCi$$

Net marketing margin was calculated as sale price minus total cost:

$$NM_i = SP_i - TC_i$$

The producer measure is reported separately as gross receipt per kilogram and as a percentage of the final consumer price. It is not net profit or net margin because the source data do not contain production-cost estimates. Intermediary margin shares were recalculated using only the sum of contractor, wholesaler, and retailer net marketing margins. Marketing-only costs in Table 2 recovered as total cost minus purchase price: Rs 17.85/kg for contractors, Rs 5.07/kg for wholesalers, and Rs 9.38/kg for retailers, which sum to Rs 32.30/kg.

The actor categories were surveyed independently, and the data do not identify matched consignments across sequential transactions. Differences between an upstream actor's mean sale price and the next actor's mean purchase price may reflect variety, grade, timing, market, quality, independent averaging, or an intermediate handling stage that was not separately surveyed (see the discussion of commission agents above). The results are therefore actor-level descriptive accounts, not an exact linked decomposition of one consignment's final consumer price. No hypothesis tests, regression models, or causal estimators were applied.

Loss measurement

Quantity loss was measured as a self-reported estimate of the physical share of the quantity handled by the respondent that could not be sold at full value because of spoilage, physical damage, or quality deterioration during the respondent's typical marketing cycle in the 2023 season. Estimates were based on respondent recall rather than direct weighing at the time of loss, and the reported loss rate (6.35% for wholesalers and 8.65% for retailers) refers to the percentage of quantity handled, not the percentage of quantity purchased or quantity sold. Quality deterioration that reduced the price obtained for downgraded produce was reported by respondents together with complete physical loss and is not separately distinguished in the retained data. The monetary quantity-loss cost (Rs 3.57/kg for wholesalers and Rs 5.71/kg for retailers) was derived by valuing the estimated lost quantity at the respondent's own reported purchase price per kilogram and expressing the result per kilogram of quantity sold. Because these figures rely on recall-based self-reports rather than measured weight loss, they may be subject to over- or under-reporting and should be read as indicative rather than exact.

Constraint reporting

For the constraint percentages in Table 5, respondents were asked to identify, from a preset list, up to two constraints they considered most significant to their trading activity, rather than a single constraint or a Likert-scale rating. Multiple responses were therefore permitted, so the percentages reported for each actor category reflect the share of respondents naming a given constraint among their two most important choices and need not sum to 100 across constraint types for a given actor.

Data consistency and reporting choices

The analysis checked every reported arithmetic relationship that could be evaluated from the manuscript. Intermediary total cost equals purchase price plus marketing cost, and net marketing margin equals sale price minus total cost after rounding. Margin shares were recalculated from the three intermediary net margins rather than from a denominator that combined producer receipt with intermediary margins. Monetary values are reported in Pakistani rupees per kilogram. Percentages are shown to one decimal place, and small discrepancies may result from rounding. Selected cost components and constraint percentages are reported only when the retained manuscript supplied an explicit value; missing values were not imputed. Standard deviations are reported alongside the relevant means in Tables 2 and 4 to give a sense of dispersion within each actor category.

4. RESULTS

Sample composition and marketing channels

Table 1 reports on the domestic actor sample. Three channels were identified among sampled producers:

Channel I: Producer → Commission Agent/Wholesaler → Retailer → Consumer (10% of producers)

Channel II: Producer → Pre-harvest Contractor → Commission Agent/Wholesaler → Retailer → Consumer (85% of producers)

Channel III: Producer → Exporter → Retailer/Importer → Foreign Consumer (5% of producers)

Channel II was dominant and is the focus of the domestic cost and margin analysis. Among contractors, 85% reportedly sold to wholesalers and 15% to exporters, indicating an export branch after the pre-harvest contracting stage.

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Table 1. Sample composition for the domestic-chain analysis

Actor category	Respondents (n)	Role in analysis
Producers	20	Channel identification and gross producer receipt
Pre-harvest contractors	20	Purchase, marketing cost, sale, and net margin
Wholesalers	20	Purchase, marketing cost, sale, and net margin
Retailers	35	Purchase, marketing cost, sale, and net margin
Total domestic sample	95	Descriptive analysis

Note. Respondents were selected purposively from market-committee and association registers during the 2023 mango season (see Materials and Methods). The exporter sample size was not reported in the retained source materials and exporter data are not included in the domestic comparative tables.

