

Supply Chain Management of Ginger and Turmeric Crops in Reasi District of Jammu and Kashmir

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Received: 16-09-2024

Revised: 29-11-2024

Accepted: 05-12-2024

ABSTRACT

The present study aimed to examine the supply chain management of ginger and turmeric crops. It is based on data collected from 120 farmers selected from four randomly selected villages of Reasi district. Reasi and Pouni blocks involves multiple channels reflecting varying degrees of complexity and intermediaries. For ginger, there were two primary distribution channels in which Channel I involved the producer selling directly to a local retailer who then sells to the consumer while Channel II featured the producer selling to a collecting trader who subsequently transfers the product to the consumer. Similarly, turmeric also had two distinct channels. Channel I followed a straightforward route where the producer sold directly to a local retailer who then sells to the consumer. Channel II, on the other hand, included additional steps; the producer sells to a processor who adds value to the product before it moves to a retailer and eventually reaches the consumer. For ginger, the price distribution through local retailers and collecting traders showed variations in cost and net margins. Similarly, the turmeric supply chain involved direct sales to retailers and additional processing before reaching the consumer. These insights into supply chain dynamics were vital for developing strategies to reduce costs, improve efficiency and enhance market access for farmers.

Keywords: Supply chain, management, ginger, turmeric, channels

The global spice market is projected to grow from USD 6.21 billion in 2021 to USD 14.51 billion by 2026 at a compound annual growth rate (CAGR) of 6.5%. This growth is driven by the rising demand for authentic cuisines and unique flavors in food and snacks, pushing manufacturers to deliver high-quality products that meet global standards. E-commerce platforms, retail stores and trade networks are the primary distribution channels with modern trade routes like Tesco, Walmart and Kroger contributing to the market's expansion. India, as the world's largest producer, consumer and exporter of spices plays a pivotal role. In 2021-2022, India produced 10.87 million tonnes of spices and exported 1.53 million tonnes with chillies, oleoresins, turmeric and cumin leading the exports. The value of spice

exports between April and February 2023 reached USD 3,332.02 million reflecting a steady CAGR of 10.47% since 2017. The Spices Board of India has initiated efforts to modernize processing, promote organic spices and build infrastructure such as crop-specific spice parks to enhance exports and support farmers. India exports spices to over 180 countries with China, the United States and Bangladesh being top importers (Global Spice Market, 2023). In Jammu and Kashmir, the government has focused on boosting specialty crop production increasing

How to cite this article: Dwivedi, S., Thakur, S., Upadhyaya, L. and Gupta, S. (2024). Supply Chain Management of Ginger and Turmeric Crops in Reasi District of Jammu and Kashmir. *Agro Economist - An International Journal*, 11(3&4): 27-31.

Source of Support: None; **Conflict of Interest:** None



output from 24,068 MT to 26,639 MT and expanding cultivation by an additional 11,000 hectares. These efforts include developing seed villages, nurseries and value chains highlighting the region's potential in contributing to India's dominance in the global spice market (Department of Agriculture, Jammu and Kashmir, 2023). The supply chain of ginger and turmeric involves multiple stages including cultivation, harvesting, post-harvest processing, storage, transportation and marketing. Farmers typically sell fresh produce to intermediaries or local markets which is then processed into dried or powdered forms for retail and export. Efficient supply chain management is crucial to reduce post-harvest losses, maintain quality and ensure a consistent market supply especially given the rising global demand for these spices. Challenges like inadequate storage facilities, price fluctuations and fragmented market linkages often hinder the profitability and sustainability of these crops. The study with an objective to Study the Supply Chain Management of Ginger and Turmeric Crops was undertaken to identify inefficiencies in the supply chain, evaluate the role of stakeholders and develop strategies to enhance the value chain of ginger and turmeric.

METHODOLOGY

Study Area

This study was conducted in the Reasi District of the Jammu region as this district was designated for spices under the One District One Product (ODOP) initiative and was selected purposively.

