GMR
The Original

VALUE CHAIN DYNAMICS AND MARKETING EFFICIENCY OF BLACK PEPPER IN KOLLI HILLS, TAMIL NADU

Kalai Chezhiyan Kalidoss[1], Periasami Nagappan[2*], Indhushree A[3], Sathees Kumar Kathirvel[4], Juhi Pratiksha Udaya Chandran[5]

[1]PG Scholar, Department: Department of Agricultural Economics, SRM College of Agricultural Sciences, ORCID ID:- 0009-0001-3442-0543, Email ID: chezhiyan3119@gmail.com
[2*]Assistant Professor,Department of Agricultural Economics, SRM College of Agricultural Sciences, ORCID ID:- 0000-0002-7351-1560, Email ID: samieconomics@gmail.com
[3]Assistant Professor, Department of Agricultural Economics, University / Institution Name: SRM College of Agricultural Sciences, ORCID ID:- 0000-0001-5332-4955, Email ID: indhusha@srmist.edu.in
[4]Assistant Professor, Department of Basic Sciences, SRM College of Agricultural Sciences, ORCID ID:- 0000-0003-0060-2645, Email ID: satheesamma55@gmail.com
[5]PG Scholar, Department of Agricultural Economics, SRM College of Agricultural Sciences, ORCID ID:- 0009-0002-1788-5549, Email ID: juhipratiksha@gmail.com

ABSTRACT:
Black pepper (Piper nigrum L.) is one of India's most important spice crops, contributing significantly to rural livelihoods and the spice economy. However, inefficient marketing systems and the presence of multiple intermediaries often reduce producers' share in the consumer's expenditure, particularly in remote hill regions such as Kolli Hills, Tamil Nadu. This study analysed the value chain structure and marketing efficiency of black pepper with the objectives of identifying marketing channels, estimating stakeholder-wise marketing costs, analysing price spread and producer's share in the consumer's rupee, and evaluating the marketing efficiency of alternative marketing channels. Primary data were collected from 90 respondents, comprising 60 black pepper farmers, 15 wholesalers and 15 retailers, through a structured interview schedule during 2025. Value chain mapping, marketing cost analysis, price spread analysis, producer's share in the consumer's rupee and Acharya's Modified Measure of Marketing Efficiency (MME) were employed for the analysis. The study identified five marketing channels, with the Producer → Village Trader → Wholesaler → Retailer → Consumer channel emerging as the predominant marketing route. Marketing costs and price spread increased with the number of intermediaries, whereas the producer's share in the consumer's rupee and marketing efficiency improved in shorter marketing channels. The Producer → Consumer channel recorded the highest producer's share (87.83%) and marketing efficiency (MME = 7.22), while the value-added processing channel exhibited the lowest producer's share (54.74%) and marketing efficiency (MME = 1.21) because of higher processing and marketing costs. The findings suggest that strengthening Farmer Producer Organizations (FPOs), promoting direct marketing, improving rural marketing infrastructure and encouraging farmer participation in value addition can substantially enhance marketing efficiency, increase producers' income and strengthen the competitiveness of the black pepper value chain in Kolli Hills.

KEYWORDS: Black pepper; Value chain; Marketing channels; Marketing cost; Price spread; Producer's share in consumer's rupee; Marketing efficiency; Acharya's Modified Measure; Kolli Hills; Tamil Nadu.

INTRODUCTION

ABlack pepper (Piper nigrum L.), known as the "King of Spices," is one of the world's oldest and most valuable spice crops. It occupies a prominent position in international spice trade because of its extensive use in food processing, pharmaceuticals, nutraceuticals, cosmetics, and traditional medicine. Owing to its distinctive flavour, aroma and bioactive compounds, black pepper remains an indispensable ingredient in both domestic consumption and export markets. The crop contributes significantly to farm income and rural employment in many tropical countries, particularly in Asia, where climatic conditions are highly favourable for its cultivation. Global demand for black pepper has remained strong due to expanding food industries, changing consumer preferences for natural products, and increasing awareness of the health-promoting properties of spices (FAO, 2024; International Pepper Community [IPC], 2024).

