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## Market dynamics and supply chain efficiency of litchi in Muzaffarpur district of Bihar

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### Abstract

Litchi (*Litchi chinensis*) is the most important sub-tropical fruit which originated in China about 3,000 years ago. India is the second largest producer of litchi in the world after China. Presently in India, litchi is cultivated in an area of about 74.40 thousand hectares with a total production of 483.60 thousand metric tonnes and productivity of 6.50 metric tonnes/ hectare. Bihar produces nearly 73.38 per cent of the total litchi of the country with 40 per cent of the area under cultivation. It is cultivated in an area of about 31.1 thousand hectares with a total production of 227 thousand metric tonnes and productivity of 7.3 metric tonnes/ hectare. It is mainly cultivated in the old districts of Muzaffarpur, Champaran and Darbhanga. In India, litchi maturity starts in the middle of May in the states of Tripura, West Bengal, Jharkhand; end of May and June in North Bihar, followed by the Northern Tarai region of Himalaya in Uttarakhand. Litchi is a non-climacteric fruit that possesses poor shelf life and results in very high postharvest losses. These studies were conducted to identify the various channels in Litchi marketing and assess the efficiency of each channel in the district Muzaffarpur of Bihar. Channel I: Producer – Pre - harvest contractor – Commission agent cum Wholesaler –Retailer – Consumer. Channel II: Producer – Retailer – Consumer. Channel IV: Producer – Consumer. The producer's share in consumer's rupee in channel III is the highest since it is the shortest channel.

**Keywords:** Litchi, production, marketing channel, marketing efficiency

### Introduction

Litchi is the most important sub-tropical evergreen tree and the most renowned edible fruits belonging to the family Sapindaceae, which originated in China about 3,000 years ago. It is botanically designated as *Litchi chinensis* Sonn. (*Nephelium litchi* Cambess) and is widely known as litchi and regionally as litchi, lichee, leechiee or lychee. Unlike annual crops, investment on orchards demands vast resources and there is a wide gap between investment and harvesting of crop due to long gestation period. It is highly specific to climatic requirements and probably due to this reason its cultivation is restricted to a few countries in the world.

Litchi is a delicious fruit of excellent quality. The fruit has high sugar content which varies from 10 to 22 per cent due to cultivar and climatic conditions. Besides sugars, litchi contains 0.7 per cent protein, 0.3 per cent fat, 0.7 percent minerals (particularly calcium and phosphorus) and vitamin C (64mg/100 g pulp), Vitamin A, B1 and B2 are also present in considerable amounts.

Litchi being a temperature sensitive fruit, the market access is constrained by the unavailability of cool chain facilities to transport it to distant markets. It is important to reach the produce to distant locations at ambient temperature within 24-36 hours after plucking, to retain its desired colour. The supply chain from farm to final consumers outside the state market is not so efficient to maintain the timings. Hence refrigerated trucks and cool chain facilities are essential for targeting larger markets. For export markets, litchi requires some processing to increase its shelf life. Additionally, litchi is also processed for pulp, juices, canned litchi etc. for preservation. Currently, there are about 5 packhouses/ litchi processors in the state. Litchi is negligibly exploited at post-harvest level for processing and value addition. This situation would normally encourage effort to develop various litchi products like a nut, canned fruits juices, squash, jam, jelly, wines etc. Product diversification will lead to income and employment generation in the agro processing sector.

### Litchi markets can be broadly classified into three categories

- Domestic Market in Bihar

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- National Market
- Export market

Marketing of litchi in India is largely dependent on the quantum of the produce available for sale within the state, outside the state, within the country and outside the country. The quality of the produce as per the cultivar codex, infrastructure support for transport and market information system as well as the government policies play a vital role in marketing of highly perishable litchi fruits. Most of the contractors market the litchi fruits as per their convenience. Some work as commission agents of wholesale merchants, operating from metro-cities, whereas some are financed by merchants and workers on their behalf. Few pre harvest contractors also supply the produce to local processing units and export houses. The potential of litchi in India is unexploited so far. High price disparities exist between the returns that the producers get and the consumers pay. The Pre-Harvest Contractor or the commission agent makes the maximum margin in litchi marketing, as they only perform a transfer function without involving any other cost. The stockist in litchi sale adopts the undercover system and realizes higher margins. Considering the importance of this fruit crop in the region, efforts are made to provide technological support through research and promoting production, post-harvest management and marketing, including export, through development programmes. Litchi has also been identified as an important crop for export. Currently, Indian export of litchi remains quite small due to expanded domestic market. The product for export and distant domestic markets is typically packed in 2 kg cartons after pre-cooling and sulphuring. Domestic marketing generally receives litchi in 10 kg wooden cages or 15 to 18 kg baskets

