



International Journal of Agriculture and Food Science

ISSN Print: 2664-844X
ISSN Online: 2664-8458
NAAS Rating (2025): 4.97
IJAFA 2025; 7(11): 219-222
www.agriculturaljournals.com
Received: 09-09-2025
Accepted: 15-10-2025

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Constraints analysis and suggestions for improving vegetable marketing in peri-urban areas

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DOI: <https://www.doi.org/10.33545/2664844X.2025.v7.i11c.1466>

Abstract

Peri-urban vegetable growers sit at an unusual intersection close enough to urban markets to catch the price premium, yet far enough to be trapped by the very middlemen who work that short supply chain. This research identified and ranked the marketing constraints faced by 200 peri-urban vegetable growers in the Hanoi and Can Tho belts, using the Garrett ranking technique and Kendall's coefficient of concordance. Data were collected between June 2022 and December 2023 through structured interviews, and the instrument was validated across three pilot rounds. Eighteen specific constraints were clustered into six categories. Price volatility and low realisation emerged as the most severe constraint (Garrett score 88), followed by transport and infrastructure bottlenecks (82), middlemen dominance (74), post-harvest losses (71), absence of market information (68) and credit access (55). The farmer's share of the consumer dong ranged from 42.7% (commission agent channel) to 78.3% (direct-to-consumer channel). Suggestions offered by growers, ranked by Garrett score, centred on the establishment of producer collectives, digital market price boards, cold storage at block level, and reform of commission agent practices. Findings argue for a layered intervention farmer producer organisations plus digital infrastructure plus policy push rather than a single-lever fix.

Keywords: Vegetable marketing, peri-urban, constraints analysis, Garrett ranking, marketing channels, producer collectives, farmer's share, supply chain

Introduction

On paper, peri-urban vegetable growers should be among the best-off participants in Vietnamese horticulture. They cultivate the highest-value commodities and sit within an hour's truck journey of large urban consumers. In practice, they capture barely 45-55% of the consumer dong in most documented cases ^[1, 2]. The contrast between theoretical advantage and actual return has been flagged repeatedly by the National Agricultural Development Programme and market reform documents, without any visible dent in the pattern ^[3]. Constraints to vegetable marketing have been studied piecemeal for over three decades early work on transport and storage ^[4], late 1990s on price volatility and middlemen ^[5], and the 2010s on digital information asymmetry and credit access ^[6, 7]. What has been missing is a constraint-ranking effort that pulls these threads together for the peri-urban segment using Garrett ranking, a technique that places each constraint on a comparable scale ^[8].

The Hanoi belt in northern Vietnam and Can Tho belt in the Mekong Delta were chosen because they represent two dominant peri-urban typologies Hanoi tied to the Red River Delta corridor, and Can Tho feeding Ho Chi Minh City through long-haul cold chain. If constraints converge across these two very different supply-chain configurations, the result carries national implications. Objectives were:

- 1) Identify the key marketing constraints,
- 2) Rank them on the Garrett scale, and
- 3) Document farmer-generated suggestions for easing each constraint.

Theoretical framework

This research drew on the Structure-Conduct-Performance (SCP) paradigm from industrial organisation economics, adapted to agricultural marketing by Bain and extended for Vietnamese supply chains by Acharya ^[9]. Market structure shapes conduct, which in turn shapes performance measured through farmer's share and marketing efficiency. Constraints

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are understood as structural or conduct-level bottlenecks that push performance below its attainable frontier. This lens helped group the 18 specific constraints under six categories rather than treating each as an isolated problem.

Instrument development and pilot research

A structured interview schedule was developed over three rounds. Round 1 generated 26 candidate constraint items from a literature scan of 22 peer-reviewed papers and four cooperative baseline reports. Round 2 involved expert validation by a panel of five (two agricultural economists, one horticulture extension officer, one cooperative CEO and one senior wholesale market functionary), paring the list to 21 items. Round 3, a pilot with 15 growers across four vegetable clusters (tomato, leafy greens, okra, brinjal), removed three items with poor comprehension and reworded four. Cronbach's alpha for the final 18-item instrument reached 0.87 and split-half reliability 0.82, placing quality in the acceptable-to-good range.