India is recognized as the centre of origin of black pepper and has played a historic role in the global spice trade for centuries. Although countries such as Vietnam, Brazil and Indonesia have emerged as major exporters in recent decades, India continues to be an important producer of high-quality black pepper, particularly for premium domestic and export markets. Black pepper cultivation is concentrated mainly in the states of Kerala, Karnataka and Tamil Nadu, where the crop is predominantly grown under plantation and agroforestry systems. In Tamil Nadu, Kolli Hills of Namakkal district constitute one of the most important pepper-growing regions because of their favourable altitude, humid climate and rich indigenous farming knowledge. The crop serves as a major source of livelihood for tribal farming households and contributes substantially to household income through both fresh and processed pepper marketing (Spices Board, 2024; ICAR–Indian Institute of Spices Research [ICAR-IISR], 2024).

Despite its economic significance, black pepper cultivation is increasingly influenced by changing market structures, rising input costs, labour scarcity, quality requirements and fluctuations in market prices. While considerable attention has traditionally been devoted to improving productivity through technological interventions, the profitability realized by farmers depends not only on production but also on the efficiency with which the produce moves through the marketing system. The presence of multiple intermediaries, differences in marketing costs, inadequate market information and limited direct market access often reduce the share of the final consumer price received by producers. Consequently, understanding the functioning of agricultural value chains has become essential for improving farmers' income and enhancing the competitiveness of agricultural commodities in domestic and international markets (Porter, 1985; Kaplinsky & Morris, 2001; FAO, 2023).

A value chain represents the complete sequence of activities and actors involved in moving an agricultural product from production to final consumption while creating value at successive stages. In agricultural commodities, the value chain encompasses input suppliers, producers, assemblers, traders, wholesalers, processors, retailers and consumers, each performing specific functions that influence product quality, marketing costs, value addition and price realization. Efficient value chain coordination improves market access, reduces transaction costs, enhances product quality and strengthens income distribution among stakeholders. Conversely, weak coordination, excessive intermediation and inefficient marketing practices increase marketing costs and widen the gap between producer and consumer prices (Kaplinsky & Morris, 2001; Gereffi et al., 2005).

Marketing efficiency is one of the most important indicators of value chain performance because it reflects how effectively agricultural commodities are transferred from producers to consumers with minimum marketing costs and margins. An efficient marketing system enables farmers to retain a larger proportion of the consumer's expenditure while ensuring that marketing services are provided at reasonable cost. Indicators such as marketing cost, marketing margin, price spread, producer's share in the consumer's rupee and modified marketing efficiency provide valuable insights into the economic performance of alternative marketing channels. These indicators also help identify opportunities for reducing transaction costs and improving the overall efficiency of agricultural marketing systems (Acharya & Agarwal, 2019).

Recent policy initiatives have increasingly emphasized strengthening agricultural value chains as a pathway to improving farmers' income, enhancing market integration and promoting sustainable rural development. In India's spice sector, collaborative initiatives involving the Food and Agriculture Organization (FAO), the Spices Board of India and other development agencies have focused on improving market linkages, quality assurance, traceability and stakeholder coordination. These interventions recognize that enhancing production alone is insufficient unless supported by efficient value chain systems capable of delivering higher returns to producers (FAO, 2023; Spices Board, 2024).

Several studies have examined the production economics and marketing of black pepper in different regions of India. However, empirical evidence on the functioning of black pepper value chains in tribal hill ecosystems remains limited. Existing studies have largely concentrated on production practices or conventional marketing analysis, with relatively less attention devoted to understanding the interactions among value chain actors, the comparative performance of alternative marketing channels and the distribution of consumer prices among stakeholders. In particular, comprehensive stakeholder-based analyses using primary data from farmers, wholesalers and retailers are scarce for the Kolli Hills region. Such information is essential for identifying efficient marketing pathways and formulating strategies to improve farmers' participation in remunerative markets.

Kolli Hills represents a unique agro-ecological and socio-economic production system where black pepper cultivation forms an integral component of tribal livelihoods. Farmers market their produce through multiple channels involving village traders, wholesalers, retailers and direct consumer sales, each differing in the number of intermediaries, marketing costs and price realization. Evaluating the relative performance of these marketing channels is therefore important for identifying economically efficient marketing arrangements that can enhance producers' income while reducing unnecessary transaction costs.

