
Sesame - A Vital Crop for Farmers and the Global Economy

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ABSTRACT

Sesame (*Sesamum indicum*), one of the world's oldest cultivated oilseed crops, plays a vital role in global agriculture and the economy. Rich in oil and nutrients, sesame is valued for its diverse industrial uses, spanning food, pharmaceuticals, cosmetics, and biofuel. Major producers including Sudan, India, Myanmar, Tanzania, Nigeria, Ethiopia, and China contribute to a thriving international trade driven by growing demand for sesame seeds, oil, and processed products. However, challenges such as climate variability, pest and disease infestations, price fluctuations, and limited mechanization impact its production and profitability. Advancements in drought-tolerant and high-yielding varieties, alongside better agronomic practices and policy support, offer promising solutions to enhance sesame productivity. Continued research and investments in sustainable cultivation, value addition, and market linkages will ensure sesame's enduring contribution to food security, farmer livelihoods, and the global agricultural economy.

INTRODUCTION

Sesame (*Sesamum indicum*) is one of the oldest cultivated oilseed crops, valued for its high oil content, nutritional benefits, and versatility in various industries. It plays a crucial role in the global economy and agriculture, providing livelihoods for millions of farmers, particularly in Asia, Africa, and Latin America. As a drought-resistant crop, sesame thrives in diverse climatic

conditions, making it an essential commodity in regions with limited water resources. Its economic significance extends beyond farming, as sesame seeds and their byproducts contribute to food processing, cosmetics, and pharmaceutical industries. This article explores the economic and agricultural importance of sesame, highlighting its role in global trade, farming practices, and sustainability.

GLOBAL SCENARIO OF SESAME CULTIVATION

Sesame cultivation is an integral part of global agriculture, with production concentrated in tropical and subtropical regions. The demand for sesame seeds continues to rise due to their high oil content, nutritional benefits, and wide applications in food, cosmetics, and pharmaceutical industries (Zhang *et al.*, 2021).

TOP SESAME-PRODUCING COUNTRIES

The leading producers of sesame include:

1. **Sudan** – One of the largest exporters, contributing significantly to global sesame trade.
2. **India** – A major producer and exporter, with sesame cultivation spread across states like Gujarat, Rajasthan, and Uttar Pradesh.
3. **Myanmar** – A key player in sesame production, exporting to China and other Asian markets.
4. **Tanzania** – A growing sesame producer with a strong export market, particularly to Asia.
5. **Nigeria** – A major African producer, with increasing export demand from China and the Middle East.
6. **Ethiopia** – Known for high-quality sesame, primarily exported to China, Israel, and Europe.
7. **China** – Though a significant producer, China also imports large quantities of sesame to meet its domestic demand.

SESAME IN GLOBAL TRADE

- The global sesame seed market is valued at billions of dollars, with exports mainly flowing to China, Japan, South Korea, and the Middle East.
- Countries like India and Sudan dominate sesame exports, while China and Japan are among the largest consumers.
- Organic sesame and processed sesame products (such as tahini and sesame oil) are gaining popularity in international markets.

CHALLENGES IN SESAME CULTIVATION

- **Climate Change:** Rising temperatures and erratic rainfall patterns impact sesame yields.
- **Price Fluctuations:** Global sesame prices are highly volatile due to supply-demand imbalances.
- **Pest and Disease Issues:** Sesame crops are vulnerable to pests like leaf rollers/capsule borers (*Antogasta catalaunalis*), Gall flu, Bihar hairy caterpillar, leaf hoppers, white fly, bud fly, Hawk moth, aphids and stink bug and diseases like phyllody, leaf spots, leaf blight, phytophthora blight, root rot, macrophomina stem and root rot (Charcoal rot), powdery mildew, anthracnose fusarium wilt and root knot nematodes.

- **Lack of Mechanization:** In many sesame-growing regions, traditional farming methods result in lower productivity.

FUTURE TRENDS IN SESAME CULTIVATION

- Increased adoption of drought-resistant sesame varieties.
- Expansion of sesame farming in Latin America and non-traditional growing regions.
- Growing demand for organic and fair-trade sesame in Europe and North America.
- Enhanced mechanization and improved farming techniques for better yield and quality.

The global sesame market continues to grow, driven by rising demand for healthy oils and plant-based nutrition. Despite challenges, sesame remains a vital crop for millions of farmers worldwide, contributing to food security and economic development.

INDIA'S CONTRIBUTION TO GLOBAL SESAME CULTIVATION AND PRODUCTION

India is one of the leading producers and exporters of sesame seeds, playing a significant role in the global sesame market. With diverse climatic conditions suitable for sesame cultivation, India produces a variety of sesame seeds, including white, black, and brown varieties, catering to different industrial and culinary needs worldwide.

INDIA'S GLOBAL RANK IN SESAME PRODUCTION

- India ranks among the top three sesame-producing countries, along with Sudan and Myanmar.
- It contributes around **15-20%** of the world's total sesame production.
- India is also one of the largest exporters of sesame seeds, supplying to markets in China, South Korea, Japan, Vietnam, Turkey, and the Middle East.

MAJOR SESAME-GROWING STATES IN INDIA

Sesame is cultivated in both Kharif (monsoon) and Rabi (winter) seasons across different regions. The major sesame-producing states include:

1. Gujarat – Leading state in sesame production, known for high-quality white sesame.
2. West Bengal – Produces a significant amount of black sesame, preferred in Asian markets.
3. Madhya Pradesh – A major contributor to India's sesame export sector.
4. Rajasthan – Suitable for sesame cultivation due to dry climate conditions.
5. Tamil Nadu – One of the key producers of high-quality sesame oil.
6. Uttar Pradesh, Andhra Pradesh, and Maharashtra – Important sesame-growing states with growing export potential.