**Materials and Methods**

The study also intended to study the market functionaries/intermediaries at various levels of marketing and their marketing efficiency. The detail of the market intermediaries was obtained from NRC for Litchi and other sources. About 80 market intermediaries from all the four blocks and distant markets were interviewed, which included pre-harvest contractors, commission agents, wholesalers, and retailers etc. A list of all the litchi growers in four blocks was prepared. The relevant information and data were collected from litchi growers and market intermediaries from all the blocks were randomly selected making the total sample of 120.

**Followings were important marketing channels in the litchi marketing observed during the study.**

**Channel I:** Producer – Pre-harvest contractor – wholesaler (Muzaffarpur) – wholesaler/commission agent (Distant market) – retailer – consumer (distant market)

**Channel II:** Producer – retailer – consumer (district and nearby market)

**Channel III:** Producer – consumer (local sale).

**Cost of marketing**

The total cost incurred on marketing, in cash or in-kind, by the producer-seller and by various intermediaries involved in the sale and purchase of the commodity till the commodity reaches the ultimate consumer was computed as follows.

$$C = Cf+ Cm1 + Cm2 + Cm3 + .....Cmn$$

Where,

C = total cost of marketing of the commodity  
 Cf =cost paid by the producer from the time, the produce leaves the farm till sale.

Cmn = cost incurred by the nth middleman in the process of buying and selling the product.

**Producer’s share in consumer’s rupee**

It is the price received by the producer as a percentage in the consumer’s price.

$$Ps= (PF/PC) X 100$$

If (Pc) is a consumer’s price and (PF) is the producer’s price then the producer’s share in consumer’s rupee (Ps) may be expressed as follows.

**Marketing margin of middleman**

This is the difference between the total payments (cost + purchase price) and receipts (sale price) of the middleman (ith agency).

a) Absolute margin of the ith middleman (Ami)

$$(Ami) = PRi-(Ppi+Cmi)$$

b) Percentage margin of the ith middlemen (Pmi)

$$(Pmi) = \frac{PRi-(Ppi + Cmi)}{PRi} \times 100$$

Where,

PRi= Total value of receipts per unit table (sale price)  
 Ppi = Purchase value of goods per unit (purchase price)  
 Cmi = Cost incurred on marketing per unit

**Analysis of price spread under different channels**

It is the difference between the price paid by the consumer and the price received by the producer. The price spread was worked out by using following method

Where,

Pp = price paid by the consumer  
 Pf = price received by the farmer  
 Price Spread = Pp – Pf

**Analysis of Marketing Efficiency under Different Channels**

Marketing efficiency is a measure of market performance. The movement of goods from producers to the ultimate consumers at the lowest possible cost consistent with the provision of service desired by the consumers is termed as efficient marketing.

**Results and Discussion**

**Major findings of the study**

**Socio-economic profile**

It is observed that only 27.50 per cent of the family’s head were illiterates. About 60 per cent of the farmers were in the age group of 35 and 55. The average family size of the farmers was five. The average size of the land holding was 4.15 hectares and about 37.59 per cent of the total holding was under litchi cultivation.

After litchi, cereals were being cultivated on 35.42 per cent of gross cropped area which shows that a significant part of the consumption was made by cereals (paddy, wheat etc.) followed by pulse which accounted for 10.36 per cent of gross cropped area. The average number of trees per hectare was found 119 on overall basis which was found 20 per cent more than recommendation. On group wise it was found decreasing from 138 trees per hectare in small, 111 trees per hectare in medium and 108 trees per hectare in large group. Thus, small farms orchards were denser followed by medium than large.

### Marketing

Marketing system of litchi was observed to be a purely traditional private system viz. Litchi merchant comprising pre-harvest contractor, village trader, commission agent & retailer. The pre-harvest contractor is observed to be most important intermediary who performed most of the marketing and other services like watch and ward of orchards, harvesting of fruits, grading & packing of harvested fruit into boxes and transportation of the consignment right from the orchard to distributing centres. Three important channels of litchi marketing were identified and are here under

**Channel I:** Producer – Pre-harvest contractor – wholesaler (Muzaffarpur) – wholesaler/commission agent (Distant market) – retailer – consumer (distant market)

**Channel II:** Producer – retailer – consumer (district and nearby market)

**Channel III:** Producer – consumer (local sale).

The study indicates that nearly 80.83 per cent of the Litchi growers prefer channel I and this channel is more popular and convenient to the farmers. Though channel III is most efficient, very few producers prefer to sell directly to consumers.

