**Original Research Article**

**Analyzing the Export Value Chain and Competitive Dynamics of India's Fresh Mango Market**

**ABSTRACT**

Mango (Mangifera indica), known as the "King of Fruits," holds significant economic and cultural importance in India, which leads global mango production, contributing approximately 40% of the total output. Despite this dominance, India's share in global mango exports remains relatively modest due to high domestic demand, logistical challenges, and stringent international trade regulations. This study explores the export value chain of fresh mangoes from India, identifying key stakeholders, cost structures, and value addition at different stages of the supply chain.

The research employs an ex post facto methodology, collecting primary data from registered exporters, farmers, vendors, and facilitators, along with secondary data from APEDA and the National Mango Database. The study maps three distinct export channels, highlighting variations in value capture. Findings reveal that in Channel I, exporters retain the highest value share (90.39%), while in Channel III, where farmers act as exporters, they capture the largest share (94.76%). The analysis also underscores the significance of compliance with international standards, particularly gamma irradiation, which constitutes the highest cost at the facilitation stage (Rs. 35/kg).

Market analysis from 2014 to 2023 indicates that the UAE is the largest importer of Indian mangoes (49.06%), followed by the UK and the USA. The study emphasizes the need for infrastructure improvements, streamlined regulatory processes, and enhanced branding strategies to boost India’s competitiveness in the global mango market. By addressing these challenges, India can strengthen its position as a premium supplier and expand its footprint in high-value international markets.

**Key Words** Export Volume, Export Value, Market Share:, Value Chain Analysis, Varietal Composition, Export Destinations.

**INTRODUCTION**

Mango, scientifically named *Mangifera Indica*, often called the “ king of fruits’’ due to their vibrant colour, rich fragrance, and exceptional sweetness. Originating from northwestern Myanmar, Bangladesh and north eastern India, Worldwide, the total mango production is estimated to be over 55 million tonnes annually, with cultivation spread across Asia, America, Africa, and Oceania. India leads global mango production, accounting for around 40 per cent of the world’s total output. India's contribution to global mango exports remains relatively small due to high domestic demand. Key exporters in the global mango market include Mexico, India, Thailand, and Brazil. In 2023, India saw a notable 19 per cent rise in mango exports, totaling around 1.2 million metric tons. This increase was particularly pronounced in shipments to the United States, reflecting the growing international demand for premium Indian mango varieties such as Alphonso and Kesar. Mexico maintained its position as the largest mango exporter globally, with exports amounting to 1.5 million metric tons. The country continues to supply a diverse range of markets, including the United States and Europe. Karnataka is the third-largest producer, accounting for 14 per cent of the national output, supported by its diverse mango varieties and efficient growing methods.

Recent observations reveal that despite India’s vast production capacity, its export share remains relatively modest compared to other major mango-exporting countries. This discrepancy underscores the need for a comprehensive analysis of the current export strategies, market demands and barriers faced by Indian mangoes. Factors such as stringent international phytosanitary regulations, logistical challenges, and competition from other exporting nations need to be thoroughly examined. This study aims to unravel the complexities influencing India's mango export competitiveness by examining various dimensions including quality standards, market preferences and infrastructure capabilities. We seek to identify the specific challenges and opportunities within the export landscape whether they stem from regulatory hurdles, quality perceptions, or competitive pricing.

**OBJECTIVES**

1. Export value chain mapping of fresh mango exports from India
2. India's Export Competitiveness for fresh mangoes in the Global Market

**METHODOLOGY**

Expost Facto reseach was adopted for the study**.** In order to examine and document the specific objectives of investigation, required data for the study was collected from both primary and secondary data. To analyze the value chain of fresh mango exports, primary data was collected from a range of sources. This included five registered fresh mango exporters listed with APEDA, five APEDA-certified farmers, five vendors and one facilitator (packhouse). The data was obtained through a well-structured and pre-tested interview schedule, ensuring its comprehensiveness and relevance. For the analysis of growth, trends, direction, and competitiveness in the export of fresh mangoes, secondary data was gathered from several sources. This data included export quantities and values from the top 10 importing countries, covering the years 2004 to 2023, sourced from the Agricultural Processed Food Products Export Development Authority (APEDA) and the National Mango Database. Descriptive statistics, such as mean and percentages, were used to analyze the data on the growth