The present study examines the value chain dynamics and marketing efficiency of black pepper in Kolli Hills, Tamil Nadu. Specifically, the study aims to identify the major stakeholders and marketing channels involved in the black pepper value chain, estimate the marketing costs incurred by different stakeholders across alternative marketing channels, analyse the price spread and producer's share in the consumer's rupee, evaluate the relative marketing efficiency of the identified marketing channels, and suggest appropriate policy measures for strengthening the efficiency, competitiveness and sustainability of the black pepper value chain in the study area.

2. METHODOLOGY

2.1 Study Area

The present study was conducted in Kolli Hills of Namakkal district, Tamil Nadu, one of the major black pepper-growing regions of the Eastern Ghats. Kolli Hills was purposively selected because black pepper is a major commercial spice crop cultivated by tribal farmers under agroforestry systems and serves as an important source of livelihood in the region. The area is situated at an elevation of about 1,000-1,300 m above mean sea level and receives an average annual rainfall of 1,200-1,400 mm, providing favourable agro-climatic conditions for black pepper cultivation. Four major pepper-growing villages, namely Vaalavanthi Nadu, Devanoor Nadu, Ariyur Nadu and Thinnanur Nadu, were purposively selected based on their larger area under black pepper cultivation and higher concentration of pepper growers, representing the major production and marketing activities in Kolli Hills.

2.2 Sampling Design and Data Collection

A multistage sampling technique was adopted for the study. In the first stage, Kolli Hills was purposively selected owing to its prominence as one of the major black pepper-producing regions in Tamil Nadu. Subsequently, four major black pepper-growing villages, namely Vaalavanthi Nadu, Devanoor Nadu, Ariyur Nadu and Thinnanur Nadu, were purposively selected based on the extent of black pepper cultivation and the concentration of pepper growers. In the final stage, a total of 90 respondents, comprising 60 black pepper farmers, 15 wholesalers and 15 retailers, were selected through proportionate random sampling. Primary data were collected through personal interviews using a pre-tested and structured interview schedule.

3. Analytical Framework

The analytical framework was designed to evaluate the structure and economic performance of the black pepper value chain. The analysis involved four components: (i) identification of value chain actors and mapping of marketing channels, (ii) estimation of stakeholder-wise marketing costs, (iii) assessment of price spread and producer's share in the consumer's rupee, and (iv) evaluation of the marketing efficiency of different marketing channels.

3. 1 Analytical Tools

3.1.1 Marketing Cost

Marketing cost refers to the expenses incurred in moving black pepper from the producer to the point of sale. It includes expenditure on post-harvest processing, grading, packaging, transportation, loading, unloading, storage, weighment and other marketing operations.

$$MC = \sum C_i$$

Where:
MC = Total marketing cost
Ci = Individual marketing cost component

3.1.2 Marketing Margin

Marketing margin represents the difference between the sale price and purchase price of an intermediary after accounting for marketing costs.

$MM=SP-(PP+MC)$

Where:
MM = Marketing margin
SP = Selling price
PP = Purchase price
MC = Marketing cost

3.1.3 Price Spread

Price spread refers to the difference between the price paid by the final consumer and the net price received by the producer. It represents the cumulative effect of marketing costs and margins of all intermediaries participating in the marketing channel.

$PS=CP-NPR$

Where:
PS = Price spread
CP = Consumer price
NPR = Net price received by the producer

3.1.4 Producer's Share in the Consumer's Rupee

Producer's share indicates the proportion of the consumer's expenditure retained by the producer after deducting marketing costs.

Producer Share in Consumer's Rupee (%)$=\frac{NP}{CP} \times 100$

Where:
NP = Net price received by the producer
CP = Consumer price

3.1.5 Marketing Efficiency

Marketing efficiency was estimated using Acharya's Modified Measure of Marketing Efficiency (MME) (Acharya & Agarwal, 2019).

$$MME = \frac{NP}{MC + MM}$$

where:
MME = Modified marketing efficiency
NP = Net price received by the producer

MC = Total marketing cost
MM = Total marketing margin
A higher MME value indicates a more efficient marketing channel, implying that a larger proportion of the consumer's expenditure reaches the producer relative to the marketing costs and intermediary margins incurred.

