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An economic potentiality and export performances of GI tagged litchi of Muzaffarpur, Bihar state in India

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Abstract

Litchi is sweet tender aromatic seasonal fruit, known as queen of fruits for its royal bright appearances and taste. Muzaffarpur in Bihar state is memorable in Indian map as Litchi kingdom of India. Shahi litchi of has famous for its sweet unforgettable taste. India has begged the GI tag for this pulpy, aromatic sweet tender litchi, which totally distinguishes it from other varieties. India is a country where agriculture can be considered as blessed occupation flourished with the boon of versatility of nature. Agricultural export potentiality can be economic progress wheels for Indian economic growth and expansion path. In this paper, the study has been conducted to understand the potentiality of Muzaffarpur Litchi export. This research tries to be pointed out the grassroot level problems for litchi farmer, exporters and traders. This is a turning point to analyses the research needs to overcome the problems and bring the potential picture of export scenario of Muzaffarpur Litchi. In spite of fabulous quality exporting Litchi outside the domain of domestic territory is almost unrealistic dream for cultivators. This paper tries to investigate the international export requirement and export knowledge gap exist among farmers, exporter and international trades. The main motive behind the research to explore export potentiality of Muzaffarpur litchi and indicates the way of export expansion for strengthening -economic growth and fostering profitable platform for litchi cultivators. The paper also highlights the recommended path for escalation in litchi export.

Keywords: Export, Muzaffarpur Litchi, economic growth, international trade, litchi cultivators, GI Tag

Introduction

Litchi is the delicious and translucent juicy fruit is widely popular in both domestic and the global market. India is the second-largest producer of litchi after China. Bihar is often at the center of attraction point in this respect. In Bihar, Muzaffarpur region especially, particularly 'shahi' litchi, is famous for its taste and flavor.

Fruits are nature's treasures for mankind. High graded fruits consumption is required for us to maintain a healthy, balanced daily diet. Commercial importance of fruits has been accelerated globally for significant contribution in economic, social and nutritional criteria. The ago based country like India the occupational engagement and income generation resource bearing platform is agricultural field. In India, Litchi is one of preferable ever green fruit crops to the family Sapinalaceae and originated from China during 3000 years ago. India is the second position in litchi production. Besides India, it is cultivated extensively in temperate regions of Australia, South Africa, Thailand Mauritius and Hong Kong etc. Litchi fruit is famous for its vibrant quality pleasant flavor and mind-catching red color along the nutritional constituents are carbohydrates organic acid, vitamins, pigments, protein, fat. Litchi is also excellent source of vitamin 'C'.

Litchi was cultivated 2000byears ago in Sothern China provinces of Guangdong and Fujian. According to Chinese legends, Emperor Xuanzong of the Tang Dynasty was particularly fond of this exotic sweet fruit. In China, litchi

was considered as symbol of trust, love and favorable fate. Historical records reveal that a prolonged time more than 700 years, litchi cultivation never cross the boundary of China.

According to the ICAR-National Research Centre on Litchi (NRCL) in Muzaffarpur litchi arrived India around 1770. It was first grown in Tripura, then it reached to Assam, West Bengal and finally destined in Bihar around 1800. The landholding proportioned of Bihar in litchi cultivation is quite larger in size and the climatic condition is favorable for productive outcomes. (ET-Bharat)

The farmer who has been cultivating litchis on three acres for the past 30 years, said sandy-loam soil with a pH level between 5 and 7 is ideal for litchi production. According to experts, a humid climate is also most suitable for the cultivation. To ensure bountiful bloom, the ambient temperature must remain below 20 °C for at least 60 days. Once the trees begin to bear fruit, the temperature should hover between 35-40 °C. Experts said North Bihar's climate is particularly conducive to litchi production and explains its high yields.

Litchi secures prominent place in the horticultural landscape of Bihar owing to its geographic confinement and the magnitude of its share to the overall production in the country. Litchi is grown in 27 districts of Bihar with 36400 ha area 265200 mt of production and 7.0 Mt/ ha productivity in Bihar. Litchi is large scale producing crops. Muzaffarpur district has major contribution in area and production wise

manner in this state. Muzaffarpur District is marked as the "Litchi Kingdom" of India, known for producing the Shahi Litchi with diverse quality, taste and preferences which frame a high level of demand. The GI tag in 2018 (Wikipedia, 2025; Financial Express, 2018) ^[2] was expected to create new export and brand opportunities.

