Original Research Article

Value Chain Analysis of Apple in Shimla District of Himachal Pradesh

ABSTRACT

The study sought to acquire extensive insights into the markets and associated marketing strategies within the Shimla district during the year 2021-22. Employing a random sampling technique, a representative sample comprising five traders, five wholesalers, five retailers, and thirty actively engaged consumers in the apple marketing sector was selected. The investigation identified the presence of five distinct marketing channels in the study area. Channel-V, which involves the processing of apples into value-added forms such as jam, wine, and juice, exhibited the most substantial degree of value addition, contributing 55.80 percent to the overall value addition.In the study area, the majority of farmers acquire their inputs from private institutes. A methodically prepared value chain map illustrates the continuous transfer of produce from farmers to consumers. Notably, the wholesale stage experienced the most significant loss, amounting to 4.11 kg per quintal. In the storage of apples, the storage unit gained a profit of 140 Rs per kg, while in the processing of apples, the processing unit it was 13333.59 Rs. per quintal.

Keywords: Value chain, value chain map,processing, value addition, storage.

INTRODUCTION

In the context of the fruit industry, a value chain refers to the sequence of activities and processes involved in the production, distribution and marketing of fruits from the point of cultivation to the point of consumption. This value chain encompasses all the steps necessary to bring fresh or processed fruits to consumers, adding value at each stage of the process. The various steps in the value chain of fruit include production, packing, grading, transportation, wholesaling, retailing and advertising.

The concept of a "Value Chain" was first introduced by Porter in 1985 to outline the complete set of actions necessary for taking a product from its inception through various

stages of production, distribution to consumers and eventual disposal once it's no longer needed. As the product transitions from one entity within the chain to another, it's generally expected to accrue more value (Hellin and Meijer in 2006). Participants in this value chain are input suppliers, farmers, processors, commission agents, wholesalers, retailers and ultimately the end customers.

Despite the rapid growth in apple production in India, the increase in apple exports has not been as substantial. In the 2023–2024 season, total area under apple cultivation in India was 303.56 thousand ha and produced a total of 2,699.39thousand tonnes of apples, with Himachal Pradesh contributing around 22.03 percent of this production (India stat, 2023-24). This issue can be attributed to a deficient supply chain, ineffective marketing strategies and a lack of transparency within the marketing system. These factors have significantly diminished the motivation for apple producers to enhance the quality and productivity of their crops. While improving production is essential, effective marketing also plays a pivotal role in providing crops with a commercial orientation. The existing marketing system in the state tends to favour intermediaries at the expense of apple farmers, redirecting incentives toward them. To address this problem, a comprehensive examination of the apple value chain in Himachal Pradesh is imperative. The current study was conducted in Himachal Pradesh with the primary objective of evaluating the apple value chain.

METHODS

Selection of market and market intermediaries

Given the pivotal role of marketing in the apple production sector, a systematic data collection process was employed to acquire information on apple marketing within the Shimla region. This involved the random selection of five merchants, five wholesalers, five retailers, and a sample size of 30 consumers. The aim was to comprehensively assess various facets of apple marketing in this specific geographical area.

Value Chain Analysis

Value chain analysis is an effective method for locating the main operations that make up an organization's value chain and have the potential to give that business an advantage in the long run.

Processing costs of processed apple

The secondary data were collected from three processing unit in terms of costs incurred annually in processing of apple such as raw material, power and electricity expenses, labour costs, storage costs, staff salaries, depreciation, interest on working capital, etc. for the years 2020-21 and 2021-22. From the data, the per quintal processing cost returns were estimated.

Net Returns (Rs. /Quintal) = Gross returns – Total processing cost

Degree of value addition

Value added is the additional value created by market intermediaries over and above the initial value of the product. In other words, it is a modification made to a product by an individual before giving it for sale to the end customer.

$$\text{Degree of value addition} = \frac{\text{Marketing margin by any intermediaries}}{\text{Purchase price of product}} \times 100$$

RESULT AND DISCUSSION

Functionaries/Actors and their role in apple value chain

The use of fertilizers, plant protection chemicals, apple rootstock and other inputs in apple production exhibits a substantial potential for enhancing the efforts of committed apple farmers. Within the research area, both commercial entities and government organizations function as primary suppliers of these inputs. Private suppliers of inputs for dedicated apple cultivation, for instance, encompass fertilizers, plant protection chemicals and apple rootstock nurseries (e.g., Garbeta, Nischelle, Avo nurseries, etc.). Governmental bodies such as the state Agriculture Department and HIMFED also serve as examples of input providers.