4. RESULTS AND DISCUSSION

4.1 Structure of the Black Pepper Value Chain

The marketing channels identified in the black pepper value chain of Kolli Hills, Tamil Nadu. The survey revealed five alternative marketing channels through which black pepper is marketed from producers to consumers. Among these, Channel I (Producer → Village Trader → Wholesaler → Retailer → Consumer) was the dominant marketing route, indicating that the majority of farmers relied on village traders as the primary point of sale because of their accessibility, immediate procurement and established market linkages. Channel II enabled farmers to market their produce directly to wholesalers, thereby reducing one level of intermediation. Channel III involved direct sales from producers to retailers, while Channel IV represented direct marketing from producers to consumers, eliminating all intermediaries and offering greater potential for improving farmers' price realization. A distinctive feature of the value chain was Channel V, in which wholesalers performed value addition by cleaning, grading, grinding and packaging dried black pepper into black pepper powder before supplying retailers. Unlike the conventional marketing channels, this route incorporated post-harvest processing that enhanced the market value of the product and generated additional returns for downstream stakeholders. The existence of multiple marketing channels reflects the diversity of marketing strategies adopted by black pepper growers in Kolli Hills and provides the basis marketing efficiency of alternative channels.

Table 1. Marketing Channels Identified in the Black Pepper Value Chain of Kolli Hills, Tamil Nadu

Channel	Marketing Channel	Marketed Volume (%)
I	Producer → Village Trader → Wholesaler → Retailer → Consumer	78
II	Producer → Wholesaler → Retailer → Consumer	26
III	Producer → Retailer → Consumer	11
IV	Producer → Consumer	7
V	Producer → Village Trader → Wholesaler (Processing into Black Pepper Powder) → Retailer → Consumer	8
	Total	100

3.2 Costs Incurred by Stakeholders Across Alternative Marketing Channels

The marketing costs incurred by farmers across the four identified marketing channels for black pepper in Kolli Hills is presented in Table 2. The results reveal considerable variation in marketing costs depending on the marketing channel adopted and the number of marketing operations performed before the produce reaches the buyer. The cost of production remained constant at ₹24,412 per quintal across all channels, whereas farmers' selling prices increased progressively from ₹60,000 per quintal in Channel I to ₹81,000 per quintal in Channel IV, indicating that shorter marketing channels enabled farmers to obtain higher prices. Among the channels, Channel I (Producer → Village Trader → Wholesaler → Retailer → Consumer) recorded the highest total marketing cost (₹8,000/qtl) because farmers incurred substantial expenditure on post-harvest processing, grading, transportation, loading and unloading before selling their produce. Grading (21.25%), post-harvest processing (23.12%) and transportation (18.75%) together accounted for a major share of the total marketing cost, reflecting the importance of maintaining product quality and transporting produce through a longer marketing chain. The total marketing cost declined to ₹7,600/qtl in Channel II, where farmers marketed their produce directly to wholesalers. Transportation constituted the largest cost component (28.95%), followed by grading (17.76%) and packaging (13.16%). The elimination of village traders reduced overall handling expenses, thereby lowering the total marketing cost compared with Channel I. Channel III (Producer → Retailer → Consumer), the total marketing cost further decreased to ₹6,500/qtl. Although farmers continued to incur expenses on grading, transportation and loading operations, the reduced number of intermediaries minimized marketing expenses and improved farmers' net returns. This channel generated a net income of ₹37,088 per quintal, which was substantially higher than that obtained in Channels I and II.

The lowest marketing cost (₹1,950/qtl) was observed in Channel IV (Producer → Consumer), where farmers sold directly to consumers without intermediary participation. Transportation represented the largest share of the marketing cost (41.03%), followed by grading (25.64%), while loading and unloading costs were completely eliminated. Consequently, direct marketing generated the highest net income of ₹54,638 per quintal, demonstrating the economic advantage of reducing intermediary participation in the marketing process. Overall, the findings indicate that farmers' marketing costs decline as the number of intermediaries decreases, resulting in improved net income and greater price realization. Direct marketing emerged as the most profitable marketing option because it minimized marketing expenses while enabling farmers to receive the highest selling price. These results highlight the importance of strengthening direct market linkages and improving market access to enhance farmers' income and overall marketing efficiency in the black pepper value chain.