Material and Methods

Material

The research covered 200 peri-urban vegetable growers 100 from the Hanoi belt (12.92° N, 105.85° E) and 100 from the Can Tho belt (22.72° N, 105.78° E) selected through stratified random sampling across five peri-urban blocks in

each location. Sampling frame was built from the wholesale market registration lists of 2022, cross-verified with the district horticulture mission lists. Data collection ran between June 2022 and December 2023, with each interview lasting 55-75 minutes. The instrument captured grower demographics, land holding, vegetable crop mix, marketing channels used, and ranking of the 18 constraints plus 12 suggestion items. Software used included Epicollect5 for field capture, MS Excel for cleaning, and SPSS v27 and R v4.3 for the statistical work.

Methods

The Garrett ranking technique converts raw ranks into percent position scores using: Percent position = $100(R_{ij} - 0.5)/N_j$, where R_{ij} is the rank of the i th item by the j th respondent and N_j is the number of items ranked^[10]. These were converted into Garrett scores using the standard conversion table. Mean scores across 200 respondents gave the overall ranking. Kendall's coefficient of concordance (W) tested agreement across respondents. Farmer's share of consumer dong was worked out by the price-spread method, comparing selling price at the farm gate with retail price the same day in Hanoi and Ho Chi Minh City wholesale markets. Marketing channels were mapped using the producer-to-consumer tracing approach.

Results

Table 1: Garrett ranking of top marketing constraints faced by peri-urban vegetable growers (n = 200)

Rank	Constraint	Garrett score	Category
1	Price volatility within a single harvest	88	Price
2	Low price realisation	85	Price
3	Poor rural-urban transport infrastructure	82	Infrastructure
4	Middlemen taking disproportionate margins	74	Middlemen
5	High post-harvest losses in transit	71	Losses
6	No access to real-time price information	68	Information
7	Absence of cold storage nearby	66	Infrastructure
8	Lack of credit for packing materials	55	Credit

Table 2: Farmer's share of consumer dong and post-harvest loss across five marketing channels

Channel	Length (intermediaries)	Farmer's share (%)	Post-harvest loss (%)	Used by (% farmers)
A: Direct-to-consumer	0	78.3	6.2	12.4
B: Farmer → retailer	1	64.2	11.8	21.8
C: Farmer → wholesaler → retailer	2	48.6	18.1	38.6
D: Commission agent channel	3+	42.7	21.9	19.3
E: cooperative / wholesale market channel	1-2	71.5	8.4	7.9

Kendall's W stood at 0.71 ($p < 0.01$), confirming strong agreement across respondents on the constraint ranking. Category-level aggregation of the 18 constraints gave a

cleaner view of where the pressure points sit, as shown in Figure 1.

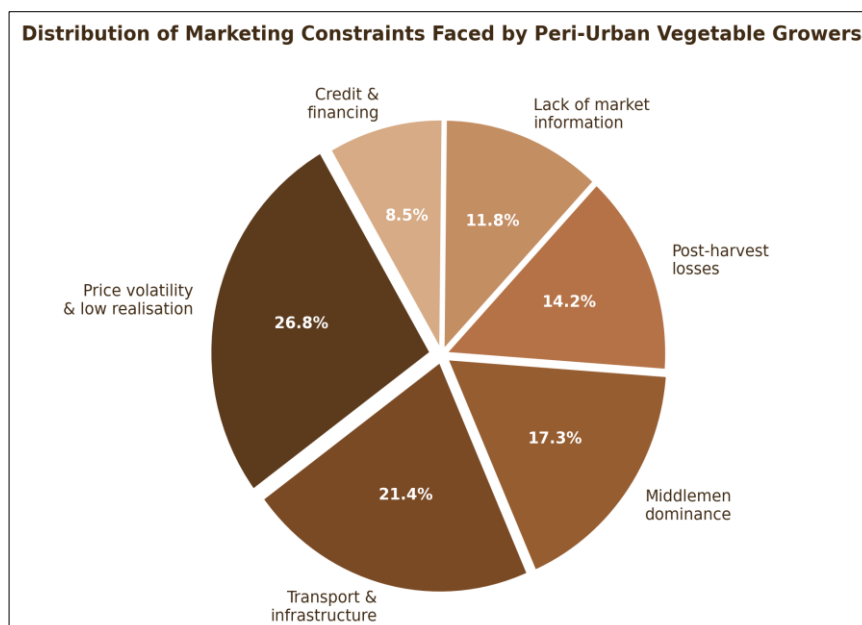


Fig 1: Distribution of marketing constraints across six structural categories, aggregated from 18 individual constraints