Figure 1 and Table 1, illustrates that a majority of apple growers procure their resources from private companies rather than government agencies. This preference is attributed to the superior quality and reliability in product delivery offered by the former.

Table 1: Sources of selected apple root stock, fertilizers and pesticides for sampled respondents

(Numbers)

Particulars	Apple		
	Root stock	Fertilizer	Plant protection chemicals
Open market	44.00 (73.33)	50.00 (83.33)	52.00 (86.67)
Government agency	16.00 (26.67)	10.00 (16.67)	8.00 (13.33)
Total no. of farmers	60.00 (100.00)	60.00 (100.00)	60.00 (100.00)

Figure in parentheses are percentage to number of farmer

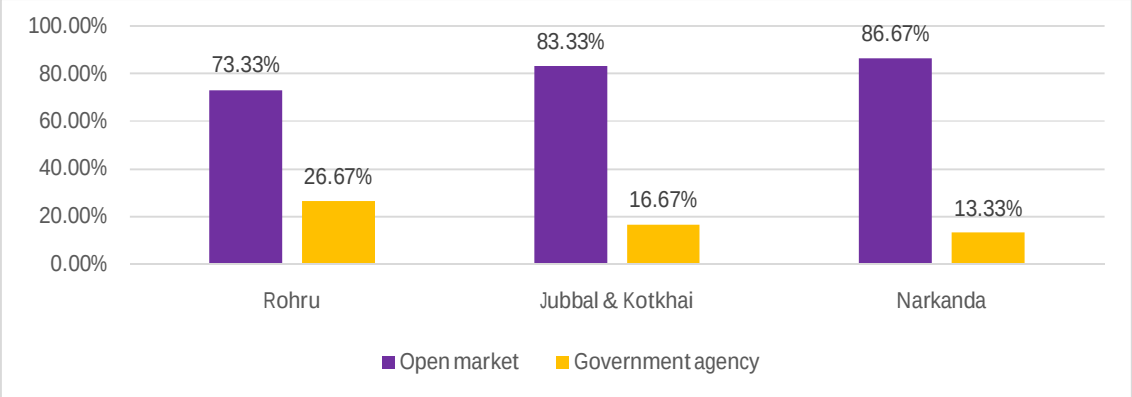

Fig. 1: Source of input of different blocks

Marketing Channels

In the study region, five marketing channels were identified, as presented below:

1. **Channel-I**: Producer → Consumer
2. **Channel-II**: Producer → Commission agent → Wholesaler → Retailer → Consumer
3. **Channel-III:** Producer → Pre-harvester → Commission agent → Wholesaler→ Retailer → Consumer
4. **Channel-IV:** Producer → Retailer→ Consumer
5. **Channel-V:** Producer → Processing unit → Wholesaler → Retailer → Consumer