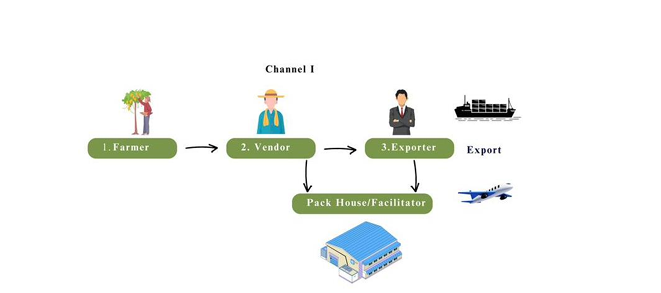
**RESULTS AND DISCUSSION**

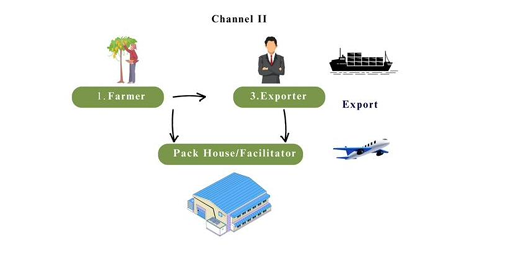
1. **Export value chain mapping of fresh mango exports from India**

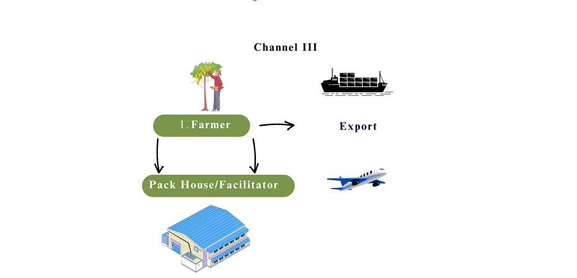
Fig.1 indicates the value chain mapping, which focuses on the value captured from farmers till the exporter, reflects the flow of value at each stage of the export value chain. Based on the needs of the research, In Channel I, mangoes were collected from farmers by a local vendor. The vendor was responsible for field-level grading, packing and transportation to the facilitation center. At the facilitation center, activities such as unloading, primary grading, hot water treatment, ripening, secondary grading, weighing, packing, marking, gamma treatment, quality checking and loading were carried out. Mangoes were then transported to the nearest airport for export. In Channel II, the exporter directly procured mangoes from the farmers and sent them to the facilitation center. After all the processes at the facilitation center were completed, the exporter handled the transportation to the airport, from where the mangoes were exported. In Channel III, the farmer acted as the exporter. The farmer harvested the mangoes, sent them to the facilitation center for processing and then transported them to the airport for export.

**1.1 Value addition at each stage of different fresh mango export channels**

The table 1 provides a comparison of value contribution and the compounded value chain across three different channels in the mango export process, involving key stakeholders such as farmers, vendors, facilitators, and exporters. In Channel I, farmers sell mangoes at Rs. 82.00, earning a margin of Rs. 60.00, which contributes 5.31 per cent to the value chain. The vendor, responsible for operational costs and logistics, contributes 0.81 per cent to the value chain with a margin of Rs. 8.20.







**Fig. 1: Export value chain mapping of fresh mango exports from India**

The facilitator incurs an operational cost of Rs. 31.32 and contributes 3.50 per cent to the total value chain, earning a margin of Rs. 22.68. Exporters in this channel bear the highest operational costs (Rs. 500.70) and contribute a substantial 90.39 per cent, earning a margin of Rs. 895.85. The total exported price in this channel is Rs. 1545.01 with the compounded value contribution reaching 100 per cent.

