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The names and affiliations of all authors are provided below, following the references.

Constraints in production and marketing of dragon fruit in Beed district of Maharashtra

Sumit Bokan¹, Jayshri B Tawale², Ranjeetsingh R Jadhav³, Prasad R Akolkar⁴,
 Rajnandini B Kadam⁵, Shelke RD⁶, Suradkar DD⁷

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ABSTRACT

The present study documented the major constraints faced by dragon fruit growers in production and marketing in Beed district of Maharashtra during the agricultural year 2025-2026. Primary data were collected from 80 selected dragon fruit growers through personal interviews using a structured schedule. The constraints were assessed using frequency, percentage and rank based on the responses of the growers. The results showed that high cost of infrastructure was the most important production constraint, reported by 92.50 per cent of the respondents and ranked first. High cost and limited availability of planting material ranked second (85.00%), followed by lack of technical knowledge (72.50%), seasonality and perishability (68.75%), lack of skilled labour (63.75%), unavailability of finance (57.50%) and high fertilizer and micronutrient cost (50.00%). In marketing, price variation was the most important constraint (82.50%), followed by high transport cost (76.25%), lack of Marketing Information System (72.50%), lack of suitable cold storage facilities (67.50%), malpractices adopted in markets (57.50%), dependence on traders and middlemen (52.50%) and low consumer awareness (48.75%). The major suggestions included regular farmer training and extension support, timely availability of quality planting material at subsidized rates, financial support for infrastructure, skill development, improved storage and transport, institutional credit, price stabilization, market information, direct marketing and consumer awareness.

Keywords: Dragon fruit, Production constraints, Marketing constraints, Suggestions, Growers

Introduction

Dragon fruit (*Hylocereus* spp.), popularly known in India as Kamalam, is an emerging high-value horticultural crop. Its relatively low water requirement, adaptability to suitable agro-climatic conditions and growing market demand have encouraged farmers to consider it as an option for crop diversification. In Maharashtra, cultivation has gained importance particularly in dryland and semi-arid regions, including the Marathwada region. The crop has commercial potential and can generate higher returns from relatively limited water resources.

Dragon fruit cultivation, however, requires considerable initial investment in support structures and planting material and also requires labour, technical knowledge and efficient marketing. The crop is perishable; therefore, timely harvesting, transportation and suitable post-harvest handling are important for maintaining quality and reducing losses. Inadequate market infrastructure, price fluctuations and dependence on intermediaries may affect the returns received by producers. Earlier studies reviewed in the thesis have also identified high establishment cost, quality planting material, technical knowledge, price fluctuation, transportation and inadequate post-harvest infrastructure among the important challenges in dragon fruit production and marketing (Pascua *et al.*, 2015; Wakchaure & Reddy, 2021; Jadhav *et al.*, 2025) [2, 1]. In view of the increasing importance of dragon fruit cultivation and the difficulties faced by growers, documentation of production and marketing constraints is essential for identifying areas requiring technical, financial and institutional support. Therefore, the present study was undertaken to document the major constraints in production and marketing of dragon fruit in Beed district of Maharashtra.

Objective

To document the constraints in production and marketing of dragon fruit.

Materials and Methods

Study area and sampling

The study was conducted in Beed district of Maharashtra during the agricultural year 2025-2026. Beed district was purposively selected for the study. Eleven talukas, namely Ambajogai, Ashti, Beed, Dharur, Georai, Kaij, Majalgaon, Parli, Patoda, Shirur and Wadwani, were selected. A multistage sampling design was

Corresponding Author: Sumit Bokan

PG Scholar, Department of
 Agricultural Economics,
 College of Agriculture,
 Latur-413512, Vasantrao
 Naik Marathwada Krishi
 Vidyapeeth, Parbhani,
 Maharashtra, India

adopted and primary data were collected from 80 dragon fruit growers through personal interviews using a structured and pre-tested schedule.

Data collection

The relevant information on production and marketing constraints was collected directly from the selected dragon fruit growers. The reference period was the agricultural year 2025-2026. The responses of the growers were tabulated and analysed using descriptive statistical tools.

Analytical technique

The constraints were documented using frequency and percentage distribution. The constraints were ranked according to the proportion of growers reporting each problem. The percentage of respondents reporting a particular constraint was calculated as:

$$P = (f/N) \times 100$$

where

P = percentage of respondents,

f = frequency of respondents reporting the constraint and

N = total number of respondents.