Sampling Method

Sampling Design: A multistage sampling approach was employed for this investigation. Two blocks from the Reasi district with the largest area and production of turmeric and ginger were purposively selected. Subsequently, two villages were randomly chosen from each selected block. With the assistance of the Sarpanch of the respective villages, a list of farmers cultivating ginger and turmeric was prepared. From this list, 30 farmers cultivating ginger and turmeric were randomly selected from each village resulting in a total of 120 respondents.

Collection of Data

The required information was gathered from primary sources to achieve the objectives of the study. Primary data were collected through in-person interviews with the selected respondents (ginger and turmeric farmers) using a well-structured and pre-tested questionnaire.

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The Multiagent Systems (MAS) approach was used for managing the supply chain, in addition to other tools and models. This approach analyzed the feasibility of adopting various strategies, decision-making approaches and behaviours.

The expression applied was:

$$x_i = -MT(1 - r_i), \text{ for: } i = 1, 2, \dots, n;$$

where r_i is a random exponential number generated by uniform distribution; x_i is a random observation and MT – mean time (for failure or reparation)

RESULTS AND DISCUSSION

Table 1 illustrated the supply channels for ginger and turmeric, outlining the various pathways through which these crops move from producers to consumers.

Table 1: Supply Channels of Ginger and Turmeric in Reasi and Pouni block

Ginger	
Channel I	Producer → Local retailer → Consumer
Channel II	Producer → Collecting Trader → Consumer
Turmeric	
Channel I	Producer → Local retailer → Consumer
Channel II	Producer → Processor → Retailer → Consumer

For ginger, there were two primary distribution channels, Channel I involved the producer selling directly to a local retailer who then sells to the consumer while Channel II featured the producer selling to a collecting trader who subsequently transferred the product to the consumer. Similarly, turmeric also had two distinct channels. Channel I followed a straightforward route where the producer

sells directly to a local retailer who then sells to the consumer. Channel II, on the other hand included additional steps; the producer sells to a processor who adds value to the product before it moved to a retailer and eventually reaches the consumer. This table provided a clear comparison of the distribution methods for both ginger and turmeric highlighting the different intermediaries involved in each supply chain.

Ginger

Price distribution for ginger through different channels was analyzed and presented in Table 2 and Table 3.

Table 2: Price distribution of Ginger through Channel I

Sl. No.	Particulars	Price/quintal
1	Sale price of producer	10500.00
Cost incurred by the producer		
2	Loading charges	50.00
3	Storage losses @0.2 per cent	20.00
	Sub-total	70.00
4	Net sale price	10430.00
	Purchase price of Local Retailer	10500.00
5	Transportation	55.00
6	Packaging (polythene bags)	30.00
7	Storage	45.00
	Sub-total	130.00
8	Total cost borne by retailer	10500 + 10630 130
9	Sale price of retailer/purchase price of consumer	10750.00
	Net margin of retailer	120.00
	Price spread	250.00

For Channel I, where the supply chain was Producer → Local Retailer → Consumer, the producer initially sets a sale price of ₹ 10,500 per quintal. The costs incurred by the producer included loading charges of ₹ 50 and storage losses at ₹ 20 resulting in a net sale price of ₹ 10,430. The local retailer then purchases the ginger at ₹ 10,500 and incurred additional expenses such as transportation (₹ 55), packaging (₹ 30) and storage (₹ 45) leading to a total cost of ₹ 10,630. The retailer sold the ginger to the consumer at ₹ 10,750 securing a net margin

of ₹ 120 and a price spread of ₹ 250. For Channel II, which involved the supply chain from Producer → Collecting Trader → Consumer, the producer's sale price remained ₹ 10,500 per quintal. The costs incurred by the producer include gunny bags/plastic bags (₹ 20), cleaning (₹ 30) and storage losses (₹ 50) leading to per quintal net sale price of ₹ 10,400. The collecting trader then adds costs for storage (₹ 60), transportation (₹ 70) and loading (₹ 40) resulting in a total cost of ₹ 10,670. The trader sold the ginger to the consumer at ₹ 11,000 earning a net margin of ₹ 330 and a price spread of ₹ 500.