As shown in table 2 in Channel II, the vendor is absent, and the exporter directly procures from the farmer. The farmer's contribution slightly increases to 5.32 per cent, with a margin of Rs.60.00. The facilitator’s role and contribution remain similar to Channel I, contributing 3.50 per cent to the value chain. The exporter takes on a larger share of the value chain, contributing 91.18 per cent with an operational cost of Rs. 505.90 and a margin of Rs.899.94. The exported price in Channel II is marginally lower at Rs. 1541.84, with the compounded value chain contribution also at 100 per cent.

As shown in table 3 in In Channel III, where the farmer assumes the role of the exporter, the farmer's direct contribution as a seller is lower (Rs. 26.80), with minimal margin from sales (1.74%). However, by acting as the exporter, the farmer captures a larger share of the total value chain, contributing 94.76 per cent, with a margin of Rs. 959.48. The facilitator’s role remains unchanged, contributing 3.50 per cent to the value chain. The absence of intermediaries like vendors makes this channel more efficient for the farmer, and the exported price is Rs. 1540.98.

Based on the research need to assess the value captured from farmers till the exporter, it is evident that the share of value varies significantly between channels. In Channel I, while farmers capture a decent margin, the highest value is ultimately captured by the exporter (90.39%). In Channel II, the absence of a vendor slightly increases the farmer’s share, but again, the exporter retains the majority (91.18%). Channel III, however, demonstrates a model where the farmer, acting as the exporter, captures the majority of the value (94.76%). This model of integration provides the greatest value retention for farmers by eliminating the need for intermediaries and allowing farmers to control the export process, thus increasing their overall earnings. This insight is critical for understanding how farmers can capture more value through vertical integration within the export value chain.this study is also inline with Mehdi *et al.* 2016

**Table 1: Channel I Value addition in fresh mango exports**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Stake Holders** | **Particulars** | **Amount in Rs. /Kg** | **Value Contributing at each stage** | **Compounded value chain** |
| **Famers** | Selling Price | 82 | 5.31 | 5.31 |
| Cost of production | 22 |
| Marketing Cost | 0 |
| Margin | 60 |
| **Vendor** | Purchase price | 82 | 0.81 | 6.11 |
| Operational E | 4.26 |
| Margin | 8.2 |
| **Facilitator** | Purchase price | 94.46 | 3.5 | 9.61 |
| Operational E | 31.32 |
| Margin | 22.68 |
| **Exporter/famers as exporter** | Purchase price | 148.46 | 90.39 | 100 |
| Operational E | 500.7 |
| Margin | 895.85 |
| **Exported Price** |  | 1545.01 | 100 |

* **Cost per Kg of Mango**

**Table 2 Channel II value addition in fresh mango exports**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Stake Holders** | **Particulars** | **Channels II** | **Value Contributing at each stage** | **Compounded value chain** |
| **Famers** | Selling Price | 82 | 5.32 | 5.37 |
| Cost of production | 22 |
| Marketing Cost | 0 |
| Margin | 60 |
| **Vendor** | Purchase price |  |  |  |
| Operational Cost |
| Margin |
| **Facilitator** | Purchase price | 82 | 3.5 | 8.9 |
| Operational Cost | 31.32 |
| Margin | 22.68 |
| **Exporter/famers as exporter** | Purchase price | 136 | 91.8 | 100 |
| Operational Cost | 505.9 |
| Margin | 899.94 |
| **Exported Price** |  | 1541.84 | 100 |

**Table 3 Channel III value addition in fresh mango exports**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Stake Holders** | **Particulars** | **Channels III** | **Value Contributing at each stage** | **Compounded value chain** |
| **Famers** | Selling Price | 26.8 | 1.74 | 1.26 |
| Cost of production | 22 |
| Marketing Cost | 4.8 |
| Margin |  |
| **Vendor** | Purchase price |  |  |  |
| Operational Cost |  |  |
| Margin |  |  |
| **Facilitator** | Purchase price | 26.8 | 3.5 | 4.81 |
| Operational Cost | 31.32 |
| Margin | 22.68 |
| **Exporter/famers as exporter** | Purchase price | 80.8 | 94.74 | 100 |
| Operational Cost | 500.7 |
| Margin | 959.48 |
| **Exported Price** |  | 1540.9 | 100 |