### Price spread of litchi

#### Channel – I

The analysis of price spread in the Muzaffarpur market reveals that the average per quintal cost of marketing was ₹2500.76 an overall basis. Spoilage transportation, packaging, and commission were the major items which constituted about 70 per cent of the total marketing cost. Among the different items of cost spoilage cost was maximum in all the cases which is due to short shelf life and system of packing followed. Packaging cost was the second most important cost in all the markets. The total cost of marketing incurred by the contractor/wholesaler worked out to be 17.20 per cent of the consumer's rupee. The producers' share in consumer's rupee was very less since producers sell their orchards directly to the preharvest contractor/wholesaler. Therefore, more profit is earned by the middleman. The producer's share in consumer's rupee may increase if the producer can sell their produce by bringing it into the market by themselves.

#### Channel II

Price spread for litchi in supply chain-II indicates that the per quintal packaging cost was highest 308.00 (42.44 per cent) and grading cost was lowest 23.76 (3.27 per cent). The spoilage was the other most important cost which was 257.12 (35.42 per cent). The other important costs were cost of transportation (70.40) and harvesting cost (42.24). The total marketing cost was 725.72 and average per quintal price

realized was 4500.00 while the net price realized was 3774.28.

### Channel III

Price spread for litchi in supply chain-III indicates that the small group farmers of different blocks sold their produce in local markets. The average marketing cost was highest in Minapur market 307.80 followed by Bochahan 296.99, Kanti 286.00, and Mushhari 266.43. The major item of cost was spoilage, packaging, and grading which were 118.68, 86.14 and 56.72 respectively on overall basis. The transportation and hamali cost contributed 6.17 per cent and 3.49 per cent of total marketing cost as the markets are near to production centre. The average price per quintal was highest in Mushhari ₹3412.37 and lowest in Minapur ₹3080.50. Similarly, the net price per quintal realized was highest in Mushhari ₹3154.94 and lowest in Minapur ₹2772.70. This was due to effect of district market Muzaffarpur which is nearest to Mushhari and farthest to Minapur. Thus, the above analysis clearly shows that the marketing margin was highest in channel I (₹52.82) followed by channel II (₹37.74) and Channel III (₹29.42). The per cent share of producers in consumers rupees was highest in channel III (91.56 per cent) followed by channel II (61.33 per cent) and channel I (27.58 per cent). This is due to fact as the market chain increases producers share in consumer rupees decreases. The price paid by consumer was highest in channel I and lowest in channel III due vicinity of production center.

### Marketing constraints

Different types of marketing constraints in litchi encountered by the farmers and intermediaries. It is well known that litchi is a perishable commodity and do not last long in normal conditions. Therefore, high perishability was the biggest challenge to farmers as well the intermediaries, therefore it was perceived as the most important problem. To overcome this problem, there were no proper cold storage facilities available in the area leading to heavy spoilage losses. The other problems faced in marketing are lack of infrastructure, high transportation cost for distant markets, lack of credit facility, formation of syndicate by the dominant market player, price fluctuations etc. in the decreasing order of importance.

### Conclusion

It may be concluded from the study that there is an immense scope for expansion of area, production, and productivity of litchi in Bihar. The system of marketing reveals that the litchi growers get a very small share in price paid by consumers and there is a need to reduce the long chain of middlemen in the litchi trade. Out of the three channels of litchi marketing, third channel i.e. producer – consumer (local market) was the most efficient from producer as well as consumer. Further it was found that marketing channel efficiency index was the highest in channel III and the lowest in channel II. The major problem identified in marketing of litchi are the perishability of the fruits. The other problems are lack of cold storage, labour shortage, lack of market information, lack of organized marketing, lack of market infrastructure etc.

### References

1. Ahmed BJ, Aara RR. Marketing management of Kashmir apple. *Commerce and Management*. 2012;1(7):34-40.
2. Anchal D, Sharma VK. Price spread of litchi in Punjab.

Indian journal of Agricultural Marketing.  
2009;23(2):157-161

3. Choubey, Manesh, Attery BR. Economic evaluation of litchi production in Bihar. The Bihar Journal of Agricultural Marketing. 2000;8(2):123-131.
4. Anonymous. Litchi resource mapping, Bihar. Report submitted to State Horticulture Mission, Bihar, 2017. <http://www.horticulture.nic.in>.