Litchi cultivation has been practiced in Muzaffarpur for 200 years. The 'Shahi' variety of litchi is considered among the world's finest due to its memorable sweet taste and mesmerizing natural aroma. Muzaffarpur's Shahi litchi was awarded a Geographical Indication (GI) tag precisely because of its unique characteristics, this royal presence begged the recognition in global market for its distinctive aroma and taste

Literature review

1. Early Large Red' is one of the superior litchi varieties due to its uniform fruiting, higher yields, and ability to tolerate recurrent issues such as fruit break (Chauhan, 2008) ^[8].
2. Micronutrients and plant growth regulators were believed to promote the growth, yield, and fruit quality of litchi, especially the 'Muzaffarpur' variety (Devaraja, 2019).
3. Besides, integrated nutrient management is related to higher yield and quality of fruit (Raghavan *et al.*, 2018)
4. Kumar, J., Dinesh Kumar, & Nikky Kumari (2018) Investigated production and export patterns in Muzaffarpur, and observed negative growth rates and major challenges including insufficient technical know-how and financial constraints.
5. Litchi being a commercial crop, almost entire crop is marketed and therefore any scheme augmenting is production is closely linked with efficient marketing system (Anchal and Sharma, 2009).
6. Litchi has been linked to several effects, including antioxidant, analgesic properties, and efficacy in mitigating inflammation, cancer, diabetes, neurological discomfort, and cardiovascular activity (Srivastava *et al.*, 2018)
7. CFTRI (2017); previously but core in context) Investigated pre- and post-harvest conditions influencing export quality, with issues such as rind browning and restricted shelf life.
8. Mishra, Vijai Kumar & Wararkar (2025) Provided an overview of packaging and chemical treatments to enhance post-harvest life with prospective technologies like MAP, bio-based materials, SO₂ treatments, and antioxidants.
9. Lal, Awtar Singh, Abhay Kumar, S. D. Pandey *et al.* (2023) Discussed the challenges in hybridization of litchi, drawing from a ten-year hybridization program at NRCL, Muzaffarpur.
10. Lal, Kumar, Pandey *et al.* (2024) Explored the effect of climatic variability on litchi production, applying regression models to estimate the effects of humidity, rainfall, and temperature
11. In India 585,300 metric tonnes of litchis are produced annually from 84710 hectares of land. About 74% of the produce from India comes from Bihar. (APEDA)

Research Objectives

1. To understand the growth potentiality for Litchi cultivation in Muzaffarpur.
2. To identify challenges faced by farmers and exporters for Litchi cultivation in Muzaffarpur
3. To assess the current production and export status for Litchi cultivation in Muzaffarpur
4. To suggest practical measures to enhance export performance for Litchi cultivation in Muzaffarpur

Discussion

Growth driven potentiality of for litchi cultivation in Muzaffarpur

a) Enhancing Health Consciousness

Litchi is translucent fruit enriched with Vitamin C and other food nutrients. It contains 71.0 mg in 100 grams of consumption. In Western countries like North America and Europe have the tremendous demand for this exotic fruit as their balanced diet. The rising demand of litchi as perfect nutritional option trends can project remarkable upward shift as healthy food market in future.

b) Export expansion potentiality

Litchi is one such fruit, which is widely grown and has a vast untapped potential in the domestic and global market. It offers immense scope to boost exports, through appropriate institutional support and has major demand in Middle East countries. A limited quantity of litchi is also exported to European market. Less than 5% of the world's litchi production, or approximately 100,000 tons, enters into world trade on an annual basis which is expected to increase in the coming years. During the Indian litchi season (May to June), good quality litchi is not available from other parts of the world except from Thailand (May and June) and Israel (July). In spite of these advantages, India has negligible share (less than 1%) in the world trade.

c) Rising demand for exotic fruits

Litchi is a delicious fruit having aromatic pulp with sweet and acid taste. Litchi is largely preferred as table fruit. It is also used for canning, which has made its impact in international trade. The global exotic fruit market is expected to reach \$1.8 billion in future, with lychee being a significant contributor. The increasing interest in diverse culinary experiences is driving consumers to explore unique flavors. In the U.S. alone, imports of lychee increased by 25% in the most recent period, reflecting a growing appetite for exotic fruits. This trend is supported by the rise of multicultural cuisine, which incorporates lychee into various dishes and beverages.