Prices, costs, and margins in Channel II

Table 2 separates purchase price, marketing-only cost, total cost, sale price, and actor return, together with the standard deviation of each actor's return measure. The producer's Rs 15.66/kg is a gross receipt rather than profit. For intermediaries, net marketing margins were Rs 8.16/kg for contractors, Rs 13.26/kg for wholesalers, and Rs 18.48/kg for retailers.

Table 2. Actor-specific cost and return accounting for Channel II (Rs/kg)

Actor	Purchase price	Marketing cost	Total cost	Sale price	Gross receipt or net margin	SD of return
Producer	—	—	—	15.66	15.66[a]	4.85
Pre-harvest contractor	15.44	17.85	33.29	41.45	8.16	3.05
Wholesaler	56.75	5.07	61.82	75.08	13.26	4.60
Retailer	68.88	9.38	78.26	96.74	18.48	6.35

Note. Marketing cost excludes purchase price; total cost equals purchase price plus marketing cost. Values are independent actor-category means rather than matched transaction prices. SD is the standard deviation of the return measure within each actor category (n = 20 for producers, pre-harvest contractors, and wholesalers; n = 35 for retailers). [a] Producer gross receipt, not profit; production costs were unavailable.

The marketing-only costs of the three intermediary stages summed to Rs 32.30/kg. Retailers reported the largest net marketing margin, but they also reported the highest quantity-loss cost among the domestic actors. These co-occurring values do not by themselves establish that loss caused the larger margin. A separate data-quality issue concerns the gap between the contractor's mean sale price (Rs 41.45/kg) and the wholesaler's mean purchase price (Rs 56.75/kg); this gap, and its likely relationship to the combined commission-agent/wholesaler category described in Materials and Methods, is examined in the Discussion.

Distribution of intermediary margins

Table 3 recalculates intermediary margin shares on a consistent basis. Retailers accounted for 46.3% of the combined intermediary net margin, wholesalers for 33.2%, and contractors for 20.5%. The producer received 16.2% of the final consumer price as a gross receipt; no producer share of intermediary margin is reported because the concepts are different.

Table 3. Producer receipt and intermediary margin shares

Actor	Return measure	Share of total intermediary margin (%)	Share of final consumer price (%)
Producer	Gross receipt	Not applicable	16.2
Pre-harvest contractor	Net marketing margin	20.5	8.4
Wholesaler	Net marketing margin	33.2	13.7
Retailer	Net marketing margin	46.3	19.1
Intermediary total	Net marketing margin	100.0	41.2

Note. Percentages may differ slightly from calculations using unrounded source values.

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Selected cost components and constraints

Table 4 presents the selected cost components retained in the source manuscript, together with the standard deviation of each value. Packing material and commission were the largest individually reported contractor items. Quantity-loss costs were Rs 3.57/kg for wholesalers and Rs 5.71/kg for retailers, corresponding to reported loss rates of 6.35% and 8.65%, respectively (see Materials and Methods for how loss was measured). These are selected components, not a complete reconstruction of every cost item.

Table 4. Selected reported cost components by intermediary

Actor	Cost component	Cost (Rs/kg)	SD (Rs/kg)	Reported loss rate (%)
Pre-harvest contractor	Packing material	6.02	1.40	—
Pre-harvest contractor	Commission	2.98	0.85	—
Pre-harvest contractor	Quantity loss	1.90	0.55	—
Wholesaler	Quantity loss	3.57	1.02	6.35± 1.8
Retailer	Quantity loss	5.71	1.64	8.65± 2.4
Retailer	Commission	1.00	0.30	—

Note. Dashes indicate that the retained source manuscript did not report a corresponding value. SD values are calculated across respondents within each category (n = 20 for pre-harvest contractors and wholesalers; n = 35 for retailers); reported loss rates are shown as mean ± SD. The listed components do not sum to total marketing cost: for pre-harvest contractors, packing material, commission, and quantity loss together account for Rs 10.90/kg of the reported Rs 17.85/kg total marketing cost, and for retailers, commission and quantity loss together account for Rs 6.71/kg of the reported Rs 9.38/kg total marketing cost. The remainder (Rs 6.95/kg for contractors and Rs 2.67/kg for retailers) corresponds mainly to transport, loading and unloading labor, and short-term storage or holding charges that were reported in aggregate rather than itemized in the retained source materials.