Results and Discussion

Constraints in production of dragon fruit

The constraints faced by the selected dragon fruit growers in cultivation are presented in Table 1. The results revealed that high cost of infrastructure was the major constraint, reported by 74 farmers (92.50%) and ranked first. High cost and limited availability of planting material was reported by 68 farmers (85.00%) and ranked second. Lack of technical knowledge was reported by 58 farmers (72.50%) and ranked third. Seasonality and perishability was reported by 55 farmers (68.75%) and ranked fourth. Lack of skilled labour was reported by 51 farmers (63.75%) and ranked fifth. Unavailability of finance was reported by 46 farmers (57.50%) and ranked sixth, whereas high fertilizer and micronutrient cost was reported by 40 farmers (50.00%) and ranked seventh.

Table 1. Constraints in production of dragon fruit among selected growers

Sr. No.	Production constraint	Frequency ($n = 80$)	Per cent	Rank
1	High cost of infrastructure	74	92.50	I
2	High cost and limited availability of planting material	68	85.00	II
3	Lack of technical knowledge	58	72.50	III
4	Seasonality and perishability	55	68.75	IV
5	Lack of skilled labour	51	63.75	V
6	Unavailability of finance	46	57.50	VI
7	High fertilizer and micronutrient cost	40	50.00	VII

The findings indicated that production constraints were mainly associated with high initial investment, availability of planting material and technical requirements of dragon fruit cultivation. The first rank of high infrastructure cost reflected the financial burden associated with establishment of support structures and other infrastructure. The second-ranked constraint, high cost and limited availability of planting material, indicated difficulties in obtaining adequate and affordable planting material. The relatively high incidence of lack of technical knowledge suggested that growers required better access to technical guidance regarding scientific cultivation and orchard management. Seasonality and perishability also created difficulties in handling the harvested produce, while labour and financial constraints affected cultivation operations.

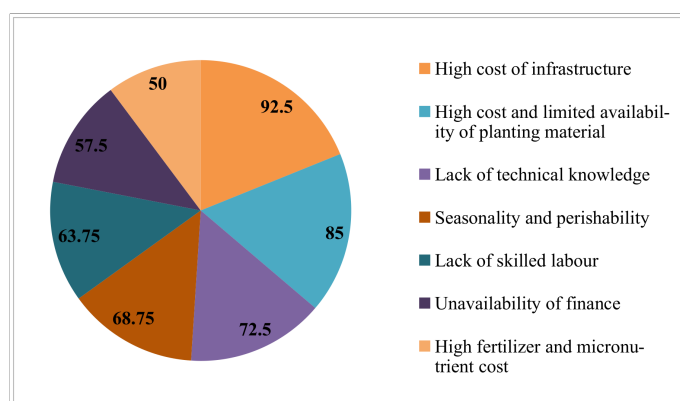


Figure 1. Constraints in production of dragon fruit

The present findings were broadly consistent with the literature reviewed in the thesis. Wakchaure *et al.* (2021) [2] identified high initial establishment cost, lack of standardised nursery practices, inadequate cultivation protocols and short shelf life among important production and marketing challenges in dragon fruit cultivation in India. Dhakal *et al.*, (2021) [3] reported poor knowledge regarding dragon fruit cultivation and identified high initial investment as a major constraint to adoption. Mehta *et al.*, (2024) [4] also highlighted the capital-intensive nature of dragon fruit cultivation during establishment, particularly expenditure on pillar construction and saplings. Jadhav *et al.*, (2025) [1] reported high establishment cost, inadequate irrigation knowledge during summer and high cost and limited availability of planting material as major production constraints among dragon fruit growers in Latur district of Maharashtra.

