

DRAGON FRUIT: A NEW SUPER FRUIT IN INDIAN FARMS

A Comprehensive Review

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ABSTRACT

Dragon fruit, locally promoted as 'Kamalam,' is rapidly emerging as a remunerative 'super fruit' within Indian agriculture (ICAR,2022) transitioning from a niche import to a domestically cultivated horticultural asset. This review examines the burgeoning significance of dragon fruit farming in India, focusing on its agro-economic viability, nutritional prominence, and future potential. The fruit's hardy nature and adaptability to India's diverse agro-climatic conditions Jana,H. (2025), especially in arid and semi-arid regions, present a sustainable option for crop diversification. For Indian farmers, dragon fruit offers compelling economic advantages, including low maintenance requirements, high-profit margins, and a relatively quick return on investment, with cultivation expanding across several states. Its recognition as a 'super fruit' is driven by a rich nutritional profile, abundant in antioxidants, vitamin C, dietary fiber, and essential minerals, which aligns with the growing health consciousness(Healthline,2018; WebMD,2024) of the Indian market. Government initiatives aimed at boosting domestic production to curb imports further underscore its strategic importance ICAR, 2022). These abstract highlights the potential of Kamalam to enhance farmer income, contribute to nutritional security, and establish itself as a key player in India's horticultural landscape, warranting further research into region-specific cultivation practices and value chain development.

Keywords: Dragon fruit, Kamalam, Super Fruit, *Hylocereus undatus*, Indian horticulture

INTRODUCTION

Dragon fruit, a vibrant and visually striking fruit native to the Americas, has rapidly transformed from an exotic curiosity to a promising "super fruit" in India's agricultural landscape (ICAR,2022). Its cultivation, while a relatively new phenomenon, is gaining significant momentum, offering a viable and profitable alternative for farmers, particularly in arid and semi-arid regions. This introduction provides an overview of its journey to Indian farms and its growing importance.

From Ornamental to Commercial Crop

Introduced to India in the late 1990s, dragon fruit was initially grown on a small-scale in-home garden and for ornamental purposes. Farmers quickly realized its potential due to its hardiness and adaptability to diverse climatic conditions. Its ability to thrive in a wide range of soils and its low water requirement, a key characteristic of its cactus family origin, made it a perfect fit for regions with water scarcity.

This resilience has made it an attractive option for crop diversification, especially in states like Maharashtra, Gujarat, Karnataka, Andhra Pradesh, and Tamil Nadu (Jana,2025).

A "Super Fruit" with Growing Demand

The fruit's recognition as a "super fruit" is a major driver of its increasing popularity. Rich in antioxidants, Vitamin C, and dietary fiber, dragon fruit aligns perfectly with the growing health consciousness of the Indian consumer market (Healthline,2018). This domestic demand, coupled with its unique appearance and mild, sweet taste, has created a lucrative market for farmers (Verywell Health,2023). Previously, India relied heavily on imports from countries like Vietnam and Thailand to meet this demand, but domestic cultivation is now rapidly expanding to curb this dependency (Tractor Junction,2024).

Economic Viability and Government Support

Dragon fruit farming offers compelling economic advantages. While the initial investment for setting up trellises and other infrastructure is high, the crop provides a relatively quick return on investment, with plants starting to yield fruit within 1-2 years and reaching full production in 3-4 years. The plants can continue to be productive for over 20 years, making it a long-term, sustainable source of income (Krishi Bazaar,2024).

Recognizing this potential, both central and state governments have initiated programs to promote its cultivation. The "Centre of Excellence for Kamalam Fruit" at the Indian Institute of Horticultural Research (IIHR) in Bengaluru (Press Information Bureau,2023) and various state-level subsidies under schemes like the Mission for Integrated Development of Horticulture (MIDH), are providing farmers with financial assistance, training, and quality

planting material. The strategic decision by the Gujarat government to officially rename the fruit 'Kamalam' further underscores its national importance and commitment to promoting domestic production, a move that has since been adopted more broadly in India.

The introduction of dragon fruit farming marks a significant shift in Indian horticulture. It represents a move towards high-value, climate-resilient crops that not only enhance farmer income but also contribute to national food and nutritional security. As a result, 'Kamalam' is well on its way to becoming a key player in India's agricultural future.

Types of Dragons Fruit

Dragon fruit, a captivating and nutritious fruit, comes in a few distinct types, primarily categorized by the colour of their skin and flesh. Each variety offers a unique combination of flavour, production characteristics, and health benefits, making them popular in different markets.

