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Economic analysis and marketing efficiency of litchi in Muzaffarpur district of Bihar

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Abstract

The present study was planned to analyze the marketing efficiency of litchi in Muzaffarpur district of Bihar. The district was selected purposely because of the leading litchi producing district in the State of Bihar. In the district 140 sample consisting 60 litchi growers and 80 market intermediaries under the study. In the district litchi crop extensively grown under the area of 33.4 thousand hectares and annual production was 258.3 thousand MT with an annual productivity of 7.8 MT/hectares. The study found that the trends of area production and productivity in the district have showed increasing trend with Compound annual growth rate (CGR) of 0.03, 0.36, and 0.38 respectively. In case of whole State, the CGR of area, production and productivity is 1.01, 0.5, -0.4 respectively. The main region behind growth in productivity showed negative trend was due to uncertainty of rainfall. The study showed that the marketing of litchi is a very complex procedure in the sampled area and where four major type of marketing channel are identified. Channel I: Producer - Pre-harvest contractor - Commission agent cum Wholesaler - Retailer - Consumer. Channel II: Producer- Village Trader- Wholesaler (local) - Commission agent (distant) - Wholesaler (distant) - Retailer -Consumer. Channel III: Producer - Retailer - Consumer. Channel IV: producer -consumer. The fourth channel Producer → Consumer, (local market) was found very much efficient for the producers as compared to other three identified marketing channel. The most important marketing constraints of litchi marketing was perishability of fruits followed by others problems such as labour shortage during harvest, Lack of market information, Lack of marketing infrastructure, Lack of ordered marketing, High transportation cost for distant markets, problem of credit facility, Unorganized production and Price fluctuation etc.

Keywords: Litchi, marketing efficiency, producer, consumer, growth rate and trend

Introduction

Litchi is an evergreen, imperative, temperature-sensitive fruit crop and related to Sapindaceae family and also known as the 'fruit queen.' It was originated three hundred years before, ending of the 17th century. Litchi is one of the most famous fruit crops in the eastern part of the country and is mostly cultivated. Litchi is also known regionally as lichi, lichee, laichi, leech, or lychee. Besides India, it is cultivated extensively in temperate regions of Australia, South Africa, Thailand, Mauritius, and Hong Kong, etc. At the present time in the country the total production is 730.0 MT, 96,000 ha area and 7.6 MT productivity of litchi. (Ag. ministry and welfare of farmers (2019-2020). After china, in the world the country shares 2nd rank in litchi cultivation. Mostly country annually, 93,300 hectares, 568,200 metric tons of litchi are produced (Anonymous, 2018). The country's average productivity of litchi is 7.5t ha⁻¹ in 2018-19, which is much lower than the crop's potential productivity. Poor fruit setting/retention in humid, dry springs and biennial bearing due to poor nutrient management are the key reasons for low productivity (Menzel and Simpson, 1990). Around fifty improved litchi cultivars are presently cultivate in India. However, the commercial varieties of north Bihar and eastern Uttar Pradesh are dominated by Shahi, China and Purbi. Other commercial varieties of importance are rose-scented for Uttarakhand and adjacent areas, Shahi, Ajhau, China, Swarna, Roopa and purbi for Jharkhand and Bombai, Bedana, and Rose scented in eastern parts of West Bengal. Few varieties have been found promising for high yields with quality fruits, such as Early & Late Bedana etc. and have been well adopted in the region. The same as Bihar, Uttarakhand, West Bengal, Jharkhand and U.P, Litchi is commercially cultivated in the region. Due to its high profitability and better export prospects, the yield is also acquisition popularity in Himachal Pradesh, Punjab, Jammu as well as Kashmir, Arunachal Pradesh, Tripura, Karnataka, and Tamil Nadu (Pandey and Sharma, 1989; Cebeco, 2001) [4]. Due to its high geographical position and the size its contribution to the region's total production, Litchi cultivation occupies an important position in the horticultural landscape in Bihar. Millions of people are employed in litchi cultivation, both on and off the sector.

Litchi farming therefore provides a source of income for a vast population, particularly in the state of Bihar.

Around 40 percent of the area under cultivation, Bihar produces approximately 73.38 percent of the country's total litchi. Litchi is mainly grown in Muzaffarpur (also known as India's litchi bowl and Litchi capital of India), Vaishali, Darbhanga, Samastipur, Sitamarhi, West Champaran, and East Champaran districts in Bihar. Out of the 31,480 hectares area under cultivation, the total production of litchi in Bihar is

around 234,200 tonnes, with a productivity of 7.4 t ha⁻¹, which is higher than the national productivity.