Value chain of apple in Shimla district of Himachal Pradesh

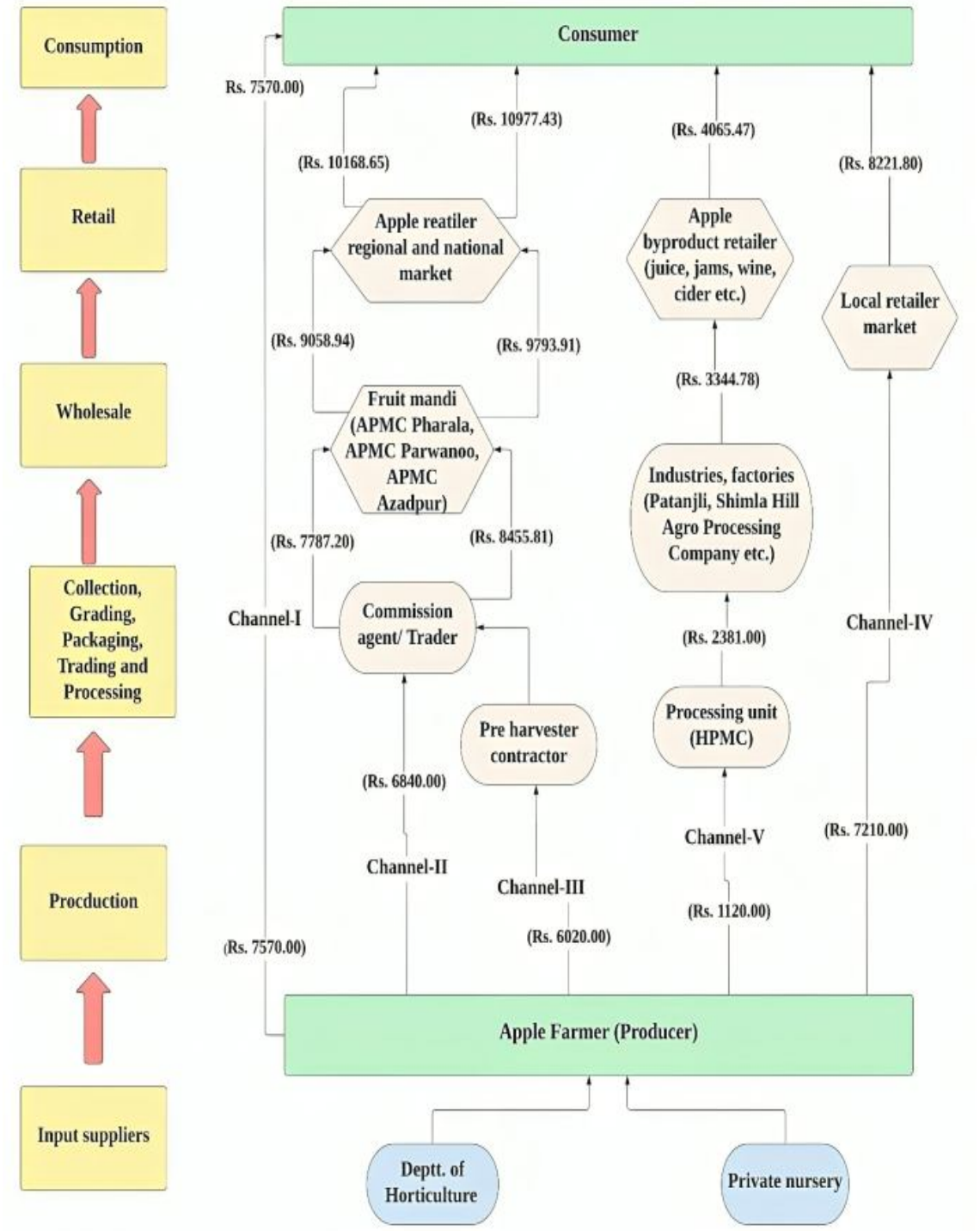

Fig 2: Value chain map of apple in study area

A value chain map for apple fruit represents the comprehensive sequence of activities involved in bringing the product from its initial stages of production through distribution, consumption and eventual disposal. This map highlights the various actors or participants

involved in this process and their interconnected roles. These participants may include input suppliers, farmers, processors, wholesalers, retailers and the end consumers. The map serves to emphasize the value-adding steps and the intricate linkages among these actors, providing valuable insights into the apple value chain. For visual reference, consider using a diagram or flowchart to illustrate the key stages and players in the apple value chain.

Physical post-harvest losses of Apple:

Table 2 provides an overview of post-harvest losses incurred in the study area concerning apple production. At the farm level, there was a cumulative loss of 2.41 kg per quintal, with the primary contributing factor being the presence of small-sized and immature fruit. In the pre-harvest stage, a total loss of 2.01 kg per quintal was observed, primarily attributed to the absence of adequate storage facilities. Among commission agents, the overall loss amounted to 2.12 kg per quintal, with the primary cause being insufficient storage infrastructure.