Market challenges

It is very clear that Muzaffarpur litchi has prominent position in the domain of agricultural field. In spite of all, it faces several challenges in today's date. Which are listed below:

- Climate Change: Global warming threats of unpredictable temperature and crucial weather change phenomenon in recent times. As Litchi is delicate types of fruits, the production cycle tremendously disturbed if the temperature rises into certain extent. If production disturbed and for seasonal fruits the market will face

- extreme fluctuation of price and volatility in supply chain. The challenges are quality consistency maintaining as well as price and demand hike scenario.
- Financial resources scarcity: The increasing cost for cultivation, labor cost, and existing big farmers competition with small scale farmers is the biggest problem where small peasants need secured financial supports. Most of the time, due to several formalities

and documentation they cannot avail the financial supports from Government.

Research methods and analysis

This is a descriptive research-based analysis sample survey methods are applied. This research incorporates qualitative and quantitative data for its analysis domain.

Sample and sample size

Table 1: The survey employs purposive sampling method to obtain respondents actually engaged in the litchi business

Sample Size	Litchi Farmers	Local traders	Exporters	Total
No. of respondents	80	45	15	140

Data collection method

- Primary Data: Obtained through structured questionnaires.
- Secondary Data: Derived from government reports, APEDA data, district agricultural office reports, research journals, and news articles (2015-2025).

Table 2: Export-oriented knowhows observe among famers

Knowhows level	No. of farmers	%
Strong	36	45%
Partial	20	25%
Not having knowledge	24	30%
Total	80	100%

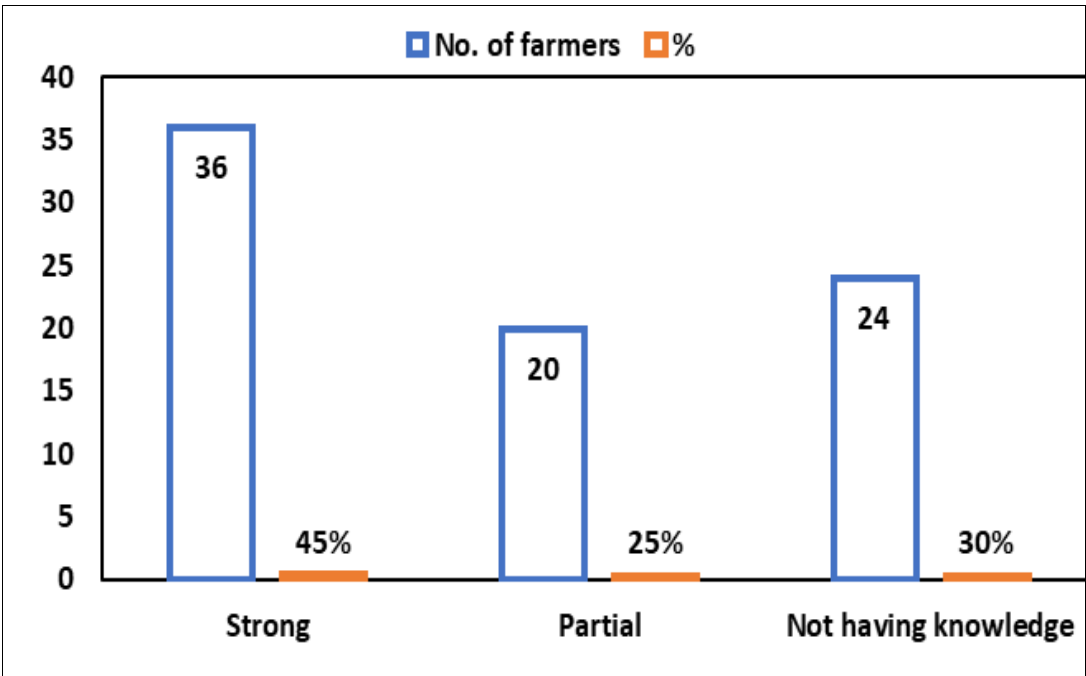


Fig 1: Export related knowledge level

Interpretation: 45% of farmers are aware of litchi export potential, while 30% have no knowledge. Therefore, significant information gap has been observed.