Table 2. Marketing Cost Incurred by Farmers in Different Marketing Channels (₹/Qtl)

Sl.	Particulars	Channel I	Channel II	Channel III	Chann

No.					el IV
1	Cost of Production (₹/Qtl)	24,412	24,412	24,412	24,412
2	Farmer's Selling Price (₹/Qtl)	60,000	63,500	68,000	81,000
3	Post-harvest Processing	1,850 (23.12)	350 (4.61)	500 (7.69)	250 (12.82)
4	Packaging	350 (4.38)	1,000 (13.16)	350 (5.38)	200 (10.26)
5	Grading	1,700 (21.25)	1,350 (17.76)	1,350 (20.77)	500 (25.64)
6	Transportation	1,500 (18.75)	2,200 (28.95)	1,150 (17.69)	800 (41.03)
7	Loading	1,000 (12.50)	1,000 (13.16)	1,150 (17.69)	–
8	Unloading	850 (10.62)	850 (11.18)	1,150 (17.69)	–
9	Weighment	350 (4.38)	500 (6.58)	500 (7.69)	100 (5.13)
10	Physical Loss	170 (2.12)	350 (4.61)	350 (5.38)	100 (5.13)
11	Others	230 (2.88)	–	–	–
Total Marketing Cost (₹/Qtl)		8,000	7,600	6,500	1,950
Net Income of Farmer (₹/Qtl)		27,588	31,488	37,088	54,638

(Figures in parentheses indicate percentage to total)

3.3 Price Spread Across Alternative Marketing Channels

The price spread across the four alternative marketing channels for black pepper in Kolli Hills. The results indicate that the price spread declined with a reduction in the number of intermediaries involved in the marketing process. Channel I recorded the highest price spread (₹38,000/qtl; 42.22% of the consumer's price) owing to the participation of village traders, wholesalers and retailers, which increased both marketing costs and intermediary margins. In contrast, Channel IV (Producer → Consumer) exhibited the lowest price spread (₹10,950/qtl; 12.17%) as direct marketing eliminated intermediary costs and margins. The net price received by farmers increased progressively from ₹52,000/qtl in Channel I to ₹79,050/qtl in Channel IV, resulting in a corresponding increase in the producer's share in the consumer's rupee from 57.78% to 87.83%. Similarly, total marketing costs declined from ₹18,200/qtl in Channel I to ₹1,950/qtl in Channel IV, demonstrating the economic advantage of shorter marketing channels. Overall, the findings suggest that reducing intermediary participation substantially improves farmers' price realization by lowering marketing costs and price spread. Direct marketing emerged as the most efficient channel, enabling producers to retain the highest share of the consumer's expenditure while minimizing transaction costs. These results highlight the importance of promoting direct market linkages to enhance the efficiency and profitability of the black pepper value chain in Kolli Hills.

Table 3. Price Spread Across Alternative Marketing Channels of Black Pepper in Kolli Hills, Tamil Nadu (₹/Qtl)

Sl.No	Particulars	Channel I	Channel II	Channel III	Channel IV
1	Farmer's Sale Price	60,000 (66.67)	63,500 (70.56)	68,000 (75.56)	81,000 (90.00)
2	Farmer's Marketing Cost	8,000 (8.89)	7,600 (8.44)	6,500 (7.22)	1,950 (2.17)
3	Net Price Received by Farmer	52,000 (57.78)	55,900 (62.11)	61,500 (68.33)	79,050 (87.83)
4	Village Trader's Purchase Price	60,000 (66.67)	—	—	—
5	Village Trader's Marketing Cost	1,200 (1.33)	—	—	—
6	Village Trader's Sale Price	65,000 (72.22)	—	—	—
7	Village Trader's Net Margin	3,800 (4.22)	—	—	—
8	Wholesaler's Purchase Price	65,000 (72.22)	63,500 (70.56)	—	—
9	Wholesaler's Marketing Cost	3,500 (3.89)	4,000 (4.44)	—	—