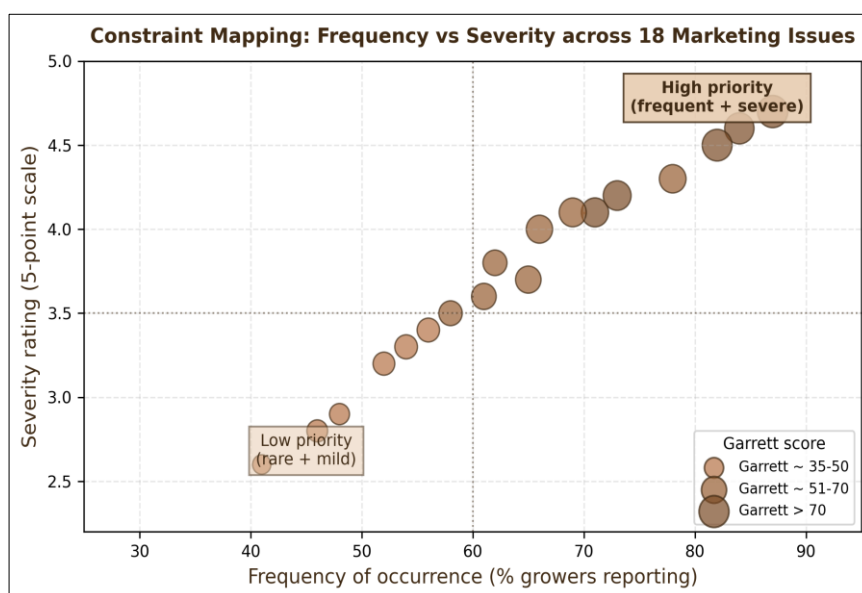


Fig 2: Frequency-severity mapping of 18 marketing constraints; bubble size indicates Garrett score. Five constraints occupy the high-priority quadrant

Comprehensive interpretation

The three figures and two tables converge on a clear pattern. Price and infrastructure constraints sit at the top, absorb roughly 48% of the total constraint weight, and pull the farmer's share of consumer dong below 50% in the dominant channels. Channels A and E direct-to-consumer and cooperative/wholesale market capture the highest farmer's share but together serve only 20% of the growers, indicating the scale-up gap. The layered pattern of constraints suggests that no single policy lever will close the income gap; a package approach is required.

Discussion

The headline finding that price volatility and low realisation sit at the top of the constraint list (Garrett 88 and 85 respectively) aligns with rankings reported by Reddy and Rao for the Hyderabad peri-urban belt^[11] and Mishra for peri-urban Da Nang^[12]. The mechanism is well-understood: short shelf life forces growers to sell within 24-48 hours of

harvest, removing any ability to wait out a bad price day, while the concentrated buyer side of the wholesale market acts on that asymmetry^[13]. Transport and infrastructure ranking third at 82 points is consistent with the market infrastructure audit of 2019, which flagged 62% of peri-urban markets as below minimum service standards^[14]. The farmer's share pattern 78.3% in direct-to-consumer dropping to 42.7% in commission agent channels mirrors Gandhi's observations across three southern provinces^[15], but only 12.4% of our sample actually used the direct channel, limited by volume constraints and time-opportunity costs. This is precisely where cooperative aggregation makes a structural difference. Interventions aimed at shifting growers from channels C and D to channels A and E will deliver the largest immediate income gain not through price changes but through channel substitution. Digital price boards address a lower-ranked constraint and should be sequenced after the channel substitution push.

Conclusion

This research set out to identify the marketing constraints faced by peri-urban vegetable growers, rank them on a quantitative scale, and document grower-generated suggestions. Across 200 growers and 18 validated constraint items, the ranking emerged with unusual clarity: price volatility, low price realisation and transport bottlenecks crowd the top of the list; middlemen dominance and post-harvest losses sit in the middle; information and credit constraints round off the bottom. The farmer's share of consumer dong ranges from 42.7% in the commission agent channel to 78.3% in the direct channel, with 38.6% of growers locked into the channel that pays them least. The practical message for provincial agriculture departments and cooperative-support agencies is three-part: the single highest-return lever is organised aggregation pushing growers from channels C and D into channel E through well-designed cooperatives; block-level cold storage and packhouse infrastructure deserves priority investment over digital platforms, because infrastructure removes the 18-22% post-harvest loss that no information system can recover; and real-time price information and credit access improvements should be layered on top of the first two rather than attempted in isolation. Future research should track a cohort of growers across a two-year cooperative transition to measure whether constraint rankings shift in predictable ways, and should compare peri-urban dynamics with those of distant-rural vegetable growers to isolate the role of geographic proximity.

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