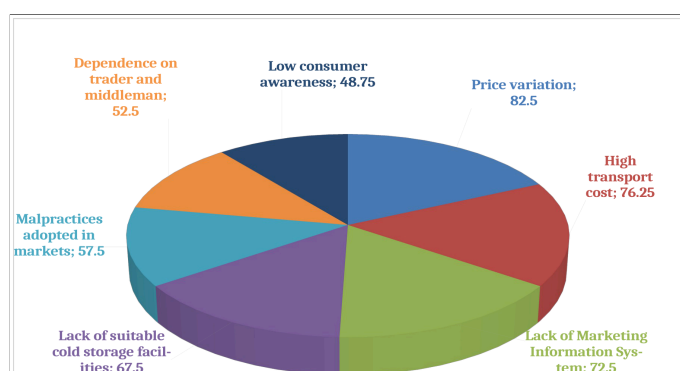
Constraints in marketing of dragon fruit

The constraints faced by the selected dragon fruit growers in marketing are presented in Table 2. Price variation was the most important marketing constraint, reported by 66 farmers (82.50%) and ranked first. High transport cost was reported by 61 farmers (76.25%) and ranked second. Lack of Marketing Information System was reported by 58 farmers (72.50%) and ranked third. Lack of suitable cold storage facilities was reported by 54 farmers (67.50%) and ranked fourth. Malpractices adopted in markets were reported by 46 farmers (57.50%) and ranked fifth. Dependence on traders and middlemen was reported by 42 farmers (52.50%) and ranked sixth, while low consumer awareness was reported by 39 farmers (48.75%) and ranked seventh.

Table 2. Constraints in marketing of dragon fruit among selected growers

Sr. No.	Marketing constraint	Frequency (<i>n</i> = 80)	Per cent	Rank
1	Price variation	66	82.50	I
2	High transport cost	61	76.25	II
3	Lack of Marketing Information System	58	72.50	III
4	Lack of suitable cold storage facilities	54	67.50	IV
5	Malpractices adopted in markets	46	57.50	V
6	Dependence on trader and middleman	42	52.50	VI
7	Low consumer awareness	39	48.75	VII

The results indicated that the major marketing problems were associated with price instability, transportation, market information and post-harvest infrastructure. The first rank assigned to price variation showed that growers faced considerable uncertainty in realizing remunerative prices for their produce. High transport cost, which ranked second, indicated the financial burden associated with movement of the highly perishable produce from farms to markets. The third-ranked lack of Marketing Information System indicated inadequate access to timely information on prevailing market prices, demand and market opportunities. The lack of suitable cold storage facilities further indicated difficulties in preserving quality and extending the marketing period. Malpractices and dependence on traders and middlemen suggested limited bargaining power in the existing marketing system, while low consumer awareness indicated insufficient demand generation.

**Figure 2.** Constraints in marketing of dragon fruit

The findings were supported by earlier studies reviewed in the thesis. Pascua *et al.*, (2015) reported unstable supply, high price fluctuation and uneven demand as important marketing challenges in dragon fruit production and marketing in the Philippines. Chomchalow *et al.*, (2008) [5] identified high transportation cost, insufficient market information and lack of consumer awareness among important con-

straints in tropical fruit marketing. Wakchaure *et al.* (2021) [2] reported an unorganised marketing system, inadequate cold-chain and post-harvest infrastructure, absence of grading and quality standards and price fluctuations as major marketing challenges in India. Jadhav *et al.*, (2025) [1] similarly reported price fluctuation as the most serious marketing constraint among dragon fruit growers in Latur district, followed by market saturation and seasonal demand variation.

Overall assessment of constraints

The combined evidence from production and marketing constraints showed that the difficulties faced by dragon fruit growers were both economic and technical. At the production stage, the major burden arose from the high cost of infrastructure and planting material, whereas at the marketing stage, price variation and high transportation cost were the most prominent problems. Thus, the constraints extended from orchard establishment and management to post-harvest handling and final disposal of produce. The results also showed that seasonality and perishability were relevant across production and marketing because the harvested fruit required timely handling, transportation and suitable storage.

Suggestions for improvement in production

The suggestions given by the selected dragon fruit growers for improvement in cultivation are presented in Table 3. Providing regular farmer training and extension support was the most important suggestion, reported by 74 farmers (92.50%) and ranked first. Ensuring timely availability of quality planting material at subsidized rates was suggested by 70 farmers (87.50%) and ranked second. Increasing subsidies and financial support for infrastructure development was reported by 67 farmers (83.75%) and ranked third. Conducting skill development and labour training programmes was suggested by 62 farmers (77.50%) and ranked fourth. Improving storage, transportation and value addition facilities was suggested by 58 farmers (72.50%) and ranked fifth. Improving access to institutional credit and simplifying loan procedures was suggested by 53 farmers (66.25%) and ranked sixth, while promoting integrated nutrient management and input subsidies was suggested by 49 farmers (61.25%) and ranked seventh.