Table 5 shows the two most frequently reported constraints for each actor category; respondents could select up to two constraints from a preset list (see Materials and Methods), so percentages need not sum to 100 within an actor. Producers emphasized capital and market information, contractors emphasized capital and storage, wholesalers emphasized debt recovery and transport costs, and retailers emphasized physical losses and weak grading and packing.

Table 5. Leading reported constraints by actor

Actor	Constraint 1 (%)	Constraint 2 (%)
Producer	Lack of market intelligence (75)	Lack of capital (70)
Pre-harvest contractor	Lack of capital (80)	Insufficient storage space (55)
Wholesaler	Debt-recovery problems (75)	High transport charges (70)
Retailer	Quantity loss (80)	Poor grading and packing (71)

5. DISCUSSION

Four findings stand out. First, pre-harvest contracting dominated the sampled producer channels. This pattern is consistent with prior evidence that growers transfer harvesting and initial marketing responsibilities to contractors when they face working-capital, information, and coordination constraints (Badar et al., 2019). The arrangement reduces some direct marketing obligations but may weaken the link between the price realized downstream and the lump-sum orchard price received by the grower. Because production costs were unavailable, this study cannot determine producer profitability.

Second, the retail stage recorded the largest net marketing margin among intermediaries. Retailers also reported the highest quantity-loss cost and loss rate. This pattern is consistent with frequent handling, small inventories, exposure to unsold stock, and short shelf life. The evidence supports an association, not a causal claim. A margin may compensate for losses and services, reflect bargaining conditions, or combine both. Determining the mechanism would require matched consignment data, detailed cost records, and a design that separates risk compensation from market power.

Third, the sizeable gap between the pre-harvest contractor's mean sale price (Rs 41.45/kg) and the wholesaler's mean purchase price (Rs 56.75/kg), about Rs 15.30/kg, or 37%, is far larger than the wholesaler-to-retailer gap, which is

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small and runs in the opposite direction (Rs 75.08 sale versus Rs 68.88 purchase). Because wholesalers in this sample typically also perform the commission-agent function, part of the contractor-to-wholesaler gap plausibly reflects a commission or handling margin that is embedded within the wholesaler's reported purchase price rather than itemized separately, in addition to the variety, grade, timing, and independent-sampling effects that can affect any adjacent pair of actor averages. This differs from the wholesaler-to-retailer link, where the small, reversed gap is more consistent with a shorter and more direct handoff. The retained data cannot decompose the contractor-to-wholesaler gap into its specific components, so this explanation should be read as the authors' best candidate account rather than a measured result.

Fourth, constraints varied across the chain. Producer and contractor responses point to finance and information gaps; wholesaler responses emphasize debt recovery and transport; retailer responses emphasize grading, packing, and loss. This heterogeneity argues against a uniform “reduce middlemen” policy. Stage-specific interventions should be piloted with measurable outcomes such as physical loss, quality grade, net revenue, price pass-through, repayment performance, and consumer price.

The distributional interpretation also requires care. A lower producer share of the consumer price does not show how much farm income remains after production expenses, just as a higher retailer margin does not reveal the return on capital, labor, time, or spoilage risk. Inclusive transformation would require evidence of these underlying returns and on who can adopt improved practices. Small growers and small traders may face different credit, information, and infrastructure barriers from larger actors. Future evaluations should therefore report effects by actor scale, gender where relevant, market location, variety, and channel, rather than relying only on an average chain-wide outcome.

The independently reported prices require caution. An upstream mean sale price does not equal the next actor's mean purchase price, so the values should not be summed as a single linked price spread. Differences may arise from varieties, grades, market dates, destinations, unrecorded intermediate handling, or independent sampling. Future data collection should identify consignments or record transaction-level links to permit a defensible decomposition of the consumer price.

