



AGRI MAGAZINE

(International E-Magazine for Agricultural Articles)

Volume: 03, Issue: 02 (February, 2026)

Available online at <http://www.agrimagazine.in>

© Agri Magazine, ISSN: 3048-8656

Socio-Economic Potential of Lemongrass: A Sustainable Pathway for Rural Development in India

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Lemongrass (*Cymbopogon flexuosus*) is a perennial aromatic grass widely cultivated in tropical and subtropical regions for its lemon-scented essential oil, rich in citral. The oil has extensive applications in perfumery, cosmetics, pharmaceuticals, food, beverages, and wellness industries, making lemongrass a high-value commercial crop. In India, lemongrass is grown across several states and provides attractive returns, particularly on marginal and underutilized lands. Export data show a remarkable increase in both quantity and value of lemongrass oil over the past two decades, highlighting its growing domestic and global demand and its contribution to foreign exchange earnings. Beyond economic benefits, lemongrass cultivation supports sustainable agriculture due to its low input requirements, adaptability to diverse agro-climatic conditions, and suitability for rainfed and degraded soils. It generates year-round employment, promotes crop diversification, and enhances rural livelihoods, especially for smallholders, women, and resource-poor farmers. With opportunities for value addition through local distillation and processing, lemongrass offers scope for rural entrepreneurship and agri-tech integration. Supported by appropriate policies and infrastructure, lemongrass can emerge as a “green gold” crop, driving inclusive rural development and strengthening India’s aroma industry.

Key words: Aromatic, sustainability, rural pathway

Introduction

Lemongrass (*Cymbopogon flexuosus*) is cultivated in tropical and subtropical regions of the world (Majewska et al., 2019) for the essential oil distilled from its leaves. Lemongrass is a perennial, multi-cut aromatic grass cultivated for lemon-scented essential oil produced in large quantities (Vimala et al., 2022) in various parts of the world. Lemongrass is a herb whose leaves and oil are used for the treatment of bowel spasms, chest pain, higher blood pressure, epilepsy, dysentery, cough, knee ache (rheumatism), flu, common cold, and tiredness (Spruha et al., 2021). The main component of essential oil is citral, providing a unique lemon-like fragrance (Kaini et al., 2022). The oil smells like lemon (Barbosa, et al., 2008) due to the presence of a high content of citral (around 70%) composed of neral and geraniol isomers in the oil (Hussain et al., 2016). The wide use of oil is due to the citral content that goes into perfumery, cosmetics, beverages, and flavouring of soft drinks (Joy et al., 2006, Thasrin and Anitha, 2023) and also used as a starting material for manufacturing vitamin A through ionones (Majewska et al., 2019). It contains considerable group of flavonoids, essential oils, phenolic compound, and other photochemical constituents which possesses pharmacological activities such as anti-obesity, antibacterial, anti-fungal, anti-nociceptive, anti-oxidant, anti-diarrheal, and anti-inflammatory properties which could enhance health. In addition, lemongrass oil also contains essential minerals such as Fe, Zn,

Mg, Na, K, Ca, Mn, and P but unfortunately, it is not utilized in broad spectrum among rural & urban people (Mukherjee *et al.*, 2024). In India, lemongrass is being cultivated in different states like Maharashtra, Andhra Pradesh, Kerala, Karnataka, Tamil Nadu, Chhattisgarh, Haryana, Punjab, Rajasthan, Jharkhand, Uttar Pradesh, Madhya Pradesh, Bihar, Arunachal Pradesh, Assam, and Sikkim (Handa and Kaul, 2001) for obtaining aromatic oil from the leaves. It provides good remuneration to the growers, particularly for those having less fertile soil and underutilized lands.

The quantity of lemongrass exports in 2000-01 was 0.1 thousand kg and it reached a higher level of 561.46 thousand kg in 2023-24. The value of exports in 2000-01 was Rs. 1.46 lakhs, which reached Rs.7358.27 lakhs in 2023-24. Lemongrass oil export in India has been observed to be 5536.84 thousand kg with a value of Rs. 68342.19 lakhs in the last twenty-four years, i.e. from 2000-01 to 2023-24. Therefore, the continuously increasing domestic and global demands for lemongrass oil have opened up wide opportunities for earning foreign exchange and promoting the Indian aroma industry. The increasing area under cultivation of lemongrass significantly provides employment opportunities for rural people, especially agricultural labourers and resource-poor people. It also offered year-round farm income, better options for crop diversification, and mechanisms for utilizing marginal and rainfed lands (Choudhri *et al.*, 2025).