Table 3: Cold-chain and storage facilities availability

Cold-chain & storage facilities level	No. of respondents	% of respondent
Highly Adequate	42	30%
Moderate Adequate	70	50%
Highly Inadequate	28	20%
Total	140	100%

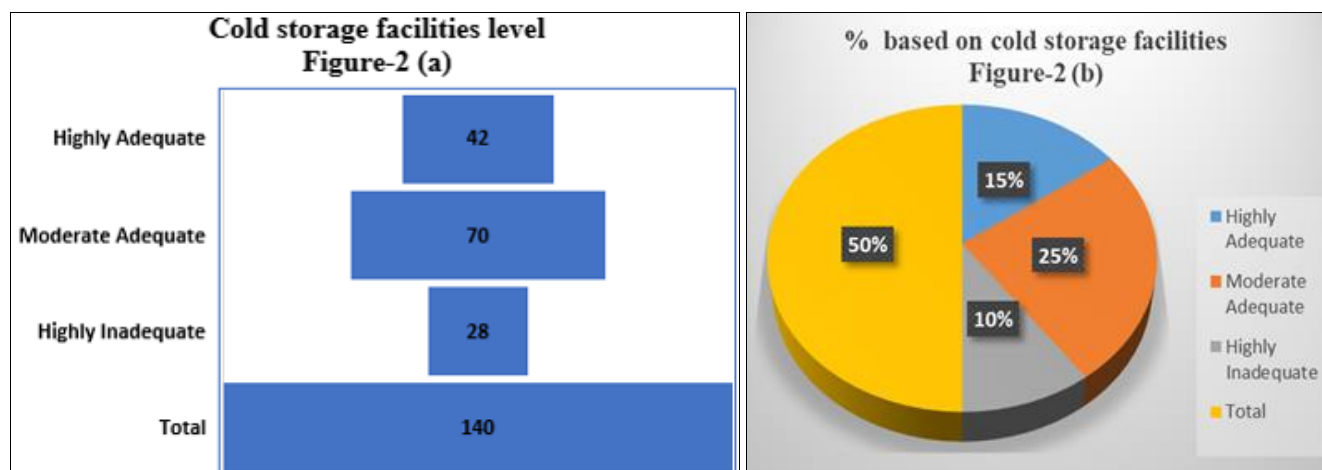


Fig 2: (a) (b) % based on cold storage facilities

Interpretation: Preservation and storing are two critical components for perishable items. Specially the sweet tender fruit like Litchi needs utmost care for exporting it as graded

one. It has been evident from data that more cold storage facilities are required for efficient level of international export and growth.

Table 4: Primary logistical bottlenecks in transporting litchi from Muzaffarpur to international transit points

Primary logistical bottlenecks in transportation	No. of respondents	% of respondent
Highly Adequate	38	27%
Moderate Adequate	42	30%
Highly Inadequate	60	43%
Total	140	100%