Muzaffarpur litchi record is created in twenty seven districts of Bihar, according to Directorate of Horticulture. With an output of 56,006 MT, Muzaffarpur is the largest district producing litchi, Vaishali came in second with 26,498 MT, and Sitamarhi came in third with 15,518 MT. Three additional districts with more over 10,000 MT of output are West Champaran, East Champaran, and Katihar.

Table 1: Major Litchi Producing States and Districts of India

Sl. No.	States	Major Litchi Producing Districts
1	Bihar	Muzaffarpur, Samastipur, Darbanga, Vaishali, East & west Champaran, Sitamarhi, Sheohar, Madhubani, Purnia, Begusarau, Saharsa, Bhagalpur, Kishanganj Etc.
2	Assam	Jorhat, Bongoigaon, Goalpara, Kamrup, Barpeta, Naoga, Golaghat, Cachar, Sonitpur.
3	West Bengal	Nadia, Murshidabad, Hubli, Malda, Uttar Dinajpur, Dakshin Dinajpur
4	Punjab	Hoshiarpur, Gurdaspur
5	Uttarakhand	Champawat, Nainital, Udham Sing Nagar, Haridwar, Tehrigarhwal, Deharadun, Paurigarhal Etc.
6	Odisha	Sambalpur, An gull, Sundergarh, Deogarh
7	Tripura	West Tripura, South Tripura, Dhalai Tripura, North Tripura

Major Products of Litchi

Litchi fruit a better amount of minerals, various vitamins, and a safe antioxidant its helps to protect against harmful free radicals. Litchi is a highly perishable fruit and litchi is made from many value-added ingredients. Litchi squash is a distilled drink prepared from heavily flavored litchi pulp. Litchi fruit is also made from many other items, such as dehydrated litchi pulp, canned litchi, wine, juice, pickle, jelly,

ice-cream, and preserves. The medicinal qualities of litchi fruit are, in natural cancer treatment, litchi fruit prevents cancer cell growth, it has amazing anti-breast cancer properties. The immune system is improved by it.

Growth rates in area, production, and productivity of litchi

Table 2: Growth rates in area, production, & productivity, of litchi in India (2010-11 to 2019-20)

S. No.	Year	Area (in '000' ha)	% change from previous year	Production (in'000'MT)	% change from previous year	Productivity (MT./ha.)	% change from previous year
1	2010-2011	78.2	-	500.48	-	6.4	-
2	2011-2012	80.4	2.81	538.68	8.2	6.7	4.69
3	2012-2013	82.7	2.86	595.44	7.81	7.2	7.46
4	2013-2014	84.2	2.41	597.82	0.9	7.1	-1.39
5	2014-2015	85.1	0.47	527.62	-9.76	6.2	-12.68
6	2015-2016	90.2	5.99	559.24	5.91	6.2	0
7	2016-2017	92.4	2.44	582.12	6.4	6.3	1.61
8	2017-2018	93.1	0.75	688.94	15.27	7.4	17.46
9	2018-2019	95.7	2.79	717.75	5.13	7.5	1.35
10	2019-2020	96.2	0.52	692.64	-2.03	7.2	-4
Compound Growth Rate (CGR)		2.4620**		3.4779**		0.9915*	

** Significant @ 1% level of significance * Significant @ 5% level of significance

The litchi cultivated area in 2010-11 was 78.20 thousand hectares. During 2011-12, the area expanded by 2.81 per cent rise in the previous year to 80.40 thousand hectares. The area extended to 82.70 thousand hectares in 2012-13. (2.86% from the preceding year) It over again greater than before to 84.20 ha (2.41%) in 2013-14. 2014-15 in the year is 85.10 thousand hectare (0.47 per cent). Similarly in 2015-16 year is 90.10 thousand hectares (5.99%) same year. Further in the year 2016-17 increase area with 92.40 thousand hectares with 0.75% from the preceding year.