White Dragon Fruit (White-Fleshed Pitaya)



Scientific Name: *Hylocereus undatus*

- **Appearance:** This is the most common variety of dragon fruit. It has bright pink or red skin with green scales and a creamy white flesh dotted with tiny black seeds.
- **Production:** White dragon fruit is the most widely cultivated type globally due to its hardiness and high yield. The plants are relatively easy to grow and can adapt to various soil and climate

conditions. In India, it is a staple variety in states like Maharashtra and Gujarat, known for its consistent and reliable production.

- **Benefits:** This type has a mild, subtly sweet flavour. It is an excellent source of dietary fiber, which aids digestion and helps regulate blood sugar. The black seeds are rich in omega-3 and omega-6 fatty acids, which are beneficial for heart health.

- **Red Dragon Fruit (Red-Fleshed Pitaya)**



Scientific Name: *Hylocereus costaricensis* or *Hylocereus polyrhizus*

- **Appearance:** This variety is instantly recognizable by its vibrant, deep red or magenta skin and equally colourful red or purple flesh with small black seeds.
- **Production:** Red dragon fruit is less common than the white-fleshed variety but is highly sought after for its intense colour and flavour. It is commercially grown in several parts of the world and is gaining popularity in India.
- **Benefits:** The rich red colour of the flesh is due to a powerful antioxidant called **betalain**. Betalains are known to have strong anti-inflammatory properties and may help reduce the risk of chronic diseases. Red dragon fruit is also a good source of lycopene, a known antioxidant that supports heart health. The taste is typically sweeter and more flavourful than the white-

fleshed variety. . **Yellow Dragon Fruit (Yellow Pitaya)**

Scientific Name: *Selenicereus*



megalanthus

- **Appearance:** This is a smaller, oval-shaped fruit with thick, spiky, bright yellow skin. The flesh is white and has a similar speckled appearance to other varieties.
- **Production:** Yellow dragon fruit is considered the rarest and often the sweetest of the common types. It is native to South America and is produced on a smaller scale compared to the red and white varieties.
- **Benefits:** The yellow variety is prized for its exceptionally high sugar content, making it very sweet. It is a potent source of Vitamin C and is particularly rich in dietary fiber, which can have a strong laxative effect and significantly improve digestive health. The seeds are a good source of healthy fats, including omega-3 and omega-6 fatty acids

Pink Dragon Fruit



Scientific Name: *Hylocereus guatemalensis*

- **Appearance:** Similar to red dragon fruit, this type has pink to magenta skin, but its flesh is a lighter, soft pink hue.
- **Production:** This variety is known for being able to adapt to different soil and climates, making it a good option for growers in diverse regions. It is often a hybrid of the other types.
- **Benefits:** Pink dragon fruit offers a delicate balance of sweet and mildly tangy flavour. Like the red variety, its colour comes from antioxidants that contribute to overall wellbeing. It is rich in vitamins and minerals and supports a healthy immune system.

Suitable Environment for the Production of Dragon Fruit

Dragon fruit, a tropical and subtropical cactus, requires a specific environment to thrive. The ideal conditions include a warm climate, moderate rainfall, and well-drained soil.

Weather and Climate

- **Temperature:** Dragon fruit thrives in warm temperatures between 20°C and 30°C. It can tolerate short periods of

higher temperatures (up to 40°C) but is very sensitive to frost, with temperatures below 0°C causing significant damage.

- **Rainfall:** The plant requires moderate rainfall, ideally between 500 mm and 1500 mm per year. While drought-tolerant, it can be harmed by excessive rainfall, which can lead to root rot in poorly drained soil.
- **Sunlight:** The plant needs ample sunlight, with a minimum of 6 to 8 hours of direct sun exposure per day for optimal growth and fruit production. However, in very hot climates, some partial shading might be necessary to prevent sunburn.

Soil and Land Requirements

- **Soil Type:** Dragon fruit is not very demanding in terms of soil, but the most suitable type is sandy loam or clay loam that is rich in organic matter. The soil must have excellent drainage to prevent water from accumulating around the roots.
- **Soil pH:** The ideal soil pH for cultivation is slightly acidic to neutral, ranging from 5.5 to 7.0.
- **Land Preparation:** Choosing a location with a slight slope or creating raised beds is a recommended practice to ensure water runs off and does not collect around the plant's base.

Production of Dragon Fruit in India

India is rapidly expanding its dragon fruit cultivation, with a focus on making the country self-sufficient and reducing imports. The crop's hardiness and high profitability have made it an attractive option for farmers, especially in regions with semi-arid climates.

Area under Cultivation

The total area under dragon fruit cultivation in India has been increasing steadily. As of 2023-24, the total cultivated area across the country was **145.4 square kilometres (or 14,540 hectares)**. The government's push for crop diversification aims to expand this area significantly, with a target of **50,000 hectares** in the coming years.