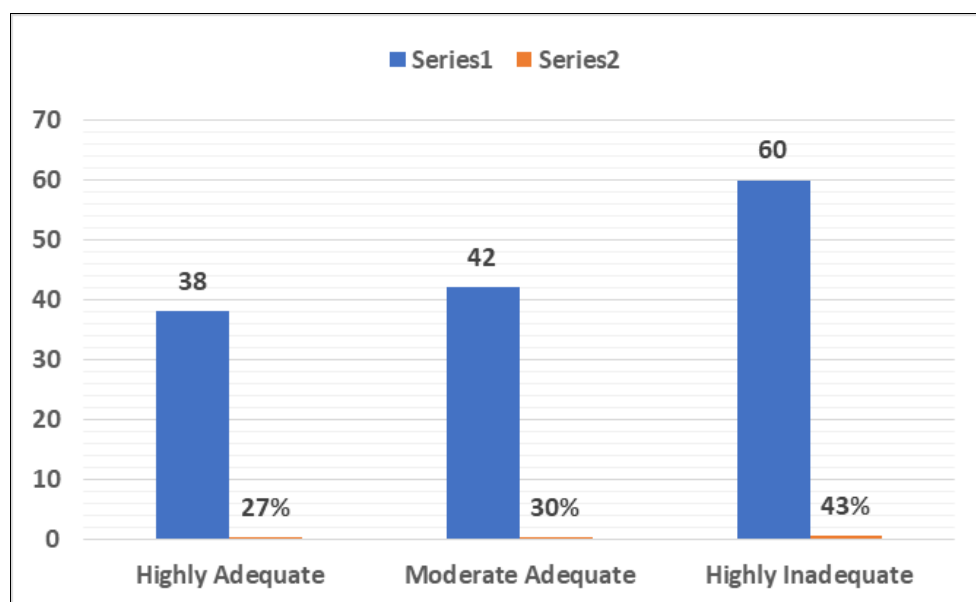


Fig 3: Primary logistical bottlenecks in transportation

Interpretation: Logistic operation is the heart for global supply chain, but the case of export for Muzaffarpur Litchi the transportation system is quite inadequate and create

hindrance to bring the essence of flavor of Litchi into global platform.

Table 5: Most critical challenge faced in litchi export

Challenges faced by litchi export	No. of respondents	% of respondent
Inadequate cold Chain Facilities	53	38%
Transport problem	39	28%
Quality maintaining problems	17	12%
Lack of export knowledge	31	22%
Total	140	100%

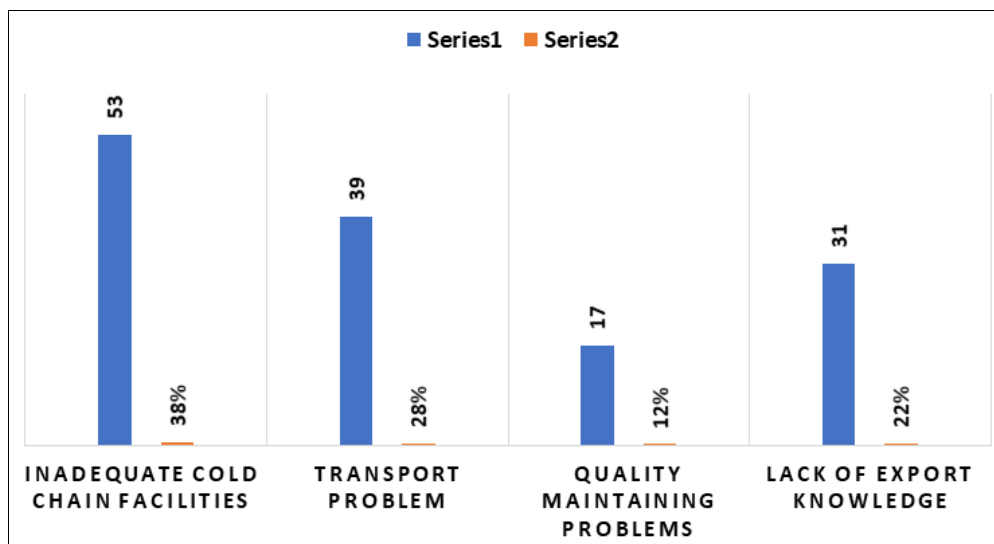


Fig 4: Challenges faced by litchi export

Interpretation: Cold chain infrastructure is the top issue affecting litchi export, followed by transport and export knowledge problems. All inputs are significant but export knowledge is crucial determiner here.

Table 6: Market demand and export readiness

Market demand & export readiness	Readiness	Not readiness
Packaging	40%	60%
Quality factors	38%	42%
Comparative price standard	65%	35%