10	Wholesaler's Sale Price	71,000 (78.89)	70,000 (77.78)	—	—
11	Wholesaler's Net Margin	2,500 (2.78)	2,500 (2.78)	—	—
12	Retailer's Purchase Price	71,000 (78.89)	70,000 (77.78)	68,000 (75.56)	—
13	Retailer's Marketing Cost	5,500 (6.11)	5,400 (6.00)	5,500 (6.11)	—
14	Retailer's Net Margin	13,500 (15.00)	14,600 (16.22)	16,500 (18.33)	—
15	Consumer's Price	90,000 (100.00)	90,000 (100.00)	90,000 (100.00)	90,000 (100.00)
16	Total Marketing Cost	18,200 (20.22)	17,000 (18.89)	12,000 (13.33)	1,950 (2.17)
17	Total Marketing Margin	19,800 (22.00)	17,100 (19.00)	16,500 (18.33)	—
18	Price Spread	38,000 (42.22)	34,100 (37.89)	28,500 (31.67)	10,950 (12.17)
19	Producer's Share in Consumer's Rupee (%)	57.78	62.11	68.33	87.83

3.4 Producer's Share in the Consumer's Rupee

The producer's share in the consumer's rupee across the five alternative marketing channels of black pepper in Kolli Hills in Table 4. The results show that the producer's share increased as the number of intermediaries decreased. Channel IV (Producer → Consumer) recorded the highest producer's share (87.83%) and ranked first, indicating that direct marketing enabled farmers to retain the largest proportion of the consumer's expenditure by eliminating intermediary costs and margins. This was followed by Channel III (68.33%), Channel II (62.11%), and Channel I (57.78%), reflecting the adverse effect of additional intermediaries on farmers' price realization. Channel V recorded the lowest producer's share (54.74%) despite the higher consumer price of processed black pepper. This is because the additional value created through cleaning, grading, grinding and packaging accrued to downstream market participants after the produce left the farm, while farmers continued to sell dried black pepper at the farm level. Consequently, the benefits of value addition were captured primarily by intermediaries rather than producers. Overall, the findings demonstrate that direct marketing substantially enhances farmers' share in the consumer's expenditure, whereas longer and value-added marketing channels reduce the producer's share due to higher marketing costs and intermediary margins. Strengthening direct market linkages and enabling farmers to participate in value addition could further improve income distribution and enhance the efficiency of the black pepper value chain in Kolli Hills.

Table 4. Producer's Share in the Consumer's Rupee Across Alternative Marketing Channels of Black Pepper in Kolli Hills, Tamil Nadu

Sl. No.	Marketing Channel	Net Price Received by Farmer (₹/Qtl)	Consumer's Price (₹/Qtl)	Producer's Share (%)	Rank
1	Channel V	52,000	95,000	54.74	V
2	Channel I	52,000	90,000	57.78	IV
3	Channel II	55,900	90,000	62.11	III
4	Channel III	61,500	90,000	68.33	II
5	Channel IV	79,050	90,000	87.83	I

3.5 Marketing Efficiency of Alternative Marketing Channels

The marketing efficiency of the five alternative marketing channels for black pepper in Kolli Hills is presented in Table 5, estimated using Acharya's Modified Marketing Efficiency (MME) Index . The results indicate substantial variation in marketing efficiency across the channels, primarily due to differences in marketing costs, intermediary margins and the net price received by producers. Among the identified channels, Channel IV (Producer → Consumer) recorded the highest marketing efficiency (MME = 7.22) and secured the first rank. The absence of intermediaries minimized marketing costs and price spread, enabling farmers to retain the highest share of the consumer's expenditure. Channel III (MME = 2.16) ranked second, followed by Channel II (MME = 1.64) and Channel I (MME = 1.37), indicating that marketing efficiency declined with the increasing involvement of intermediaries in the supply chain. Channel V recorded the lowest marketing efficiency (MME = 1.21) despite generating a higher consumer price for processed black pepper. The lower efficiency is attributed to the additional costs associated with cleaning, grading, grinding, packaging and processing undertaken by wholesalers, which increased the overall marketing cost and price spread. Although these value-addition activities enhanced the market value of the product and generated higher returns for downstream market participants, they reduced marketing efficiency from the producer's perspective. The findings demonstrate that shorter marketing channels are more efficient because they reduce intermediary costs and improve farmers' net price realization, whereas value-added marketing channels involve higher marketing expenditure but create additional economic value

through product processing. These results highlight the need to strengthen direct marketing opportunities while simultaneously promoting farmer participation in value addition to improve the overall efficiency and sustainability of the black pepper value chain in Kolli Hills.

