

A Study of Value Chain Analysis of Litchi in Dehradun

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ABSTRACT

Litchi is a common subtropical fruit crop in India. It is the most tasteful, juiciest, and healthiest fruit and is predominantly cultivated in Eastern India. Litchi farming is a source of livelihood security for a significant number of people in litchi. The research aims at an analysis of the value chain of litchi in Dehradun, looking at the existing scenario, challenges, and opportunities in the production, processing, and marketing of litchi. The value chain has different stakeholders, such as growers, pre-harvest contractors, traders, commission agents, and consumers. Poor information and communication technology infrastructure is a limitation in price discovery and market information dissemination.

Keywords: Value Chain Analysis of Litchi, Dehradun, Agricultural Marketing, Post-Harvest Management, Supply Chain Efficiency

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1. INTRODUCTION

Litchi (*Litchi chinensis* Sonn.) is a significant commercial crop with immense export potential. India is the second largest producer of Litchi next to China. Thailand, Australia, South Africa, Madagascar, and Florida in the US are other major producing nations. It is a tasty fruit with aromatic pulp of sweet and acidic taste. It is a very good source of Vitamin C and has a negligible amount of fat, cholesterol, protein, pectin, and minerals, particularly calcium, sodium, and iron. Litchi is not a climacteric fruit; therefore, it is not likely to increase in soluble solids after harvesting. The fruits have 60% juice, 8% rag, 19% seed, and 13% skin depending on variety and climate. The moisture is 77-83 per cent with variable TSS level (15.90- 20.100 Brix). Fruit is greatly used as a table fruit. It is also canned, which has made its own mark in the global trade. 'Litchi Nut', a dehydrated whole litchi fruit, is also a potential product globally. Flavoured squashes of high quality can be made from litchi. Value chain analysis is an analysis of activities through which the commodity passes to gain value at each stage. It is a method of analysing the activities best to undertake in a business and best to be provided by others. It defines the business's activities and relates it to analysing its emotional strength. There exist aligned value or supply chains in the agricultural industry that stretch from growers to processors to consumers. Value-adding activities are divided into primary and secondary activities. They define activities that are conducted within a single unit.



Figure 1. Tree of litchi

Each activity generates cost and is associated with some other activities. Therefore, the value chain is made up of operating profit, to which consumers are willing to pay more than the expense of performing both groups' activities. The support and primary activities create value for the product. It connects the demand side with the supply side. Therefore, rendering the value chain profitable and synchronizing end users' tastes, demand, and the supply chain are essential.

1.1 Global scenario in litchi

The leading five world litchi-producing nations are China, India, Taiwan, Thailand, and Vietnam. India and China hold 91 per cent of the world's litchi production, but it is produced primarily for marketing in domestic markets. India has a stronghold on the world's litchi map in production map. India has observed considerable development in the production and productivity of litchi during the years, though it is not uniform. China is the global leader in litchi production. India ranks second in litchi production (produces nearly one-fifth of the world's total production) with comparatively greater productivity (730,000 MT 92019-20) as compared to other production areas. Taiwan ranks third in litchi production. Vietnam comes second in the order of litchi producer harvesting. Currently, the Arab countries, Europe, and the USA are constantly growing their demand for litchi. Vietnam ranks as the second-largest exporter of litchi, even though its output is less compared to India and China.

1.2 India scenario in litchi

Litchi cultivation is limited to just a few countries in the world, with a gross area of around 8 lakh /ha and production of around 24 lakh MT. India and China produce 91.00 per cent of the world's litchi production. NHB database (2013) shows around 580.10 thousand MT of litchi production each year from 82.70 thousand ha of land in our nation. The climatic needs of this crop are stringent in nature, thus limiting production to a few states. Significant increase in litchi area and production in India during the past few years. Litchi production has increased from 49.30 thousand ha in 1991-92 to 82.70 thousand ha in 2012-13. Production has grown from 243.80 thousand MT to 580.10 thousand MT during the same period. The entire production of litchi is localized in Bihar, West Bengal, Uttarakhand, Assam, and Jharkhand, and to a minor extent in Tripura, Punjab, and Odisha. Litchi covers approximately 1.00 per cent of the country's area under fruits, yet it has a clear economic importance in its production areas. While the particular soil and climatic needs of the litchi crop limit its cultivation to a few areas of the country, our yield (7 MT/ha) is the highest in the world after Taiwan. Based on the quantum of production, India is the second largest world producer of litchi after China. Worldwide, southern hemisphere countries like South Africa, Madagascar, Australia, and Brazil produce litchi from October to March, while northern hemisphere countries produce between April to August. Around 90.00 per cent of the total litchi production is consumed as fresh fruit, of which at least 25.00 per cent goes through post-harvest losses at different stages. Generally, there is an abundance of fresh fruits available in the market at the time of harvesting, which has of very short duration of 15-20 days at a location. The maturation of litchi in our nation begins in Tripura, followed by West Bengal, Jharkhand, Bihar, Uttar Pradesh, Uttarakhand, Punjab, and Himachal Pradesh. A negligible amount is shipped out, although there is high demand and a lot of scope to raise the quantum of export, as the harvesting period is quite different in the rest of the globe. This can be further enhanced by venturing into the newer regions of litchi production in the country's south region where fruits are available from November to January and promoting more area and better production technologies in Tripura, Assam and other north eastern states where fruits are available a little early and supply to International and domestic market at premium price (vision 2030, NRCL, 2011).