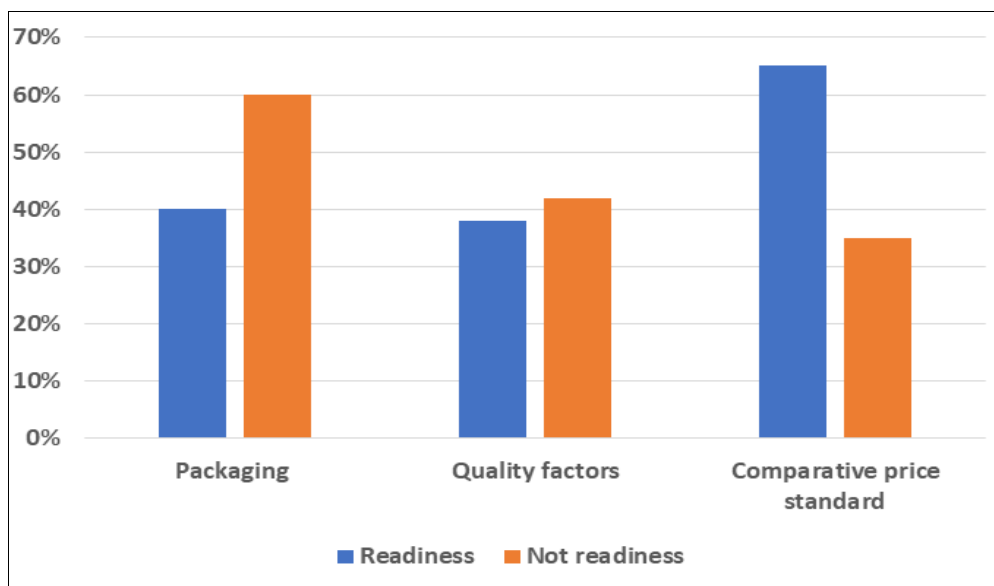


Fig 5: Market demand and export readiness

Interpretation: Packaging and quality factors are partially meet the export formalities and requirements, so improvement needs in these sectors to grab the high export potential

Table 7: The impact of the Geographical Indication (GI) tag

Impact of the Geographical Indication (GI) tag	No. of respondent	%
Very positive	42	30%
Positive	76	54%
Neutral	18	13%
Very negative	0	0%
Negative	4	3%

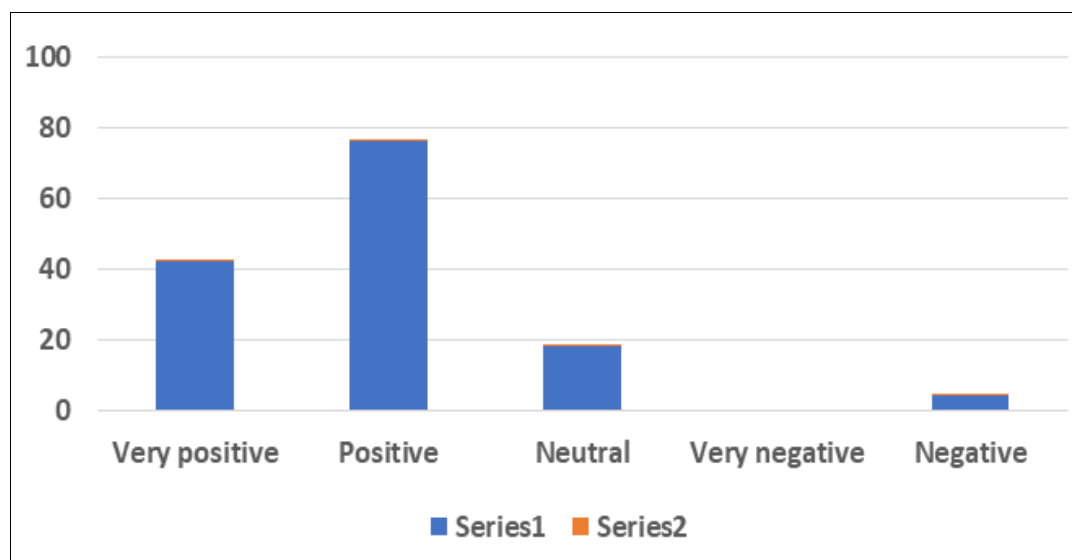


Fig 6: Opinion regarding GI tag

Interpretation: GI tag has quite significant impact over the market. It brings positive and followed by very positive impact over the global branding of Muzaffarpur litchi.