INDIA'S ROLE IN SESAME EXPORT

- India is the largest exporter of sesame seeds, accounting for 25-30% of global sesame exports.
- Key export destinations include China, Japan, South Korea, Vietnam, Turkey, the USA, and European nations.
- India exports both hulled and natural sesame seeds, with increasing demand for organic sesame in the European and American markets.

CHALLENGES IN INDIAN SESAME CULTIVATION

- Unpredictable weather affecting yields.
- Pest and disease attacks, impacting crop productivity.
- Price volatility in global markets, affecting farmer income.
- Limited mechanization, leading to higher labor costs.

FUTURE PROSPECTS AND GOVERNMENT SUPPORT

- The Indian government supports sesame farmers through subsidies, improved seed varieties, and export incentives.
- Research institutions like ICAR (Indian Council of Agricultural Research) are working on high-yielding, drought-resistant sesame varieties.
- Growing demand for organic and processed sesame products (tahini, sesame oil) is expected to boost India's sesame industry further.

India's strong production capacity, high-quality sesame varieties, and well-established export market make it a key player in the global sesame industry. With technological advancements and better farming practices, India's contribution to the world sesame market is expected to grow in the coming years. With ongoing research on varietal improvements, mechanization, and sustainable crop management practices, sesame holds significant potential as a high-value crop under changing climatic conditions. International organizations and governments are investing in sesame research to enhance seed quality, increase yields, and stabilize farm-gate prices, ensuring better returns to producers and long-term agricultural sustainability (Wei P *et al.*, 2022).

CULTIVATED AND WILD TYPES OF SESAME

Sesame (*Sesamum indicum*) is one of the oldest oilseed crops known to humans, with both cultivated and wild varieties. The domestication of sesame is believed to have originated in India and Africa, where wild relatives of the crop still exist.

1. CULTIVATED SESAME (*Sesamum indicum*)

Cultivated sesame is the domesticated variety grown for commercial purposes. It is valued for its high oil content, rich nutrients, and wide applications in food, medicine, and cosmetics.

CHARACTERISTICS OF CULTIVATED SESAME:

- High oil content (40-60%)
- Non-shattering pods, making it easier to harvest
- Grown in tropical and subtropical regions worldwide
- Varied seed colors (white, black, brown, red, yellow) based on variety
- Resistant to moderate drought conditions

POPULAR CULTIVATED SESAME VARIETIES:

1. White Sesame – Used for tahini, bakery products, and oil extraction.
2. Black Sesame – Rich in antioxidants, commonly used in Asian cuisine and medicine.
3. Brown Sesame – Used for oil extraction and in some culinary dishes.
4. Golden Sesame – A hybrid variety known for its high oil yield.

2. WILD SESAME (*Sesamum* spp.)

Several wild relatives of cultivated sesame exist, mainly found in Africa and parts of India. These wild species are important for genetic diversity and are often used in breeding programs to develop disease-resistant and climate-resilient varieties.

CHARACTERISTICS OF WILD SESAME:

- Lower oil content compared to cultivated sesame
- Shattering pods, making seed collection difficult
- More resistant to pests and diseases
- Adapted to harsh environments, including drought-prone areas
- Smaller seeds compared to cultivated varieties

NOTABLE WILD SESAME SPECIES:

1. ***Sesamum mulayanum*** – Considered the closest wild relative of cultivated sesame, found in India.
2. ***Sesamum radiatum*** – Found in Africa, traditionally used as a leafy vegetable and medicinal plant.
3. ***Sesamum angustifolium*** – Grows in arid regions, has potential for developing drought-resistant sesame varieties.
4. ***Sesamum alatum*** – Native to Africa, exhibits resistance to certain pests and diseases.

IMPORTANCE OF WILD SESAME IN AGRICULTURE

- **Breeding Programs** – Wild species help develop drought-resistant, pest-resistant, and high-yield sesame varieties.
- **Genetic Diversity** – Essential for maintaining a strong gene pool for future crop improvements.
- **Adaptation to Climate Change** – Wild sesame varieties can thrive in extreme conditions, offering solutions for sustainable agriculture.

Both cultivated and wild sesame play crucial roles in global food security, economy, and agricultural sustainability. While cultivated sesame is vital for commercial production, wild varieties provide the genetic foundation for improving future sesame crops.

CONCLUSION

Sesame (*Sesamum indicum*) holds significant economic and agricultural importance, serving as a vital oilseed crop in many parts of the world. Its high oil content, nutritional value, and versatility make it a crucial commodity in the food, pharmaceutical, and cosmetic industries. Economically, sesame farming provides income and employment for millions of smallholder farmers, particularly in Asia, Africa, and Latin America, while also playing a key role in global trade. Agronomically, sesame is valued for its drought tolerance, adaptability to various soil types, and role in sustainable farming systems. Its ability to grow in semi-arid regions makes it an important crop for areas facing water scarcity and climate variability. Moreover, advancements in breeding, precision agriculture, and improved farming techniques continue to enhance sesame production, making it more profitable and sustainable. Despite challenges such as low mechanization, price fluctuations, and disease susceptibility, sesame remains a high-value crop

with growing market demand. By investing in research, technological innovations, and improved agronomic practices, farmers and stakeholders can further unlock the potential of sesame, ensuring its continued contribution to global agriculture and economic development.

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