**1.2 The cost break-up for value added at Facilitators level**

Table 4 illustrates the cost break-up for value added at facilitators level for mangoes as follows, unloading costs were Rs. 1 per kilogram, primary grading costs were Rs.3 per kilogram, hot water treatments incurred Rs. 6 per kilogram and ripening costs amounted to Rs. 3 per kilogram. Secondary grading, weighing, marking, and related tasks were priced at Rs. 4 per kilogram, while the gamma treatment represented the highest cost, at Rs. 35 per kilogram. Finally, loading charges were Rs. 2 per kilogram, bringing the total operational cost at the facilitation center to Rs. 54 per kilogram.

In terms of value distribution, gamma treatment, which is a compulsory SPSS (Sanitary and Phyto sanitary) requirement for USA, one of India’s major trade partners, accounted for the largest share of the costs. This highlights the critical importance of adhering to international phytosanitary standards, especially for the U.S. market. The costs associated with hot water treatments and secondary grading further underscore the emphasis on quality assurance and preparation for export, ensuring the mangoes meet both regulatory and market expectations (Sharma, A. and Shilpa 2021). Meanwhile, the relatively lower costs for unloading, loading and primary grading reflect the basic logistical operations within the facilitation center. Overall, the most significant investments are in post-harvest treatments essential for international trade, with gamma treatment playing a pivotal role in compliance and market access.

**Table 4: The cost break-up for value added at Facilitators level**

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Operations** | **Costs (Rs./ Kg)** |
| 1 | Unloading charge | 1 |
| 2 | Primary grading | 3 |
| 3 | Hot water treatments | 6 |
| 4 | Ripening | 3 |
| 5 | Secondary grading, weighing, marking and etc | 4 |
| 6 | Gamma treatment | 35 |
| 7 | Loading charge | 2 |
|  | Total | 54 |

**1.3 The cost break-up for value added at exporter level**

Table 5 represents cost break-ups at exporter level in export value chain of fresh mangoes, results found that, in Channel I and III, the costs outlined were Rs. 20.00 for packing material, Rs. 5.00 for the Customs House Agent (CHA) and quality check, Rs. 3.20 for insurance, Rs. 467.50 for freight, and Rs. 5.00 for miscellaneous expenses, totalling Rs. 500.70 per kilogram. In Channel II, an additional Rs. 5.20 per kilogram is incurred for transportation from the farm to the facilitative center, bringing the total cost to Rs. 505.90 per kilogram.

The packing material of a 4 kg box costing Rs.80 per box, which is ideal measure for exports. The licenced Customs House Agent (CHA) services are predominantly for the U.S exports. Insurance and freight costs are averaged for air transport. Miscellaneous charges cover legal expenses, transportation to the airport and airport handling fees. In Channel II, the transportation from the farmer to the facilitative center is also included as part of the overall cost structure. These findings were similar with the results of (Mehdi *et al.,* 2016).

**Table 5: The cost break-up for value added at exporter level**

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Operation** | **Cost (Rs./Kg)** |
| 1 | Packing material  (Rs. 80/4kg box) | 20 |
| 2 | CHA/Quality checking | 5 |
| 3 | Insurance | 3.20 |
| 4 | Freight | 467.50 |
| 5 | Miscellaneous | 5.00 |
| Channel I and III | Total Cost | 500.70 |
|  | Transportation | 5.20 |
| Channel II | Total Cost | 505.90 |