Table 3. Suggestions for improvement in production of dragon fruit cultivation

Sr. No.	Suggestion	Frequency (<i>n</i> = 80)	Per cent	Rank
1	Provide regular farmer training and extension support.	74	92.50	I
2	Ensure timely availability of quality planting material at subsidized rates.	70	87.50	II
3	Increase subsidies and financial support for infrastructure development.	67	83.75	III
4	Conduct skill development and labour training programmes.	62	77.50	IV
5	Improve storage, transportation and value addition facilities.	58	72.50	V
6	Improve access to institutional credit and simplify loan procedures.	53	66.25	VI
7	Promote integrated nutrient management and input subsidies.	49	61.25	VII

The results indicated that the growers mainly emphasized technical guidance, timely availability of quality planting material and financial support for infrastructure development. The highest rank given to reg-

ular farmer training and extension support indicated that growers considered technical knowledge and continuous guidance essential for improving orchard management and production practices. The sec

ond-ranked suggestion reflected the importance of ensuring the availability of quality planting material at affordable rates. The demand for increased subsidies and financial support for infrastructure development indicated the financial burden associated with establishing dragon fruit orchards. Similarly, the suggestions related to labour training, storage, transportation, value addition and institutional credit indicated the need for support across both production and post-harvest stages.

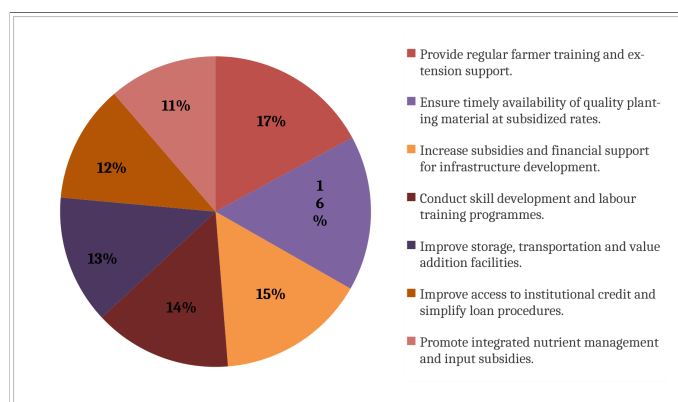


Figure 3. Suggestions for improvement in production of dragon fruit cultivation

Table 4. Suggestions to overcome marketing problems in dragon fruit cultivation

Sr. No.	Suggestion	Frequency (n = 80)	Per cent	Rank
1	Stabilize prices through contract farming and improved market linkages.	76	95.00	I
2	Expand cold storage, pack-house and value addition facilities.	74	92.50	II
3	Strengthen market information systems for timely price and demand updates.	73	91.25	III
4	Reduce transportation costs by improving logistics and providing transport support.	71	88.75	IV
5	Ensure transparent and regulated marketing practices to prevent malpractices.	69	86.25	V
6	Encourage direct marketing, FPOs and digital marketing platforms to minimize dependence on middlemen.	68	85.00	VI
7	Increase consumer awareness through promotional and nutrition campaigns.	66	82.50	VII

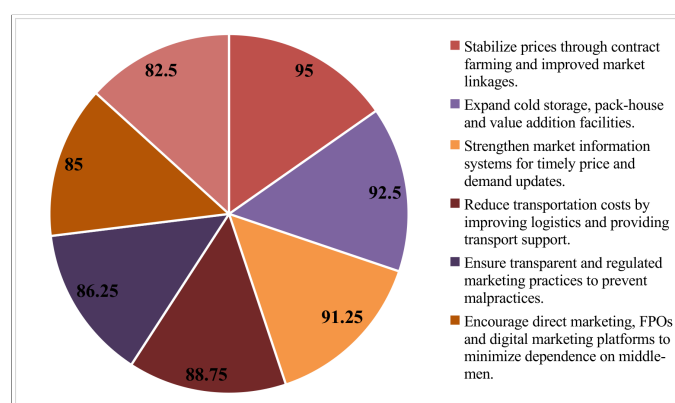
The results indicated that the growers primarily emphasized price stabilization, post-harvest infrastructure, market information and reduction in marketing costs for overcoming marketing problems. The first-ranked suggestion indicated that growers considered stable and remunerative prices essential for reducing uncertainty in marketing. The second-ranked suggestion highlighted the importance of cold storage, pack-house and value addition facilities for reducing post-harvest losses and improving the marketability of the produce. Strengthening the market information system was also considered important for enabling growers to obtain timely information regarding prevailing prices and demand. The suggestions related to transport support, transparent marketing practices and direct marketing indicated the need to reduce marketing costs, improve bargaining power and minimize dependence on intermediaries. The suggestion related to consumer awareness further indicated the importance of expanding market demand for dragon fruit.

