

GINGER

Lifting Pressure on Production & Quality under Potting Conditions

Non-GMO, Non-Chemical, Non-Pesticides

A Cellular Regeneration Biotech with HQ in Singapore

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SUPER SPICY

Editor Dr. Jeff Lim

Fieldwork by ChongMing

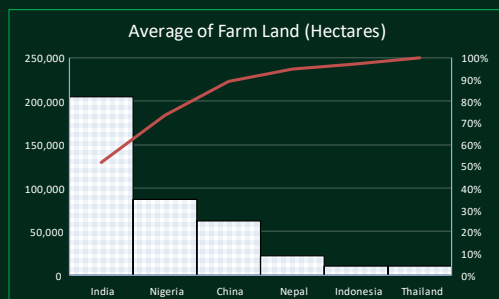
ECONOMICS OF GINGER

Ginger farming is an economically significant agricultural activity with various factors influencing its profitability. As an important spice in the orient, India leads production at just over 2 million metric tonnes (MT) per annum, followed by Nigeria and China at 0.77 million MT and 0.66 million MT, respectively.

Using India as an example, we look into Impact of ginger production on spice production and export in the last 5 Years.

Increased Production Volume

- **Growth in Production:** Over the past five years, India's ginger production has seen a significant increase. From 2,000,000 metric tonnes in 2019 to 2,225,000 metric tonnes in 2023. This growth has contributed to the overall increase in spice production in the country.



- **Contribution to Spice Sector:** Ginger is a major spice crop in India, contributing approximately 17.79% to the total annual average spice production. This increase in ginger production has bolstered the spice sector, making it more robust and diversified.

Economic Upliftment

- **Revenue Generation:** The increased production of ginger has led to higher revenue from both domestic sales and exports. The revenue from ginger farming has significantly contributed to the agricultural GDP of India.
- **Export Growth:** India has seen a steady increase in the export of ginger. In 2020-2021, the export of ginger and turmeric reached its highest quantity and value due to the demand for their immunity-boosting properties during the COVID-19 pandemic. This has helped India maintain a strong presence in the global spice market.

Employment and Rural Development

- **Job Creation:** The expansion of ginger farming has created numerous job opportunities in rural areas, from farming to processing and packaging. This has led to improved livelihoods for many farmers and workers involved in the ginger supply chain.
- **Infrastructure Development:** Increased ginger production has necessitated better infrastructure for storage, transportation, and processing, leading to overall rural development.

Technological Advancements

- **Improved Farming Practices:** The rise in ginger production has been supported by the adoption of better farming practices, including the use of high-yielding varieties and

MEASURING UP

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PER 1,000 ACRES GINGER FARM				
Time to Harvest	Biomass (%)	Yield	Additional Revenue (USD)	Additional Profits (USD)
50%	+150 to 200%	+200 to 250%	+20M	+20M

10 YEAR CUMMULATIVE ROI PER 1,000 ACRE (USD)
+ 200M

improved pest management techniques.

- **Research and Development:** Continuous research and development efforts have led to innovations in ginger farming, enhancing productivity and quality.

Market Dynamics

- **Price Stability:** The increased production has helped stabilize the prices of ginger in the domestic market, making it more affordable for consumers and ensuring steady income for farmers.
- **Export Markets:** India has expanded its export markets for ginger, reaching countries like the USA, EU, and West Asia. This diversification has reduced dependency on a few markets and increased resilience against market fluctuations.

CLAIMING A LOST BUSINESS OPPORTUNITY

With increasing business uncertainty due to climate change globally, the question then arise on identifying key factors of adverse climatic events affecting various aspects of production, quality, and economic viability. Some key aspects include:

Temperature Variations

- **Heat Stress:** Increased temperatures can lead to heat stress in ginger plants, reducing growth and yield. Optimal growth occurs at temperatures between 25-30°C, but higher temperatures can cause physiological stress.
- **Flowering and Yield:** Extreme temperatures can disrupt the flowering process, leading to lower yields. High temperatures can also cause premature bolting, affecting the quality of the ginger.