Table 3: Price Distribution of Ginger through Channel II

Sl. No.	Particulars	Cost/quintal
1	Sale price of producer	10500.00
Cost incurred by the producer		
2	Gunny bags/plastic bags	20.00
3	Cleaning	30.00
4	Storage losses @ 0.2 per cent	50.00
5	Sub-total	100.00
3	Net sale price	10400.00
Cost incurred by the collecting trader		
6	Storage	60.00
7	Transportation	70.00
8	Loading	40.00
	Sub-total	170.00
9	Total cost borne by trader	10670.00
10	Sale price of trader/purchase price of consumer	11000.00
	Net margin of trader	330.00
	Price spread	500.00

Turmeric

The price distribution of turmeric through two different supply channels, providing a detailed analysis of costs and margins are presented in Table 4 and 5. Channel I, where the supply chain was from Producer → Local Retailer → Consumer. The producer's initial sale price for turmeric was ₹ 2,000 per quintal. The costs incurred by the producer included loading charges of ₹ 30 and storage losses of ₹ 20 resulting in a net sale price of ₹ 1,950. The local retailer then purchased the turmeric at ₹ 2,000 per quintal and added transportation costs of ₹ 45, packaging expenses of ₹ 30 and storage costs

of ₹ 45 culminating in a total cost of ₹ 2,120. The retailer sold the turmeric to the consumer at ₹ 2,200 per quintal resulting in a net margin of ₹ 80 and a price spread of ₹ 200. In Channel II, producer's sale price remained ₹ 2,000 per quintal. After deducting loading charges (₹ 30) and storage losses (₹ 20), net sale price was ₹ 1,950 per quintal. The processor then incurred costs including transportation (₹ 50), boiling (₹ 50), mill charges (₹ 120), electricity (₹ 84) and packaging (₹ 50) leading to a total cost of ₹ 2,354. The processor sold the turmeric to the retailer at ₹ 2,400 earning a net margin of ₹ 46. Retailer added further costs including transportation (₹ 45.83), loading and unloading (₹ 25), packaging (₹ 30) and storage (₹ 52.25) resulting in a total cost of ₹ 2,552. The final sale price to the consumer was ₹ 2,600 yielded a net margin of ₹ 48 and a price spread of ₹ 600.

Table 4: Price distribution of Turmeric through Channel I

Sl. No.	Particulars	Cost/ quintal
1	Sale price of producer	2000.00
Cost incurred by the producer		
2	Loading charges	30.00
3	Storage losses @0.2 per cent	20.00
	Sub-total	50.00
4	Net sale price	1950.00
5	Purchase price of Local Retailer	2000.00
6	Transportation	45.00
7	Packaging (polythene bags)	30.00
8	Storage	45.00
	Sub-total	120.00
9	Total cost borne by retailer	2120.00
10	Sale price of retailer/purchase price of consumer	2200.00
	Net margin of retailer	80.00
	Price spread	200.00

Table 5: Price distribution of Turmeric through Channel II

Sl. No.	Particulars	Cost/ quintal
1	Sale price of producer	2000.00
Cost incurred by the producer		
2	Transportation	0

3	Loading charges	30.00
4	Storage losses @ 0.2 per cent	20.00
	Sub-total	50.00
5	Net sale price	1950.00
Cost incurred by the processor		
6	Transportation cost	50.00
7	Boiling	50.00
8	Mill charges	120.00
9	Electricity charges	84.00
10	Packaging	50.00
	Sub-total	354.00
11	Total cost borne by processor	2354.00
12	Sale price of processor/ purchase price of retailer	2400.00
13	Net margin of processor	46.00
Cost incurred by the retailer		
14	Transportation	45.83
15	Loading and unloading	25.00
16	Packaging (polythene bags)	30.00
17	Storage	52.25
	Sub-total	152.00
18	Total cost borne by retailer	2552.00
19	Sale price of retailer/ purchase price of consumer	2600.00
	Net margin of retailer	48.00
	Price spread	600.00

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