The most significant loss, amounting to 4.11 kg per quintal, occurred within the wholesale stage, as they are involved in extensive distribution throughout the country. On the other hand, retailers experienced a total loss of 1.06 kg per quintal.

Table 2: Physical post-harvest losses in apple

Intermediaries	**Particular**	**Losses in Kg/quintal**
Producer		
i.	Immature fruits/Small	1.07
ii.	Cracks and Canker	0.48
iii.	Harvesting injury	0.86
	Total	2.41
Pre-harvester		
i.	Storage loses	0.92
ii.	Rotten fruit	0.73
iii.	Crushed fruits	0.36
	Total	2.01
Commission agent		
i.	Storage loses	0.79
ii.	Rotten fruit	0.65
iii.	Crushed fruits	0.68
	Total	2.12
Wholesaler		

i.	Physical damage during transportation	0.95
ii.	Physiological weight loss (dryness)	1.21
iii.	Rotten fruits	1.95
	Total	4.11
Retailer		
i.	Physically damaged fruit	0.45
ii.	Rotten fruit	0.39
iii.	Transportation losses	0.42
	Total	1.06

As evident from the above that the significant losses experienced throughout various stages of Apple marketing. To address these issues, it is recommended to enhance storage facilities and implement processing methods for apples. The processing of apple would enable the utilization of C-grade apples, potentially mitigating losses.

Storage of apple

Storage is a key marketing function that involves holding and conserving commodities from the moment they are produced until they are consumed. Storage is a human foresight effort in which goods are kept from degradation and surplus supplies in times of abundance are carried over to seasons of scarcity. As a result, the storage function provides time utility to items.To overcome the losses due to insufficient storage facility, it is important to study about the economics of apple storage in study region.

Cost and returns from apple storage

The Table 3, clearly depicted that storage cost of a box of apple was Rs. 40 for 1 month and Rs. 360 for 8 months, thereby, the market price of a box of apple was Rs. 1500 before storage and Rs. 2000 after storage. Hence, the gross return was Rs. 500 and net return was Rs. 140.

Table 3: Cost and return from the apple storage

(Rs. / Box)

S.No.	Particular	Rs. per box
1	Market Price (Before storage)	1500.00
2	Selling price (After storage)	2000.00
3	Storage cost	360.00 (40/month, for 8 month)
4	Gross return	500.00

5	Net return	140.00

Economics of apple processing

Economics of apple processing is presented in Table 4. The capacity utilization of plant worked out to be 78.75 per cent which implies that of the total capacity of plant (100 %) only 78.75 per cent was used. The revenue realized out of final product viz. Concentrated Apple Juice (CAJ) worked out to Rs. 15120.00 per quintal. Plant generated profit of Rs. 13333.59 per quintal. Overall, the data shows that the processing unit was not completely utilised to its installed capability due to the state electrical board's inability to provide continuous power supply. Utilizing the facility to its full potential will not only lower the cost of apple juice concentrate production and boost net returns, but will also help the producers (orchardists) by utilising their apple culls.

Table 4: Economics of apple processing

(Rs. / Quintal)

Sr. No.	Particular	2021-22
1	Capacity utilized (%)	78.75
2	Apple juice recovery	15120.00
3	Total processing cost	1786.41
4	Net returns	13333.59

Degree of value addition

The degree of value addition on the selected fruit crop was analysed and is shown in Table 5. The degree of value addition in channel-II at the commission agent stage was 4.09 per cent as they performed grading, transportation and loading/unloading operations, which added up to the value. Wholesalers add 2.82 per cent of value, whereas retailers add 2.75 per cent by performing activities such as transportation, loading/unloading, and retailing. In the case of channel-III, the degree of value addition at the pre-harvester stage was 5.78 per cent since they performed the activities like packing, grading, transporting, and loading/unloading operations, which resulted in the value getting added.The commission agent adds 3.20 per cent of value, the wholesaler adds 2.36 per cent, and the retailer adds 2.55 per cent. The degree of value addition at the retailer stage for channel-IV was 4.16 percent because they performed transportation, loading/unloading, and retailing operations.