In the 2016-17 further the area extends to 95.70 thousand hectare 2.79% from preceding year. In the year 2019-20, area also increased with 96.20 thousand hectare with 0.52% from before year. Cultivated area under litchi cultivation increase from 2010-11 to 2019-20 was mainly due to remunerative price of Litchi. The litchi production in the country in 2010-11 was 497.3 MT. In 2011-12 it greater than before to 538.10 MT (8.20%) and same as augmented to 580.10 thousand metric ton (7.81%) in succeeding year. the production

increased to 580.10 metric ton (0.91%) in 2012-13 from preceding year. The increase in production 585.20 thousand (0.90%) in 2013-14 year. In 2014-15 decline 528.20 thousand (-9.76%) from the prior year. The increase in production is 559.40 thousand MT in 2015-16 & (5.91 per cent) in excess of the earlier year in 2016-17. The level of production in country again increased during 2017-18 and 2018-19 to 721.30 MT and 750.20 thousand MT respectively. Finally in 2019-20 production level decreased to 700.20 thousand MT i.e. 2.93% preceding year. The Litchi productivity in 2011-12 is seen as 6.4 MT/ha which remained stable at 6.7 MT/ha is 2011-12 and it increased marginally to 6.7 MT/ha (7.46%) in year of 2012-13. where as the productivity decreased to 7.1 MT/ha (-1.39 per cent) in 2013-14 and then decreased -12.68% during 2014-15. The productivity stable with 0.00, t/hectare in year 2015-16, and it marginally increased to 1.61 MT/ha in 2016-17. Whereas in 2017-18, the productivity increased to 7.4 MT/ha (17.46) from the preceding year & also stable with 1.35 MT/ha in succeeding year. Finally 2019-

20 productivity decreased to 7.2 MT/ha (-4.00) from the preceding year. From the above observation the Area, production, and productivity have the compound growth rates of 2.4620%, 3.4779%, and 0.9915%, respectively. Among all the variables, the area and production growth rates are significant at 1% significance level, and productivity is significant at 5% level of significance.

Marketing of Litchi

Litchi fruit is temperature-sensitive; due to the unavailability of transport with cool chain installations, its access to the distant market is limited. To maintain the desired flavour and colour at room temperature, the commodity needs to enter distant market locations within 24-36 hours after harvesting. The existing supply chains of litchi frequently take more than 24-36 hours from the manufacturing site to the ultimate trade out of state. To target distant markets, refrigerated van and cold chain are therefore required, while fruit needs processing to increase its shelf life for export markets. Markets for litchi can be divided mainly into three markets:

1. Market at domestic level
2. Market at national level
3. Market at International level

Litchi marketing in Bihar requires the presence of a variety of market middleman between producers point to consumer so the price paid by the latter is reduced when it reaches the producer. There is a considerable disparity among the price remunerated by the consumers and the value earned through the manufacturers, and a substantial proportion of that price is appropriated by the intermediaries. In Muzaffarpur, the litchi market, PHC plays a crucial role. The traders enter into a contract with the manufacturer to buy litchi at the agreed price in the field itself before harvesting litchi and to sell them at the time of harvest in urban markets through a commission agent. Where the price is higher than the agreed price, the higher returns are not shared with the suppliers and only the contract price is charged to the producer, while, in the case of the harvest price falling below the pre-harvest price, the contractors pay 10% of the value of the goods sold by them while paying the producers.

In India, the marketing of litchi depends largely on the quantity of the goods available for sale within the state, outside the state, within the country, and outside the country. The quality of the products according to the cultivar codex, road and rail system support for the transportation & information about system of market, as well as administration policies have a vital role. Due to the importance of tropical fruits in the area, efforts should be made to give assistance through capacity building that promote production, post-harvest maintenance, and sales, includes export. Litchi has been identified as a valuable export crop. Due to the growing local market, India's litchi exports are currently very minor. High variations in the market price are noted and simply a undersized share of the buyer income enters the farmer. The growth of litchi under different climatic conditions in different states has reward in provisions of early harvesting;

prolonged harvesting & fruits are only available for 3-4 weeks under season. This season available from May (2nd week) to June (2nd week). Around 80 percent of litchi developed in the state is sold out of the state. According to the survey report Delhi Mumbai, Bangalore are the major important markets for Litchi.

Process of litchi marketing

In Muzffarpur litchi grower sell their produce through pre harvest contractor for one year or more. Crop contractor settle the price and terms and condition with the growers and these contractor gave price on time basis. If tree is 10 to 30 years with 100 kg yield they gave 500 rs per tree per year. If tree is 5 to 10 years then gave RS 300 per tree per year. Farmers receive 50% price before the harvest when they settle price and rest at the time of harvest. Harvesting, packaging, sorting, transportation are done by the contactor.