Lemongrass cultivation presents a sustainable and economically viable pathway for rural development in India, especially in regions with marginal or underutilized land. As a hardy, low-input crop with multiple harvests per year, lemongrass offers rural farmers a steady income and requires minimal use of fertilizers or pesticides. Its essential oil has high demand in the pharmaceutical, cosmetic, and food industries, creating opportunities for value addition and entrepreneurship through small-scale distillation units and herbal product manufacturing. This crop also supports environmental sustainability by improving soil quality, preventing erosion, and promoting regenerative agricultural practices. Furthermore, lemongrass cultivation can empower rural women through self-help groups and create local employment in farming, processing, and marketing. With support from government schemes and integration into farmer cooperatives or producer organizations, lemongrass can play a significant role in enhancing livelihoods, promoting green enterprise, and driving inclusive rural growth across India.

So, Lemongrass has the potential to significantly leverage the socioeconomic landscape of India by tapping into several key areas-agriculture, employment, export, health and wellness, and sustainability.

Sustainable Pathway for Rural Development in India

Rural India struggles with underemployment, dependence on monsoon-prone crops, land degradation, migration, and low incomes, especially among smallholders, tribal communities and women. However, realizing this potential fully depends on coordinated policy support, institutional capacity, infrastructure investment, market linkages and ensuring quality & environmental sustainability. With these in place, lemongrass could become a “green gold” crop in many parts of rural India. In this context, the cultivation of high-value, low-input crops like lemongrass presents an opportunity to address these issues while aligning with India’s broader goals of sustainable agriculture and rural development.

There are some given below

1. Rural Employment and Livelihood Enhancement

Lemongrass farming offers a way to improve the livelihoods of India’s vast rural population. With over 60% of India’s population engaged in agriculture, introducing lemongrass as a high-value crop can provide an alternative source of income, especially for smallholder farmers. By promoting lemongrass cultivation, farmers in rural areas can diversify their crops and increase their earnings, especially in regions with suitable tropical or subtropical climates, such as Uttar Pradesh, Tamil Nadu, and Madhya Pradesh. This diversification can

help mitigate the risks associated with traditional crops that are more susceptible to price volatility and climate change.

2. Sustainable Agricultural Practices

Lemongrass is well-suited to India's diverse climates, especially the tropical and semi-arid regions, making it an excellent crop for regions where other water-intensive crops may not thrive. It requires relatively low water input compared to other crops like rice or sugarcane, and it can grow on marginal lands, making it an ideal crop for regions suffering from soil degradation or water scarcity. Promoting sustainable farming practices around lemongrass cultivation can help conserve water and reduce dependency on chemical fertilizers, fostering environmentally friendly agricultural techniques.

3. Income Generation through Value Addition

Beyond cultivation, lemongrass can be processed into essential oils, dried leaves, and other by-products, offering value-added opportunities. The extraction of lemongrass oil, which is highly valued in global markets, can increase the profitability of the crop. By setting up local processing units, rural communities can capture a larger share of the value chain, creating local jobs in distillation, packaging, and marketing. This approach not only boosts local economies but also strengthens India's position in the global essential oils market.

4. Export and Economic Growth

India is one of the largest exporters of essential oils, and lemongrass oil, in particular, has strong export potential due to its wide use in perfumes, cosmetics, food products, and aromatherapy. The global demand for natural and organic products is rising, and India's position as a major agricultural exporter can be strengthened by focusing on high-value crops like lemongrass. Exporting lemongrass and its derivatives can contribute to India's foreign exchange earnings, boosting the economy and expanding its agricultural export market. Establishing strong trade relationships, particularly with Europe, North America, and East Asia, can help scale this sector.

5. Health and Wellness Market

The rising middle class in India, coupled with a growing interest in natural and wellness products, provides an opportunity for lemongrass to capture domestic market demand. Lemongrass is increasingly being used in wellness products like herbal teas, oils, skincare, and aromatherapy products. India can leverage its vast domestic market to drive local consumption of lemongrass-based products, thus reducing dependency on imports and promoting indigenous production of health and wellness products. This also aligns with the global trend of increasing demand for organic and holistic health solutions.