Table 5: Degree of value addition at each stage for fresh apple

(Rs. / Quintal)

Item					
Channels	**Farmer to Commission agent**	**-**	**Commission agent to Wholesaler**	**Wholesaler to Retailer**	**Retailer to Consumer**
Channel - II					
Purchase price			6840.00	7787.20	9058.94
Sale price	6840.00		7787.20	9058.94	10168.65
Price difference			947.20	1271.74	1109.71
Cost	440.00		667.20	1051.74	859.71
Margin			280.00	220.00	250.00
Degree of value addition (%)			4.09	2.82	2.75
Channel - III	**Farmer to Pre harvester**	**Pre harvest to Commission agent**	**Commission agent to Wholesaler**	**Wholesaler to Retailer**	**Retailer to Consumer**
Purchase price		6220.00	7477.60	8455.80	9793.91
Sale price	62200.00	7477.60	8455.80	9793.91	10977.43
Price difference		1257.60	978.20	1338.11	1183.52
Cost	20.00	897.60	738.20	1138.11	933.52
Margin		360.00	240.00	200.00	250.00
Degree of value addition (%)		5.78	3.20	2.36	2.55
Channel - IV	**Farmer to Retailer**	**-**	**-**	**-**	**Retailer to Consumer**
Purchase price					7210.00
Sale price	7210.00				8221.20
Price difference					1011.20
Cost	360.00				711.20
Margin					300.00
Degree of value addition (%)					4.16

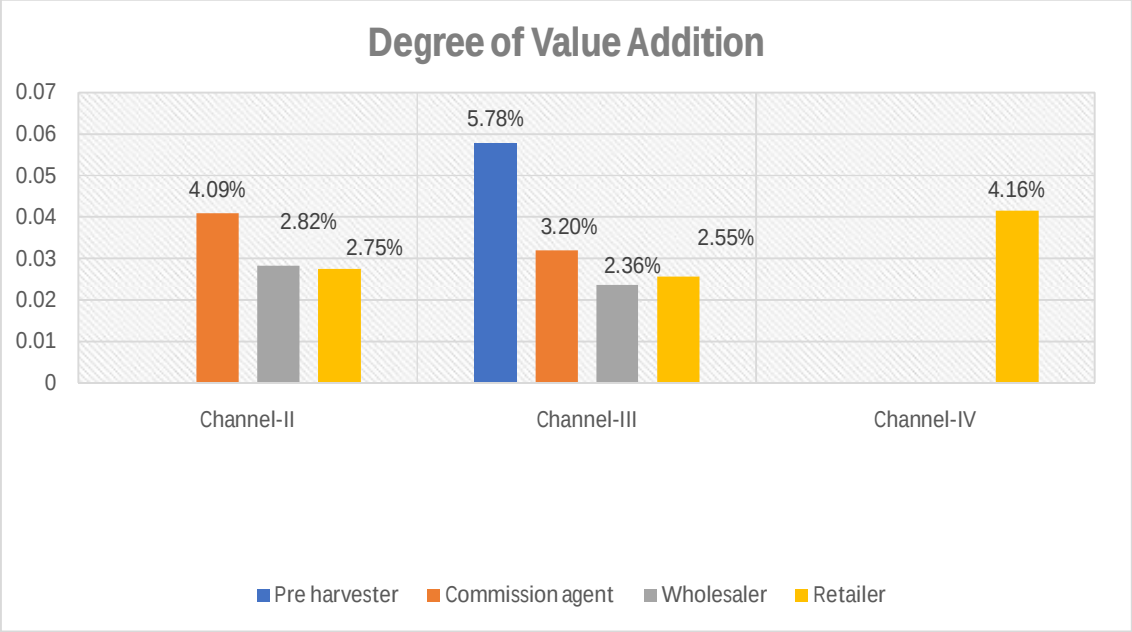

Fig 3: Degree of value addition of fresh apple

The degree of value addition on the processed apple was analysed and is shown in able 6. The degree of value addition in channel-V at the processing unit was 55.80 per cent because they purchase c-grade apple at the price of Rs. 9.5 per kg and processed it into various s by products like apple concentrate, apple wine, apple jam, apple pickle etc. Wholesalers add 16.79 per cent of value by performing various operation like transportation, loading/unloading and by converting apple concentrate into apple juice (1kg of apple concentrate convert into 7 to 7 litre of apple juice). Retailers add 10.46 per cent by performing activities such as transportation, loading/unloading, advertisement and retailing. The degree of value addition of apple is much higher than in any other stage as it changes the form at processing stage.