Rainfall Patterns

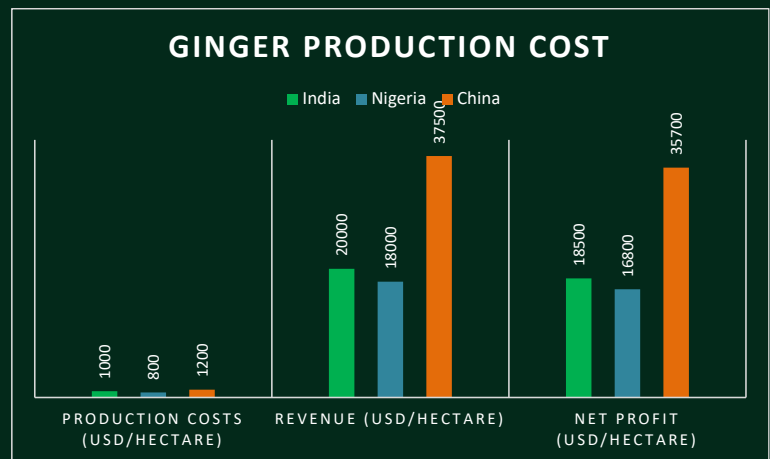
- **Drought:** Irregular rainfall and prolonged dry periods can lead to water stress, affecting the growth and development of ginger plants. Drought conditions can reduce yield and increase the risk of pest infestations.
- **Flooding:** Excessive rainfall and flooding can cause root rot and other fungal diseases, severely impacting ginger crops. Waterlogged conditions are detrimental to ginger, which requires well-drained soil.

Pest and Disease Pressure

- **Increased Infestations:** Climate change can alter the distribution and lifecycle of pests and diseases. Higher temperatures and humidity levels can increase the prevalence of pests like aphids and diseases such as bacterial wilt and rhizome rot.
- **Management Challenges:** Farmers may need to adopt new pest and disease management strategies, which can increase production costs and require additional resources.

Soil Health

- **Soil Degradation:** Changes in rainfall patterns and increased temperatures can lead to soil erosion, nutrient depletion, and reduced soil fertility. Maintaining soil



health is crucial for sustainable ginger production.

- **Carbon Sequestration:** Ginger farming practices can impact soil carbon levels. Sustainable practices, such as agroforestry and organic farming, can help mitigate the effects of climate change by enhancing soil carbon sequestration.

Economic Impacts

- **Cost of Production:** Climate change can increase the cost of production due to the need for additional irrigation, pest control, and soil management practices. These increased costs can affect the profitability of ginger farming.
- **Market Prices:** Fluctuations in yield and quality due to climate change can lead to volatility in market prices. This can impact the income stability of ginger farmers.

LIFTING BARRIERS TO PROFITABILITY

There are several ways to mitigate the negative impact due to climate change, including

- **Improved Varieties:** Developing and planting climate-resilient ginger varieties that can withstand heat, drought, and pests.
- **Water Management:** Implementing efficient irrigation systems and water conservation practices to manage water resources effectively.
- **Agroforestry:** Integrating ginger farming with agroforestry systems to improve soil health, enhance biodiversity, and provide shade to reduce heat stress.
- **Sustainable Practices:** Adopting organic farming practices, crop rotation, and mulching to improve soil health and reduce the impact of pests and diseases.

In this issue, we apply a proprietary 100% water soluble mixture comprised bio-enzymes, L-amino acids in low concentrations, organic NPK biofertilizer (<1%), as well as micronutrients on drip

irrigation system. A weekly application regime comprised substrate and foliar spray implemented in tandem, with the later intended to increase surface area for additional 5% biomass yield conversion. Not surprising, the recipe performed as expected, delivering double biomass into the third week of application.

By harvest, a sweet yield ranged between 200 to 250% was delivered, similar to the performance for tubers.

In addition, the crop also inherited all the fine qualities of an accelerated metabolism presented in [\[ISSUE 1-6\]](#), [\[SPECIAL ISSUE STRAWBERRY\]](#), [\[SPECIAL ISSUE PRESERVATION\]](#), matching back to harvest security and profitability priorities.

CONCLUSION

A profitable, climate resilient, incredibly spicy and vertically integrated ginger farming venture becomes available, with India as the largest beneficiary in Asia.