

The Story of Sandalwood: India's Fragrant Treasure

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OPEN ACCESS

Keywords

Sandalwood, Cultivation, Heartwood, Global Markets, Fragrant Gold

How to cite this article:

Vijayalakshmi, K. P. and Soares, H. 2026. The Story of Sandalwood: India's Fragrant Treasure. *Vigyan Varta* 7 (05): 160-163.

ABSTRACT

Sandalwood (*Santalum album*), often referred to as India's "fragrant gold," holds immense cultural, ecological, and economic significance. For over three millennia, it has been deeply embedded in religious rituals, traditional medicine, perfumery and social customs. Renowned for its high-quality essential oil rich in santalol, Indian sandalwood commands premium value in global markets. However, excessive exploitation, illegal harvesting, forest fires and diseases have led to a drastic decline in natural populations, reducing annual production from about 4,000 tons in the 1960s to nearly 350 tons today. In response, policy reforms across several Indian states have encouraged private cultivation, transforming sandalwood from a state-controlled resource into a farmer-driven enterprise. Its integration into agroforestry systems offers both ecological benefits—such as biodiversity conservation and carbon sequestration—and economic opportunities through long-term high-value returns. Despite challenges like heartwood uncertainty, pest infestations and theft, advancements in research, biotechnology and plantation management are improving productivity and sustainability. With rising global demand and strategic interventions, sandalwood has the potential to re-emerge as a cornerstone of India's green economy while preserving its rich cultural legacy.

INTRODUCTION

Few trees in the world enjoy as much reverence, history and economic value as sandalwood (*Santalum album*). Known as *Chandana* in Sanskrit, this tree is woven deeply into India's cultural, religious, medicinal and economic traditions. Its soothing fragrance, sacred wood, and precious oil have earned it the title of the "royal tree". Today, sandalwood is not just a cultural symbol but also a multi-billion-dollar resource attracting farmers, entrepreneurs and global investors (Ananthapadmanabha *et al.*, 2018; Uthappa *et al.*, 2015).

A Legacy Rooted in Culture

For over 3,000 years, sandalwood has been a part of human life—from temples to homes, from rituals to perfumes. In India, sandalwood paste marks auspicious ceremonies, weddings, and festivals. During cremations, its fragrant heartwood is used as a spiritual offering, believed to carry the soul towards peace. Ancient texts describe sandalwood as a symbol of purity and generosity: "*Even the axe that fells a sandal tree carries its fragrance.*" Across the world, sandalwood oil has been used in perfumes, cosmetics, incense, and medicines. Its main compound, α - and β -santalol, is what makes Indian sandalwood so prized. While Australian sandalwood oil contains about 39% santalol, Indian sandalwood oil boasts a much higher concentration—between 66% and 79% making it the world's finest and most sought-after (Uthappa *et al.*, 2015; Rao and Bapat, 2013; Kumar *et al.*, 2012).

Decline in the Wild

Despite its prestige, sandalwood has faced a steep decline. Once abundant across southern India, it is now categorized as "vulnerable" by the IUCN. Over-exploitation, illegal felling, smuggling, frequent forest fires, diseases like

sandal spike, and lack of natural regeneration have decimated populations.

- In the 1960s, India produced ~4,000 tons of sandalwood annually.
- Today, production has dropped to barely 350 tons.
- Old trees above 30 cm girth are now rare, and in many landscapes sandalwood is commercially extinct.

This scarcity has driven skyrocketing prices: auction rates range between ₹79 lakh and ₹1.25 crore per ton of heartwood, while oil sells for \$2,000–2,500 per kg, making it one of the world's costliest natural products.

Cultivation: From Forests to Farms

The crisis in natural forests has shifted focus to commercial cultivation. With policy changes in Karnataka, Tamil Nadu, Maharashtra, and other states, farmers can now legally grow, own and sell sandalwood. This has triggered a plantation boom not only in southern states but also in Gujarat, Rajasthan, Madhya Pradesh, and Bihar.