**Market share of major importers of Indian Fresh Mangoes**

The table 6 indicated that the market shares of major importers of Indian Fresh Mangoes in the world from 2014 to 2023, the United Arab Emirates (UAE) dominated the market for Indian fresh mangoes, accounting for nearly half of both the quantity and value of imports. On average, the UAE imported 18,735 metric tons (MT) annually, representing49.06 per cent of the total imports and contributing 48.72 per cent to the total value, equivalent to $25.9 million. The United Kingdom followed, though with a much smaller share: it imported 3,028 MT (7.93 %) but contributed a higher proportion to the value (14.15%) due to higher price points, amounting to $7.5 million. Other significant importers include Qatar (5.09 % of the quantity, 5.43 % of the value), the United States (2.45 % of the quantity,4.38 % of the value), and Oman (4.37 % of the quantity, 4.27 % of the value). Notably, Other Countries collectively made up 28.09 per cent of the total imports and 15.84 per cent of the value, suggesting a diversified but lower-value import market for Indian mangoes across various regions. Overall, the world imported an average of 38,186 MT of Indian mangoes annually, worth $53.2 million.

**Table 6: Market share of major importers of Indian Fresh Mangoes in the world (2014 to 2023)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Imports** | **Average Quality (MT)** | **Percentage Contribution (%)** | **Average Quality (MT)** | **Percentage Contribution (%)** |
| United Arab Emirates | 18735 | 49.06 | 25919544 | 48.72 |
| United Kingdom | 3028 | 7.93 | 7525359 | 14.15 |
| Qatar | 1942 | 5.09 | 2887555 | 5.43 |
| Oman | 1667 | 4.37 | 2272802 | 4.27 |
| United States of America | 935 | 2.45 | 2332408 | 4.38 |
| Nepal | 695 | 1.82 | 2972824 | 5.59 |
| Kuwait | 459 | 1.20 | 856684 | 1.61 |
| Other Countries | 10726 | 28.09 | 8428834 | 15.84 |
| **Total** | **38187** | **100.00** | **53196013** | **100.00** |

**Source ITC Trade Map**

**CONCLUSION**

Mangoes, known as Mangifera indica, are cultivated extensively in tropical and subtropical regions. India leads global production, accounting for (40%) of the total, with key states including Uttar Pradesh, Andhra Pradesh and Karnataka. Despite this dominance, India’s export share is limited due to high domestic demand. India exported approximately 32,104 MT of fresh mangoes in FY 2023-24, marking a (19%) increase from the previous year. Major markets include the UAE, UK, and USA. However, exporters face challenges such as meeting international standards, insufficient cold storage, and competition from other countries. Opportunities exist in expanding global demand, particularly for processed mango products like pulp and juice. Emphasizing sustainable farming practices could enhance market appeal and cater to evolving consumer preferences.

The value chain mapping of fresh mango exports from India examines the flow of value across different stakeholders, from farmers to exporters. The study identifies three key channels: Channel I: Farmers earn Rs. 60.00 (5.31% of total value), while exporters capture the highest value (90.39%).Channel II: Farmers’ share increases slightly to 5.32%, while exporters retain 91.18% of the value.Channel III: Farmers, acting as exporters, gain the highest share (94.76%) by eliminating intermediaries.

Cost Distribution and Complianc: At the facilitation center, key costs include gamma treatment (Rs. 35/kg), hot water treatment (Rs. 6/kg), and ripening (Rs. 3/kg). Gamma treatment is essential for exports to the U.S., ensuring compliance with international standards. Export costs per kg range from Rs. 500.70 (Channel I & III) to Rs. 505.90 (Channel II), with freight (Rs. 467.50) being the largest component.Market Share of Indian Mango Exports (2014-2023)UAE: Largest importer (49.06% of quantity, 48.72% of value, $25.9M).UK: 7.93% of quantity but 14.15% of value ($7.5M), indicating premium pricing. Total exports: 38,186 MT annually, worth $53.2M.

ACKNOWLEDGMENTS

A sincere thanks to my chairperson who guiding me in pursing my thesis and special thanks to University of Agricultural Sciences, Bangalore for all kind of support for conducting research. I would like to express my gratitude to my beloved parents and friends

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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