Table 8: Government Support Perception among Farmers and Exporters

Types of support	Positive views	Negative views
Export training support	30%	70%
Quality preserving support	24%	76%
Subsidies & export promotion	32%	68%

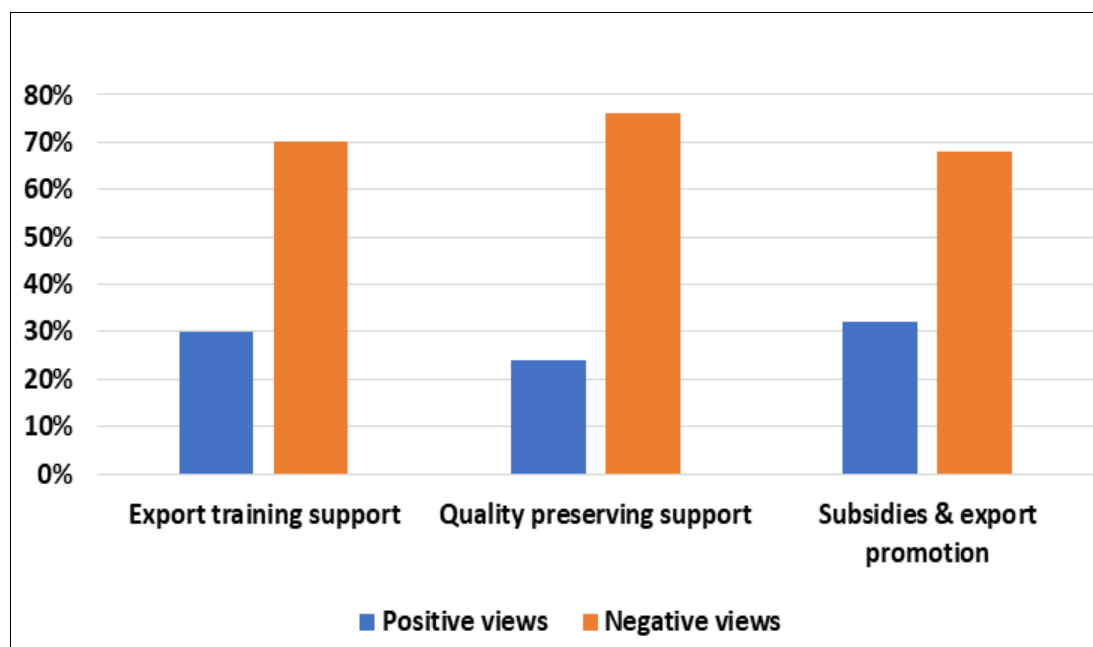


Fig 7: Government support perception among Farmers and Exporters% wise

Interpretation: Most stakeholders feel government initiatives are not enough and significant gap exists between Govt support bodies & the grassroots level engagement operations.

Table 9: Initiatives and research conducted for Litchi export

Initiatives and research conducted for Litchi export	No. of respondent	%
Very effective	20	14%
Somewhat effective	36	26%
Needs improvement	84	60%
Total	140	100%

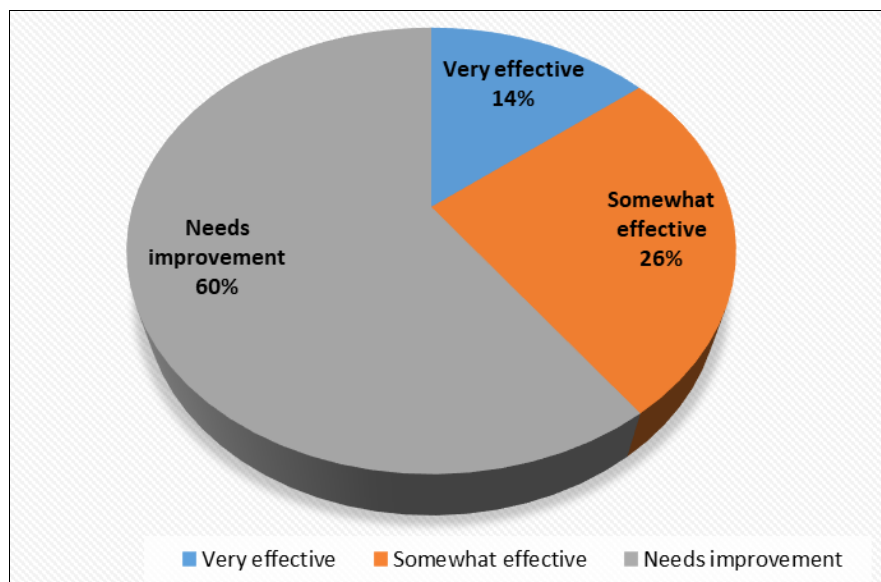


Fig 8: Initiatives and research conducted for Litchi export

Interpretation: Most of the respondent feels that there is a serious need to conduct productive research to remove the gap between the exporter and global market of litchi. The root level problems identification can be possible by systematic and planned initiatives of research.