6. Promotion of Organic and Eco-Friendly Products

The global and domestic markets are shifting towards sustainable and organic products, especially in the personal care and food sectors. By promoting organic lemongrass farming and adhering to fair trade and certification standards, India can enhance its competitiveness in the premium segment of the essential oils market. This could lead to an increase in exports of organic lemongrass oil and position India as a leader in eco-friendly agricultural practices.

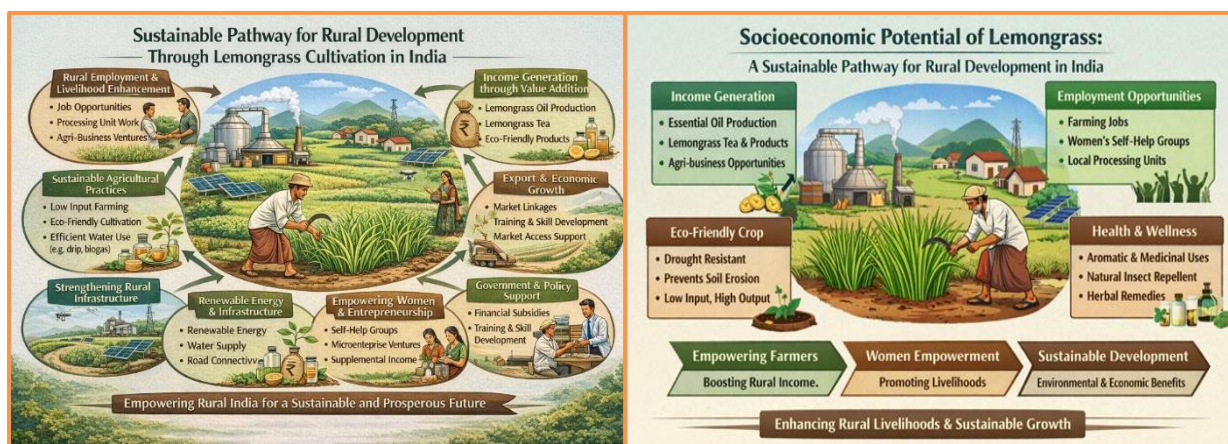
7. Government and Policy Support

The Indian government has increasingly recognized the potential of high-value crops like lemongrass, and initiatives to support non-traditional crops are growing. Schemes to promote essential oil cultivation, agricultural diversification, and rural entrepreneurship can be aligned with lemongrass farming. Additionally, financial support, such as subsidies for irrigation, seed distribution, and crop insurance, can further encourage farmers to adopt lemongrass cultivation. Government initiatives like the CSIR-Aroma Mission or other various schemes to promote agri-tech solutions can be leveraged to improve yields and market access for lemongrass.

8. Strengthening Rural Infrastructure

As India focuses on improving rural infrastructure, investing in transportation networks, cold storage facilities, and processing units for crops like lemongrass will help streamline the supply chain and reduce post-harvest losses. Better infrastructure will allow farmers to

transport lemongrass more efficiently to processing plants and markets, ensuring the crop's profitability and market reach.



9. Innovation and Agri-Tech Opportunities

Lemongrass farming also presents opportunities for technological innovation in Indian agriculture. Digital tools for crop monitoring, weather forecasting, and precision agriculture can help farmers optimize their yields. Agri-tech startups and innovations in processing technologies can play a pivotal role in increasing productivity, improving product quality, and connecting farmers directly to markets.

10. Empowering Women and Entrepreneurship

In rural India, women are often the primary labour force in agriculture. By promoting lemongrass cultivation and its value-added products, women can be empowered through entrepreneurship, particularly in rural processing and small-scale businesses. This can help close the gender gap in rural economies and create more opportunities for women in the agricultural sector.

Conclusion

Lemongrass has the potential to significantly impact India's socioeconomic landscape by offering a sustainable, high-value crop that supports rural development, promotes environmental sustainability, and drives economic growth through exports and value-added industries. By capitalizing on global health trends, government support, and technological advancements, lemongrass farming can not only improve the livelihoods of millions of farmers but also contribute to India's positioning as a leader in the global essential oils market.

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