Table 1. Area, production, and productivity of litchi in India

Year	Area [ha]	Production [MT]	Productivity [MT/ha]
2010 -11	1628	23881	14.7
2011 - 12	1672	24682	14.7
2012 - 13	1752	26520	15.1
2013- 14	1848	28003	15.2
2014 - 15	1988	32108	16.2
2015 - 16	2152	34882	16.2
2016 - 17	2320	37637	16.2
2017 - 18	2708	43958	16.2

2018 – 19	2885	46940	16.3
2019 – 20	3057	50091	16.4
2020 - 21	3142	51504	16.4

Source: India Horticulture Database, 2021.

Table 2. Area, production, and productivity of litchi in different states during 2012-2014

	2011 - 2012		2012 - 2013		2013 - 2014	
State	Area (000 Ha)	Production (000 MT)	Area (000 Ha)	Production (000 MT)	Area (000 Ha)	Production (000 MT)
Bihar	31.1	236.4	31.28	26.43	31.48	234.20
West Bengal	8.9	85.3	9.19	90.00	9.30	93.90
Jharkhand	4.8	57.5	5.27	58.24	5.27	58.24
Assam	5.3	41.5	5.63	49.64	5.38	48.08
Chhattisgarh	4.5	27.1	4.99	30.89	5.36	37.63
Uttarakhand	9.5	19.0	9.49	19.16	9.44	30.71
Punjab	1.7	24.5	1.75	26.52	1.85	28.00
Odisha	4.5	20.1	4.46	20.26	4.47	20.32
Tripura	3.2	16.6	3.46	17.97	3.88	20.18
Others	3.2	16.6	7.23	10.98	7.74	14.04
Total	80.40	538.10	82.70	580.10	84.17	585.30

Sources: All Indian 2013-2014 (Final Estimates), Department Agriculture and Cooperation

1.3 Cluster scenario in litchi

Litchi is made in Dehradun according to the Directorate of Horticulture (DOH) database. Dehradun's litchi orchards are declining because of large-scale constructions, and hence, overall productivity is low. Dehradun had the least productive litchis among Uttarakhand's top three litchi-growing districts in a 2023 report, reflecting a major disparity between research farm outcomes and field yields. Average yields of 40–100 kg per tree are attainable under ideal circumstances; numerous factors make this figure deviate in Dehradun.

2. CURRENT VALUE CHAIN IN LITCHI

2.1 Primary value chain

Fruits are graded primarily according to colour and size, along with any injury or damage to the fruit. Cracked and damaged fruits are usually sorted out, while the others are wrapped in a bunch along with twigs and leaves. The packaging type and size are determined according to the market supply and demand. Litchi is generally packed into wooden boxes lined with dried litchi leaves to support the product. Plastic boxes are also employed by certain producers. It is generally branded according to the traders/processors' requirements.

The contribution of factors along the value chain is as follows:

Growers- The litchi growers in the area are primarily small and marginal, with the average size of landholdings up to 2.84 acres. The growers own and operate the orchards, including farm activities such as soil preparation, planting, nutrition management, irrigation, etc. Most of the farmers in the district hire out their orchards to contractors in the flowering or early fruiting stage during the months of January/ February, who perform the rest of the operations, including harvesting and after-harvest operations like sorting, grading, packing, and transportation. The contractor bears the cost of this operation in that scenario. Apart from the above-mentioned farmers, some of the farmers in the area also sell directly to the local market; under such circumstances, growers also perform other farm operations like harvesting and post-harvest

handling. Some of the farmers also supply to the processors who work in the Figure 10 Litchi Varieties according to NRCL 26 | Page region. Different state Govt. Agencies are also encouraging FPOs in the region under study under rural livelihood promotion programs.

Pre-harvest contractors: Pre-harvest contractors are also referred to as Vyapaari in Dehradun. They enter into an oral contract with 10 to 15 farmers to take care of their farms. The same contract, referred to as the Pre-Harvest Contract, is accepted for 1 to 3 years as agreed upon by farmers and Pre-Harvest Contractors. Farmer's contract management involves the total upkeep of farms, such as land tilling, manuring, pest & nutrient control, pruning, light & shade maintenance, harvesting, and employment of labourers in orchards are all at their own expense. Since pre-harvest contractors are bound by hand not to prune trees, as pruning is required for sunlight maintenance, which in turn allows growth. These are because these smaller, less knowledgeable farmers assume that pruning is just tree cutting, and thus a loss of yield. The pruning is also required for the maintenance of appropriate tree height for easy and smooth harvesting without damaging the trees and fruits while picking. The pre-harvest contractors also do not keep orchards continuously every year, but their choice is dependent upon last season's harvest.