This pre harvest contactor affect the health of litchi orchard. Litchi arrive at flowering stage that is valid for that year. Contactor spray for fruit flies but owner do cultural practices.so the final cost is deducted because litchi orchard is harm due to spray of insecticide.

If contractor for 2 to 3 years so the contactor do all operation. He is doing all operations for only about own profit he don't care about orchard maintenance. Contactor also not invests in orchard because they are not sure about next year contract. So landlord suffer in long run if the orchard owner is not present at the time of harvesting so the contactor may be damage branches when harvesting so this damage affect at long run to landlord.

Channels of marketing & price spread in litchi

The marketing tool refers to the series of intermediaries through which items are transferred from producers to consumers. On the basis of preliminary information four channels were identify.

Channel I: Producer - Pre-harvest contractor - Commission agent cum Wholesaler – Retailer – Consumer.

Channel II: Producer- Village Trader- Wholesaler (local) – Commission agent (distant) – Wholesaler (distant) – Retailer – Consumer.

Channel III: Producer - Retailer – Consumer.

Channel IV: Producer –consumer.

Marketing channel efficiency

Market efficiency refers to the degree to which market prices reflect all available, relevant information. If markets are efficient, then all information is already incorporated into prices. Functioning of efficient marketing system is essential to increase the area under Litchi and to ensure remunerative prices to the primary producers' particularly perishable commodities like litchi. Marketing efficiency of separate channel consider under following table 3.

Table 3: Marketing Efficiency of Litchi in Difference Channel

Particulars	Channel I	Channel II:	Channel III:	Channel IV:
Value of Marketing Output (Rs./q)	4066.27	11058.28	3424.08	2093.38
Total Marketing Cost (Rs./q)	1214.67	5407.10	996.23	287.88
Total marketing margins (Rs./q)	1701.27	4750.81	1027.85	505.50
Marketing Efficiency	0.55	0.16	0.79	2.02
Price spread	2466.27	9458.28	1824.08	493.38

Index of marketing efficiency represent the efficiency of each channel that is for channel 1, 2, 3 and 4th were 0.55, 0.16, 0.79, and 2.02 in that order. Among those marketing channel fourth (IV) was found highly efficient for the reason that of including less number of market middlemen, high marketing margin receive due to less wastage of fruits.

The problem faced by litchi market intermediaries as well as producers, pre harvest contractor, contractors, wholesalers, retailers, throughout the marketing process were Perish ability of fruits, Lack of freezing services, Lab our scarcity during harvest, Lab our scarcity during harvest etc. be deficient in of organized marketing, elevated transportation cost for distant markets, be deficient in of credit facility, Unorganized manufacturing, fluctuation in price with Muzaffarpur district was perish ability of fruits; it was a major constraint in among all the distributed constraints with 98.92 mean score followed by lack of cold storage facilities with 83.46 average scores. Another marketing constraints were Lab our shortage during harvest, Lack of market information, Lack of marketing infrastructure, be deficient in of organized marketing, elevated transportation cost for distant markets, be deficient in of credit facility, Unorganized manufacturing, fluctuation in price with average scores of 66.86, 63.57, 58.71, 58.64, 48.71, 38.36, 26.21, and 18.50 respectively.

Conclusion

The study showed that the marketing of litchi is a very complex procedure in the sampled area and where four major type of marketing channel are identified. Channel I: Producer - Pre-harvest contractor - Commission agent cum Wholesaler - Retailer - Consumer. Channel II: Producer- Village Trader-Wholesaler (local) - Commission agent (distant) - Wholesaler (distant) - Retailer -Consumer. Channel III: Producer - Retailer - Consumer. Channel IV: producer - consumer. The fourth channel Producer → Consumer, (local market) was found very much efficient for the producers as compared to other three identified marketing channel. In fourth channel producer take 70.23% of consumer rupee while the left behind 29.77% was incurred in cost of marketing incurred by producer /contractor & retailers as well as middlemen's margin. The most important marketing constraints of litchi marketing was perish ability of fruits followed by others problems i.e. Labour shortage during harvest, Lack of market information, Lack of marketing infrastructure, Lack of ordered marketing, High transportation cost for distant markets, problem of credit facility, Unorganized production and Price fluctuation etc.

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