The previous findings reviewed in the study also emphasized the importance of improving marketing infrastructure, market information and organized marketing systems. Wakchaure *et al.*, (2020) [6] reported the need for improved marketing infrastructure, pre-cooling, packaging, transportation and controlled storage facilities in dragon fruit marketing. Wakchaure *et al.* (2021) [2] highlighted the importance of strengthening cold-chain and post-harvest infrastructure, grading and quality standards and organized marketing systems to overcome marketing challenges. Pascua *et al.*, (2015) reported price fluctuations, unstable supply and uneven demand as important marketing challenges in dragon fruit production. These findings provided

Suggestions for improvement in marketing

The selected growers also suggested several measures for overcoming marketing problems. Stabilizing prices through contract farming and improved market linkages was the most important suggestion, reported by 76 farmers (95.00%) and ranked first. Expansion of cold storage, pack-house and value addition facilities was suggested by 74 farmers (92.50%) and ranked second. Strengthening market information systems for timely price and demand updates was suggested by 73 farmers (91.25%) and ranked third. Reduction in transportation costs through improved logistics and transport support was suggested by 71 farmers (88.75%) and ranked fourth. Ensuring transparent and regulated marketing practices to prevent malpractices was suggested by 69 farmers (86.25%) and ranked fifth. Encouraging direct marketing, FPOs and digital marketing platforms to minimize dependence on middlemen was suggested by 68 farmers (85.00%) and ranked sixth. Increasing consumer awareness through promotional and nutrition campaigns was suggested by 66 farmers (82.50%) and ranked seventh.

support for the suggestions related to price stabilization, improved market infrastructure and market linkages.



Conclusion

The study concluded that dragon fruit growers in Beed district faced important constraints in both production and marketing. High cost of infrastructure was the foremost production constraint, followed by high cost and limited availability of planting material and lack of technical knowledge. Seasonality and perishability, lack of skilled labour, unavailability of finance and high fertilizer and micronutrient cost were other important production constraints. In marketing, price variation ranked first, followed by high transport cost, lack of

Marketing Information System and lack of suitable cold storage facilities. Malpractices in markets, dependence on traders and middlemen and low consumer awareness were also reported as important problems.

The findings indicated that reducing the constraints would require co-ordinated technical, financial, input-supply and market-support measures. Improved extension and training, timely availability of quality planting material, financial assistance for infrastructure, better transport and cold-storage facilities, reliable market information and stronger organized marketing arrangements would help reduce the difficulties faced by growers and improve the sustainability of dragon fruit cultivation.

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Authors

Sumit Bokan

PG Scholar, Department of Agricultural Economics, College of Agriculture, Latur-413512, Vasant Rao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India

Jayshri B Tawale

Assistant Professor, Department of Agricultural Economics, College of Agriculture, Dharashiv, Maharashtra, India

Ranjeetsingh R Jadhav

PG Scholar, Department of Agricultural Economics, College of Agriculture, Latur-413512, Vasant Rao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India

Prasad R Akolkar

PG Student, Department of Agricultural Economics, College of Agriculture Dr. SPCOA, Baramati-413102, Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra, India

Rajnandini B Kadam

PG Scholar, Department of Agricultural Economics, College of Agriculture, Latur-413512, Vasant Rao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India

Shelke RD

Professor, Department of Agricultural Economics, College of Agriculture, Latur, Vasant Rao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India

Suradkar DD

Professor, Department of Agricultural Extension Education, College of Agriculture, Latur- 413512, Vasant Rao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India