Findings

The analysis shown that the export potential of Muzaffarpur's litchi production has different limitation to excel the export performance. Unawareness into export performance, lack of maintaining quality standard and inadequate preservation infrastructure (cold storage system) the logistic limitation also significantly creating hindrance in global export. On the other hand, still it lags behind international standard of packaging and faced the situation of poor transport network.

On other hand, research initiatives to uplift the situations are limited. The training support for litchi export is highly encouraged. As most of the framers are less educated, the training can be organized in regional language or their mother tongues are also taken into consideration. The poor farmers need constructive export promotion and subsidies support, which also not up to the mark for GI tagged famous litchi production which has enormous demand into global market. For international compliance for global market pre-and post-harvest management and eco-friendly usages of pesticides are mandatory which also indicates a training for farmers and exporters.

Recommendation

- Proper developed cold chain infrastructure needed at the district level.
- Constructive frequent step by step systematic training and awareness workshops for farmers into their regional language or mother tongue
- Develop constructive alliances with international traders and logistic firms.
- Effective branding and marketing of Shahi Litchi through online media is advisable

Conclusion

Muzaffarpur's litchi industry holds extensive potential for export growth, given the unique aromatic flavor and GI-tagged status of Shahi Litchi. However, infrastructural deficits, lack of export awareness and unfamiliar policy implementation creating barrier into the way of progress. The current export volume is significantly lower compare to world trade scenario. The limitations are found due to lack of cold chain logistics, inefficient processing and lower grade packaging and poor international market networking and connectivity.

On the other farmers are not so educated enough to understand export quality, norms and formalities. Most of the time they deserve the export promotion support from govt. but due to their unawareness regarding policy, quality and procedures, they deprive from that. The dedication of farmers are really appreciable initiatives but ground level interventions are required to bring it as global platform for efficient export formulation. Basically, Muzaffarpur litchi growers have not been appropriately plugged into this system that can be only possible if sustainable export led policy formulation taken place. One critical point is that the dedication and proper training and education of exports needed for farmers to frame Muzaffarpur as the memorable destination in Indian map not only as Lichi kingdom of India but exotic export potential hub for litchi.

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7. Assess the impact of the Geographical Indication (GI) tag on the global branding of Muzaffarpur litchi:
 - a. Highly Effective
 - b. Somewhat Effective
 - c. No Impact
8. How effective are the initiatives and research conducted by local bodies for promoting litchi export growth?
 - a. Very Effective
 - b. Somewhat Effective
 - c. Needs Improvement
9. Govt support perception regarding Litchi Export:
 - a. Export training
 - b. Quality preserving
 - c. Subsidizing & export promotion

Appendix

Questionnaire

Section-A

1. Respondent Category: Tick into appropriate box
 - Farmer / Orchardist
 - Local Trader / Aggregator
 - Exporter / Processor
2. Experience in Litchi Trade:
 - 1-5 years
 - 5-10 years
 - More than 10 years

Section -B

2. How much export-oriented knowhows observe among famers?
 - a. Strong know-how
 - b. Partial know-how
 - c. Not having any knowhow
3. How do you assess the current cold-chain and storage facilities available in Muzaffarpur?
 - a. Highly Adequate
 - b. Moderately Adequate
 - c. Highly Inadequate
4. What are the primary logistical bottlenecks in transporting litchi from Muzaffarpur to international transit points (e.g., Patna or Kolkata airports/seaports)?
 - a. Poor transportation
 - b. Unreliable refrigerated trucking (reefer vans)
 - c. High transportation costs
5. Most critical challenges faced for Litchi export:
 - a. Cold chain facilities
 - b. Transport problem
 - c. Low export knowledge
 - d. Quality maintaining
6. Market demand and export readiness observed
 - a. Packaging
 - b. Quality factor
 - c. Comparative price standard