Table 6: Degree of value addition at each stage for processed apple

(Rs. / Quintal)

Item	Farmer	Processing Unit	Wholesaler	Retailer	Consumer
Sale price	1120.00	2381.68	3344.78	4065.47	
Purchase price		1120.00	2381.68	3344.78	4065.47
Price difference		1261.68	963.10	720.69	
Cost	170.00	636.68	563.10	370.69	
Margin		625.00	400.00	350.00	
Degree of value addition (%)		55.80	16.79	10.46	

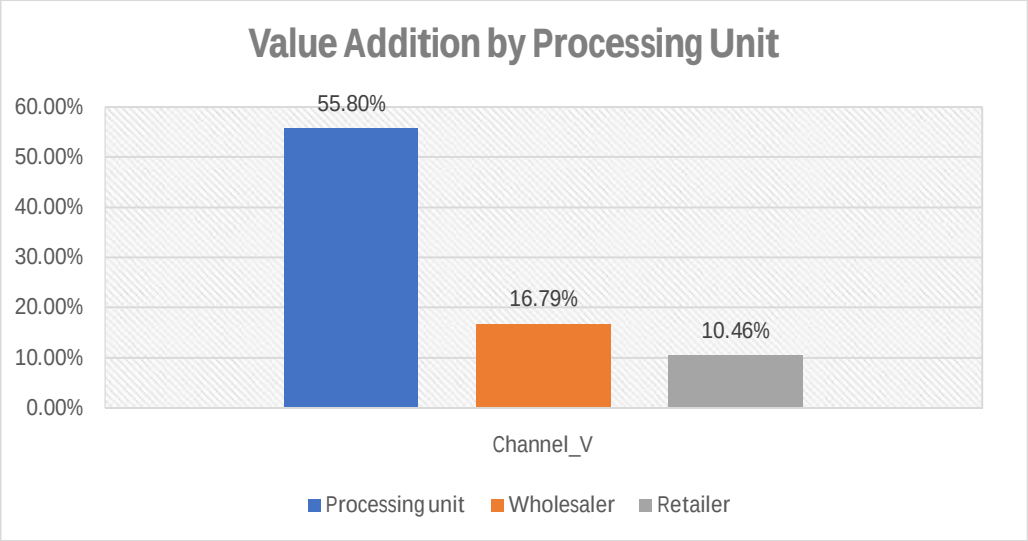

Fig 4: Degree of value addition of processed apple

CONCLUSION

The value chain is like a roadmap that shows all the steps from growing fruits to selling them, including how they are distributed and marketed. This comprehensive chain encompasses all stages necessary to bring fresh or processed fruits to consumers, incrementally adding value at each step. The key components of the fruit value chain include production, packing, grading, processing, transportation, wholesaling, retailing and advertising. The research reveals a significant post-harvest losses are a substantial concern, with the wholesale stage experiencing the most significant loss due to extensive distribution. To mitigate losses, the study recommends improving storage facilities and implementing processing methods, particularly for utilizing C-grade apples. The economics of apple storage and processing are explored in the study, showcasing the potential benefits of proper storage and utilization of processing units. The degree of value addition at each stage of the value chain is analysed to understand the contributions of various actors in enhancing the overall value of apples. The highest value addition occurs in Channel-V, which involves processing units, indicating that processing plays a key role in increasing the product's market value. In conclusion, the study sheds light on the complexities of the apple value chain in Himachal Pradesh, emphasizing the need for strategic interventions in storage, processing and marketing to optimize value and reduce losses. The findings serve as a valuable guide for

stakeholders seeking to enhance the efficiency and profitability of the apple industry in the region.

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