

## Expansion of Exotic Fruits: Dragon Fruit (Kamalam) as a Resilient Crop under Climate Variability

Foram V. Chavda

M.Sc. Scholar, Department of fruit Science, College of Horticulture, Junagadh Agricultural University, Junagadh-362001,

Corresponding Author : foramchavda991@gmail.com

Manuscript No: KN-V3-09/001

### Abstract

Dragon fruit (*Hylocereus spp.*), also known as Kamalam in India, is emerging as an economically and agronomically valuable exotic fruit crop. Native to the tropical regions of Central and South America, it has shown remarkable adaptability to arid and semi-arid conditions in India, particularly in Gujarat, Maharashtra, and Andhra Pradesh. The crop's drought tolerance, minimal input requirements, early bearing, and high market demand make it a suitable option for horticultural diversification in the era of climate change. This article reviews the crop's botanical attributes, climatic adaptability, nutritional value, economic viability, and prospects under Indian conditions. It also highlights government initiatives, expansion trends, and key recommendations for sustainable promotion of this resilient exotic crop.

**Keywords:** Kamalam, *Hylocereus*, climate-resilient horticulture, exotic fruits, India

### Introduction

The rising demand for nutrient-rich exotic fruits and the increasing threats posed by climate variability have led to the exploration of alternative crops that can sustain productivity under water-limited and heat-stressed conditions. Dragon fruit (*Hylocereus spp.*), a member of the Cactaceae family, originally domesticated in the Americas, has found a niche in Indian horticulture due to its resilience and commercial appeal. The Government of Gujarat renamed it "Kamalam" to encourage its cultivation and domestic recognition. Its ability to thrive in degraded and semi-arid lands makes it an ideal candidate for future-ready horticulture.

### Botanical Description

Dragon fruit is a climbing, epiphytic cactus characterized by triangular, jointed stems, aerial roots, and large nocturnal flowers. It is primarily pollinated by moths and bats, though hand pollination is sometimes practiced to improve fruit set. Three species are predominantly cultivated:

- *Hylocereus undatus* (white pulp, pink skin)
- *H. polyrhizus* (red pulp, red skin)
- *Selenicereus megalanthus* (white pulp, yellow skin)

Fruits weigh between 200–600 grams and are rich in seeds embedded in pulp.

**Figure 1:** Different Types of Dragon Fruit



## Climate and Soil Requirements

Dragon fruit thrives in tropical and subtropical climates with:

- Optimal temperatures: 20–35°C
- Rainfall: 500–1,500 mm/year
- Soil: Sandy loam to loamy, well-drained, pH 5.5–6.5

It tolerates drought, salinity, and high temperatures better than most fruit crops. These traits align with the agro-ecological conditions of Gujarat, parts of Maharashtra, Rajasthan, and the Deccan Plateau.

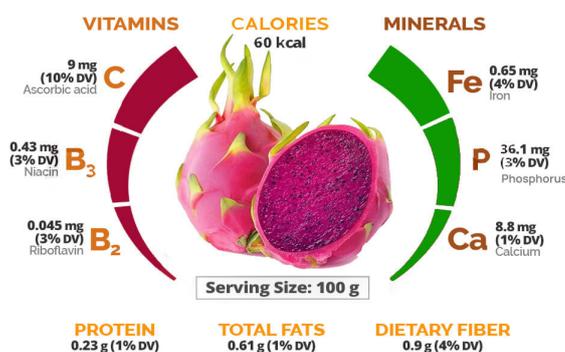
## Nutritional and Medicinal Properties

The fruit is categorized as a “superfruit” owing to its:

- High vitamin C, antioxidants (betalains, flavonoids, polyphenols)
- Dietary fiber, aiding in digestion and metabolic health
- Omega-3 and omega-6 fatty acids (from seeds)
- Low glycemic index and calorie content

Studies have shown positive effects on blood glucose regulation, lipid metabolism, and gut microbiota (Hossain et al., 2021).

**Figure 2:** Nutritional Property of Dragon Fruit



## Agronomic and Economic Advantages

Dragon fruit offers multiple benefits:

- **Early yield:** Begins from second year post-planting
- **Productivity:** 10–30 tonnes/ha under proper management
- **Harvest frequency:** 4–6 flushes per year
- **Shelf life:** 10–15 days, suitable for export
- **Low-input farming:** Drought-tolerant and low pest incidence

- **Economics:** Returns of ₹5–6 lakhs/ha/year from third year onward (ICAR-CIAH, 2023)

These features make it attractive to small and marginal farmers looking for a high-value, low-risk crop.

### Area Expansion and Policy Support in India

Kamalam cultivation has gained significant traction across India:

- **Gujarat:** Over 3,000 ha cultivated; Kamalam Board established
- **Maharashtra:** Nashik and Solapur leading in area and productivity
- **Southern and Northeastern states:** Increasing adoption under MIDH and RKVY schemes

The National Horticulture Board (NHB) and APEDA have recognized dragon fruit for its export and processing potential. Subsidies are available for planting material, drip systems, and trellising.

### Government Initiatives

Key policy measures include:

- Inclusion under **Mission for Integrated Development of Horticulture (MIDH)**
- Financial aid through **RKVY, NHB, and state horticulture departments**
- Promotion by APEDA as an emerging export crop
- R&D support by ICAR-CIAH, ICAR-IIHR, and other SAUs
- Branding under *Atmanirbhar Bharat* as a climate-resilient fruit

These initiatives aim to reduce import dependency and promote local entrepreneurship.

### Challenges and Strategies

Despite its promise, dragon fruit cultivation faces several bottlenecks:

Challenge	Strategy
Limited planting material	Tissue culture, certified nurseries
Pollination dependency	Breeding for self-compatible genotypes
Disease issues (stem rot, anthracnose)	Good drainage, bio fungicides, and integrated pest control
Marketing limitations	Formation of FPOs, cooperative models, export clusters

### Future Prospects

Dragon fruit aligns well with sustainable horticultural goals:

- **Wasteland utilization:** Thrives on non-arable lands
- **Nutritional security:** Boosts fruit consumption among consumers
- **Climate resilience:** Tolerant to temperature and water stress

- **Export readiness:** Shelf-stable with unique appearance and health value

Integration into existing cropping systems and agri-tourism can further amplify its potential.

## Conclusion

Dragon fruit (Kamalam) represents a paradigm shift in Indian horticulture toward climate-resilient and market-oriented fruit production. Its expansion reflects the adaptability of exotic fruits to Indian conditions and their potential in transforming underutilized agro-ecosystems. With scientific interventions, value addition, and coordinated marketing, Kamalam can emerge as a flagship crop in India's quest for sustainable horticulture.

## References

- APEDA. (2022). *Export Potential of Dragon Fruit from India. Agricultural and Processed Food Products Export Development Authority. Retrieved from <https://apeda.gov.in>*
- Hossain, M. S., Islam, M. S., & Rahman, M. S. (2021). *Dragon fruit: A potential crop for the future. Journal of Agriculture and Food Research, 3, 100115. <https://doi.org/10.1016/j.jafr.2021.100115>*
- ICAR-CIAH. (2023). *Production Technology of Dragon Fruit. Central Institute for Arid Horticulture, Bikaner. Retrieved from <https://ciah.icar.gov.in>*
- ICAR-NRC on Pomegranate. (2022). *Kamalam: A Climate-Resilient Exotic Fruit Crop. National Research Centre on Pomegranate, Solapur.*
- NHB. (2023). *Horticulture Statistics at a Glance. National Horticulture Board, Ministry of Agriculture and Farmers Welfare, Government of India. Retrieved from <http://nhb.gov.in>*