- **Biology of the tree:** Sandalwood is a hemiparasite, depending on host plants like red gram, neem, pongamia, or casuarina for nutrients.
- **Timeline:** Heartwood begins forming at 7–8 years, while commercial harvest occurs at 15–20 years.
- **Yield potential:** A mature plantation can produce 15–20 kg heartwood per tree, fetching farmers ₹1.2–1.5 crore per hectare over its life cycle.
- **Agroforestry integration:** Sandalwood is now grown with horticultural crops (mango, citrus, dragon fruit) and pulses,

giving farmers both short-term and long-term returns.

The Sandalwood Cultivation Acts: From “Royal Tree” to Farmer’s Tree

Historically, sandalwood was state property, strictly controlled by forest departments. Farmers had no ownership rights—even if the tree grew on their land. This monopoly backfired, fueling smuggling and discouraging cultivation.

Reforms changed this scenario:

- Karnataka Forest (Amendment) Bill, 2001: First allowed private cultivation. Later, the Karnataka Sandalwood Policy 2022 gave full rights to landowners to grow and sell sandalwood in open markets.
- Tamil Nadu & Kerala: Relaxed laws in the 2000s, permitting patta landowners to cultivate sandalwood (though harvest/transit still needs permission).
- Maharashtra (2021): Removed sandalwood from scheduled trees under the Maharashtra Felling of Trees Act, 1964, allowing harvesting without prior approval.
- Telangana, Gujarat & Madhya Pradesh: Actively promote sandalwood cultivation under agroforestry schemes with subsidies.

These reforms have transformed sandalwood from the “royal tree of Mysore” into the “farmer’s tree of India”, empowering cultivators while boosting conservation (Rao and Bapat, 2013; Uthappa *et al.*, 2016).

Opportunities and Challenges

Opportunities

- High-value returns: One of the most profitable agroforestry options in India.

- Export potential: Strong global demand in perfumery, pharmaceuticals, Ayurveda, and aromatherapy.
- Employment generation: Nursery, plantation, distillation, value-added products.
- Ecological role: Sandalwood plantations help in soil enrichment, biodiversity conservation, and carbon sequestration.

Challenges

- Heartwood unpredictability: Not all trees form heartwood, creating economic risks.
- Theft & smuggling: Plantations often require fencing, guards, and insurance.
- Pests & diseases: Sandal spike disease remains a major threat.
- Adulteration of oil: Rampant in markets, affecting credibility.

Research institutions like IWST (Bengaluru), ICFRE (Dehradun), and state agricultural universities are working on:

- Improved sandalwood clones & hybrids with faster growth and higher oil yield.
- Tissue culture & micropropagation techniques for mass multiplication.
- Agroforestry models that combine sandalwood with food and cash crops.
- Digital tracking systems to prevent illegal harvesting.

Global Market and the Road Ahead

The global sandalwood market, valued at \$300 million in 2020, is projected to touch \$3 billion by 2040. While India is still the largest exporter, Australia has become a serious competitor through industrial-scale plantations.

For India to reclaim its historic leadership, key steps include:

- Strengthening farmer cooperatives for better bargaining power.
- Value-addition industries: Sandalwood soaps, perfumes, Ayurvedic medicines, incense.
- Export branding: “Indian sandalwood” as a global GI (Geographical Indication) product.
- Sustainable practices: Community forestry, certification, and eco-labeling.
- Technology adoption: Remote sensing, blockchain for supply chain transparency.

CONCLUSION

Sandalwood is far more than just a tree—it is a bridge between India’s past, present and future. From the fragrance in a temple ritual to the promise of green wealth for farmers, sandalwood continues to inspire reverence and opportunity.

With science, community participation, and progressive policies, this “fragrant gold” of India can once again flourish—restoring ecological balance, empowering farmers, strengthening industries and preserving its timeless cultural essence. Sandalwood, once guarded as a royal monopoly, now stands as a symbol of sustainable prosperity and national pride

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