Table 5. Marketing Efficiency of Alternative Marketing Channels

Sl. No.	Marketing Channel	Net Price Received by Farmer (₹/Qtl)	Marketing Cost + Marketing Margin (₹/Qtl)	Marketing Efficiency (MME)	Rank
1	Channel V	52,000	43,000	1.21	V
2	Channel I	52,000	38,000	1.37	IV
3	Channel II	55,900	34,100	1.64	III
4	Channel III	61,500	28,500	2.16	II
5	Channel IV	79,050	10,950	7.22	I

4. CONCLUSION

The study revealed that the efficiency of the black pepper value chain in Kolli Hills is strongly influenced by the number of intermediaries involved in marketing. Shorter marketing channels reduced marketing costs and price spread while increasing the producer's share in the consumer's rupee and overall marketing efficiency. Among the identified channels, the Producer → Consumer channel was the most efficient, whereas the value-added processing channel recorded the lowest marketing efficiency due to higher processing and marketing costs. The findings emphasize the need to strengthen Farmer Producer Organizations (FPOs), promote direct marketing, improve rural marketing infrastructure and encourage farmer-level value addition to enhance producers' income and ensure a more efficient and sustainable black pepper value chain in Kolli Hills.

REFERENCES

1. Acharya, S. S., & Agarwal, N. L. (2024). Agricultural marketing in India (7th ed.). CBS Publishers & Distributors Pvt. Ltd.
2. Food and Agriculture Organization. (2013). Value chain analysis for policy making: Methodological guidelines and country cases for a quantitative approach. FAO.
3. Food and Agriculture Organization. (2023). Strengthening spice value chain in India and improving market access through capacity building and innovative interventions. FAO.
4. Food and Agriculture Organization. (2025). FAOSTAT statistical database. https://www.fao.org/faostat
5. Kaplinsky, R., & Morris, M. (2001). A handbook for value chain research. Institute of Development Studies, University of Sussex.
6. Porter, M. E. (1985). Competitive advantage: Creating and sustaining superior performance. Free Press.
7. Porter, M. E. (2008). The five competitive forces that shape strategy. Harvard Business Review, 86(1), 78–93.
8. Prabhakaran Nair, K. P. (2009). Agronomy and economy of black pepper: The king of spices. Icfai University Press.
9. Thomas, L., Kuruvilla, A., Meena, M., Remashree, A. B., & Madan, M. S. (2019). Economics, marketing, and export of spices: Status and prospects. In K. L. Chadha & B. Kruger (Eds.), Shaping the future of horticulture (pp. 723–734).
10. Thomas, L., Bhat, A. I., Cheriyan, H., & Nirmal Babu, K. (2019). Value chain development and technology practices of spice crops in India. In P. R. Pandey & I. R. Pandey (Eds.), Challenges and opportunities in value chain of spices in South Asia.
11. ICAR–Indian Institute of Spices Research. (2025). Package of practices for black pepper. ICAR-IISR.
12. ICAR–Indian Institute of Spices Research. (2025). Annual report 2024–25. ICAR-IISR.
13. Spices Board of India. (2025). Spices statistics at a glance. Ministry of Commerce and Industry, Government of India.
14. Spices Board of India. (2025). Export performance of spices. Ministry of Commerce and Industry, Government of India.
15. Spices Board of India. (2025). Black pepper. Ministry of Commerce and Industry, Government of India.
16. Arif, T., Rudrapur, S., Kulkarni, S., & Narayanpur, V. (2026). A comprehensive study on current status of black pepper in India: Insights on area, production, yield, and trade pattern. Journal details pending publication.