Commission agent: They are stationed primarily in mandis and extend credit to pre-harvest contractors, who in turn advance payment to farmers. As they take financial risk and also arrange trade between the contractor and wholesaler, they collect a commission. 4. Wholesaler/Traders: They are stationed in mandi and supply the produce to the domestic market. Wholesalers typically handle large quantities. Typically stationed in Mandis, they handle produce arriving at the mandis through aggregators or farmers directly. The selling of litchi is conducted by an auction process in the presence of farmers/aggregators. Farmers are remunerated based on mutual negotiation between wholesalers/Traders and producers/aggregators.

2.2 Secondary value chain

The secondary value chain entails grading, sorting, packaging, and marketing of produce. Litchis are hand-sorted/graded at the pack house. The highest grade intended for the fresh market is subjected to fumigation, and the remaining is processed for peeling. Litchi being highly perishable, the pack house operators crop to multiple markets at the earliest. The cold stores are largely utilized by pack house operators for transit use. Pack house operators purchase Litchi either from the preharvest contractors or directly from farmers. The operators have marketing connections with some processing units.

A Research to analyse the supply chains of litchi in the Dehradun district of Uttarakhand. The aim was to assess the price spread, marketing efficiency, and develop various strategies for improving the supply chain. Two kinds of 6 chains were found, one consisting of pre-harvest contractors favoured by 67 per cent of farmers who had 13.15 per cent share in consumers' rupee, and the second consisting of local retailers favoured by 33 per cent of farmers who had 60 per cent share. Thus, due to inadequate post-harvest handling and short life span, the intermediaries controlled the market

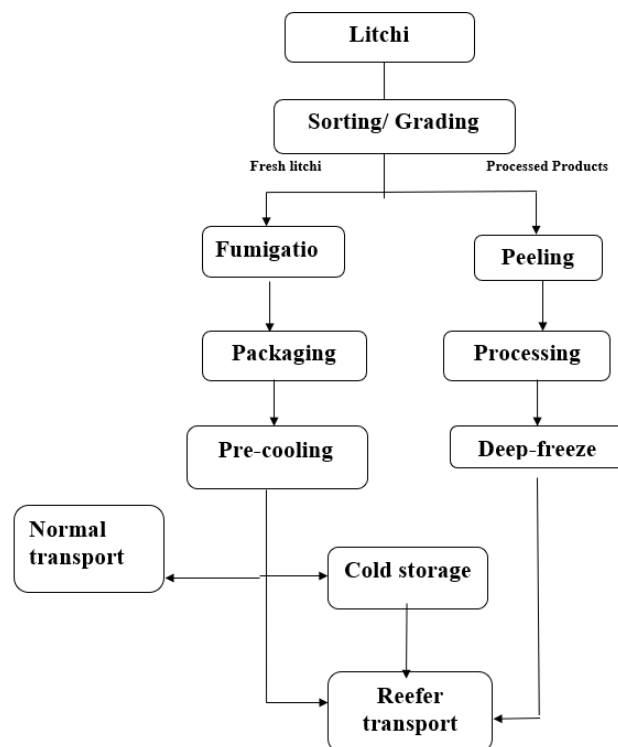


Fig 2. Secondary value chain

2.3 Logistic

For the upkeep of supply and demand balance, is a need for appropriate post-harvest handling and transportation of produce from the farm gate to market. With few exceptions, usually farmers, wholesalers, and traders organize their own transport or carry their produce with assistance from some transport agencies (pickup) and Mini trucks. Road and rail transport constitute logistics for the value chain of Litchi. Pickups are the primary means of distribution of Litchi. Accordingly, a normal supply chain moves from the farmer to the aggregator, to mandi or to distributor through mini truck transport, and to the retailer.

2.4 Marketing channels and infrastructure. Some typical marketing channels for marketing of litchi have been found as follows across the sample districts:

Channel I: Growers ---- Pre-harvest Contractors (PHC) ---Wholesale Buyers --- Retail Traders --- Consumers

Channel II: Growers ---- Wholesale Buyers ---- Retail Traders ---- Consumer

Channel III: Growers ---- Pre-harvest Contractors ---- Wholesale Buyers (Through CA) ---- Retail Traders - --- Consumer

Channel IV: Growers ---- Pre-harvest Contractors ---- Commission Agents ---- Retail Traders ---- Consumer

Channel V: Growers ---- Pre-harvest Contractors ---- Middlemen ---- Export Merchants

Channel VI: Growers ---- Pre-harvest Contractors ---- Processing Industry

Channel VII: Growers ---- Processing Industry

In the context of infra infrastructure of markets, it is interesting to see that different activities have been undertaken by Central as well as State organizations to enhance the value chain of litchi. APEDA is establishing the necessary post-harvest infrastructure for the promotion of litchi exports from the state.

3. CONCLUSION

An analysis of the Dehradun value chain of litchi finds that although the area has a very strong potential for production of high-quality litchis, the potential remains largely untapped because there are serious weaknesses in post-harvest infrastructure, market links, and value addition. The final finding is that interventions are necessary, which are targeted in nature to enhance farmer profitability, mitigate serious post-harvest losses, and utilize the demand for litchis both within the country and abroad.

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