Table – 1 Top States by Cultivated Area (2023-24):

States	Area (in km ²)
Andhra Pradesh	79.7
Maharashtra	8.0
Telangana	6.2

Production

Indian dragon fruit production has seen a remarkable rise, driven by increasing domestic demand for this "super fruit."

• **Total Production:** The total national production for 2023-24 was **53.72 kilo tonnes**

Table – 2 Leading States by Production (2023-24)

States	Production (Kilotons)
Andhra Pradesh	27.89
Telangana	7.29
Maharashtra	6.20
Karnataka	4.40
Tripura	2.98

Productivity (Yield)

Productivity refers to the yield per unit of land. Dragon fruit has high productivity, making it very profitable despite the high initial investment.

• **Average Yield:** The average yield of a well-maintained dragon fruit farm in India is **810 tons per acre** annually

after the plants reach full maturity (typically in the third year).

- **Yield per Hectare:** This translates to an average productivity of **20-25 tons per hectare**. In some cases, with excellent management and ideal conditions, yields can be even higher.
- **Top States by Productivity (Tons/Hectare):**

Tripura has the highest productivity in India, demonstrating the crop's success in the Northeast.

Telangana and **Kerala** also show high productivity, making them key players in the domestic market.

Table – 3 Summarized cultivation, production, and productivity (2023-24)

Metric	Details
Total Area Under Cultivation	14,540 hectares (145.4 km ²)
Total Production (2023-24)	53.72 kilotons
Average Productivity	20-25 tons per hectare
Top Producer	Andhra Pradesh (27.89 kt)
Highest Productivity	Tripura

Price of Dragon fruit

The price of dragon fruit in India varies based on several factors, including the variety, quality, seasonality, and the market (wholesale vs. retail). The price also differs between locally grown and imported fruit.

Table- 4 Current prices in Indian

Market Type	Price (INR/kg)
Retail Price	₹200-₹450
Wholesale Price	₹100-₹300
Farm Gate Price	₹80-₹250

Dragon Fruit: A Nutrient-Dense Superfruit

Dragon fruit is a nutrient-dense fruit that's low in calories and packed with vitamins, minerals, and antioxidants. Its impressive nutritional profile makes it a popular "super fruit." The edible black seeds are a source of healthy fats, including omega-3 and omega-6 fatty acids, which is rare for a fruit.

Nutritional value of dragon fruit

- **Low in Calories & Fat:** A 100-gram serving of dragon fruit contains roughly 60 calories and less than 1 gram of fat, making it an excellent guilt-free snack.
- **High in Fiber:** With about 3 grams of fiber per 100g, dragon fruit is great for digestion and helps keep you feeling full.
- **Antioxidant Powerhouse:** The vibrant colours of dragon fruit, particularly the red-fleshed variety, come from betalains, powerful antioxidants that fight inflammation and protect cells from damage. It also contains flavonoids and phenolic acid.
- **Rich in Vitamins & Minerals:** Dragon fruit is a good source of Vitamin C, which boosts the immune system, and minerals like Magnesium, which is vital for muscle and nerve function, and Iron, which is crucial for oxygen transport in the blood.

Table – 5 Dragon Fruit Nutritional Table (Per 100g)

Nutrient	Amount	Daily Value
Calories	50-60 kcal	3%
Carbohydrates	11-13 g	4%
Dietary Fiber	3 g	11%
Protein	1.0 g	2%
Fat	<1 g	<1%

Vitamin C	3 mg	3%
Iron	0.7 mg	4%
Magnesium	18 mg	4%
Calcium	9 mg	1%

CONCLUSION

Dragon fruit (*Hylocereus* spp.), now gaining popularity as “Kamalam,” is quickly emerging as one of India's most lucrative high-value crops. Its remarkable resilience to climate variations, minimal water requirements, and robust market demand position it as an exceptional choice for farmers. This review emphasizes the rapid expansion of dragon fruit cultivation in India, driven by government initiatives, heightened farmer awareness, and soaring consumer demand for nutrient-dense foods. With its impressive antioxidant content, dietary fiber, and rich micronutrient profile, dragon fruit earns its status as a “superfruit.” Furthermore, the crop's high productivity and attractive profit margins make it an enticing and economically viable option for farmers in arid and semi-arid regions.

Despite significant progress, several challenges remain. These include the need for region-specific varieties, improved postharvest management, standardized production protocols, and enhanced value-chain infrastructure. Future research should concentrate on breeding programs, climate-smart cultivation practices, pest and disease diagnostics, and the development of processing and export pathways.

Overall, dragon fruit has considerable potential to increase farmers' income, contribute to nutritional security, and become a key element of India's diversified horticulture sector.

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