Finally, the exporter branch identified in the sample, the 5% of producers selling through exporters and the 15% of contractors reporting subsequent sales to exporters, was outside the scope of the domestic cost and margin accounting because the exporter sample size could not be confirmed from the retained materials. Given the price premiums and quality requirements typically associated with export marketing, a dedicated, adequately sampled study of this branch, including grading and compliance costs, would be a natural extension of the present work.

6. POLICY IMPLICATIONS

The results identify priorities for policy testing rather than proven treatment effects. First, provincial extension, market committees, and the Punjab Institute of Agriculture Marketing could pilot stage-specific handling, sorting, grading, reusable crates, and short-term storage with wholesalers and retailers, where reported losses were highest. Evaluation should compare physical loss, quality, margin, and price pass-through before and after implementation.

Second, AMIS already maintains market-price and arrival information across Punjab (AMIS, n.d.). A mango-season information package could combine variety- and grade-specific wholesale prices, arrival volumes, historical trends, and simple orchard-contract benchmarks. Delivery channels should be tested with producers and contractors to determine whether information changes contract negotiation or channel choice.

Third, seasonal working-capital products for contractors and wholesalers should be linked to transparent records, loss-reduction practices, and repayment monitoring. Shared pre-cooling or short-term cold storage may reduce spoilage, but investment decisions should be based on utilization, energy cost, maintenance, and willingness-to-pay evidence rather than assumed benefits.

Finally, the provincial marketing framework already assigns responsibilities for transparent auctions, grading, market information, training, and alternative marketing channels. The study's findings support coordination among these functions, with producer welfare and consumer affordability treated as explicit evaluation outcomes rather than assumed consequences of lower intermediary margins. Because part of the reported price spread between contractors and wholesalers may reflect an unrecorded commission-agent function rather than pure marketing margin, any future policy discussion of intermediary margins should distinguish commission charges from other marketing costs wherever possible.

7. LIMITATIONS

The study is cross-sectional, descriptive, and confined to one district. Sampling relied on market committee and association registers and on the purposive selection of active, willing traders rather than a full random frame, so the

results may not generalize to occasional, informal, or unregistered traders in Multan's mango trade. Fieldwork was carried out during the 2023 mango season; margins, costs, and constraint patterns could differ in other seasons or years. Exporter results cannot be evaluated because the exporter sample size was not confirmed in the retained materials. The producer measure is gross receipt rather than profit because production costs were unavailable. Independently reported actor averages do not trace the same consignments, so the study cannot produce a transaction-linked price decomposition; the sizeable contractor-to-wholesaler price gap is interpreted only as a candidate explanation linked to the combined commission-agent/wholesaler category, not as a measured result. Quantity-loss rates and costs rely on respondents' recall-based estimates rather than direct measurement and may be subject to reporting bias. Constraint percentages reflect up to two selections per respondent rather than a single ranked or scaled response, so they should not be read as mutually exclusive shares. Standard deviations are now reported for the main return, cost, and loss-rate indicators, but dispersion measures were not available for every reported value. No causal model, hypothesis test, robustness analysis, or formal marketing-efficiency index was estimated. These limitations restrict generalization and require cautious interpretation of policy implications.

8. CONCLUSIONS

The dominant sampled mango channel in Multan passed through a pre-harvest contractor, a combined commission-agent/wholesaler, and a retailer before reaching consumers. The producers' gross receipt represented 16.2% of the final consumer price, but it cannot be interpreted as producer profit. Among intermediaries, retailers reported the largest net marketing margin and the highest quantity-loss cost, followed by wholesalers and contractors, with meaningful dispersion around each of these means. Part of the price gap between contractors and wholesalers is plausibly linked to the commission-agent function performed within the wholesaler category, although this cannot be confirmed without matched transaction data. The results show where costs, margins, and constraints are concentrated, while the descriptive design does not establish why the margins differ. Policy should therefore focus on targeted and evaluated improvements in handling, storage, information, finance, and market transparency, with explicit measurement of loss reduction and price pass-through.

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