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# Vision 2030: Focusing on high-value horticulture for Atmanirbhar Bharat

**April 2026**







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# Executive summary

India's horticulture sector has emerged as the most consequential driver of agricultural value creation. Contributing ~33% of agricultural GVA and having overtaken foodgrains in aggregate output, horticulture today anchors farmer incomes, dietary diversification, and agri-export potential. Total horticulture production has increased from ~281 million tons in 2013–14 to ~368 million tons in 2024–25, supported by rising domestic demand, expanding processing capacity, and strong global market pull for safe, traceable, and value-added produce.

India's horticulture sector has emerged as the most consequential driver of agricultural value creation. Contributing ~33% of agricultural GVA and having overtaken foodgrains in aggregate output, horticulture today anchors farmer incomes, dietary diversification, and agri-export potential. Total horticulture production has increased from ~281 million tons in 2013–14 to ~368 million tons in 2024–25, supported by rising domestic demand, expanding processing capacity, and strong global market pull for safe, traceable, and value-added produce.

Despite this structural strength, India's high-value and premium horticulture segments remain constrained by persistent ecosystem failures. Chronic shortages of clean and elite planting material, ageing orchards with declining productivity, fragmented post-harvest systems, and uneven quality and traceability standards continue to limit competitiveness. These constraints have created a structural paradox: India remains import-dependent in several high-value value chains even as domestic processing capacity is under-utilised. For instance:

- **India imports ~60% of its raw cashew nut requirement, despite having one of the world's largest processing industries operating at only 50–60% capacity.**
- **Domestic production of cocoa meets less than 20% of demand, forcing large-scale imports of beans and derivatives even as installed grinding capacity remains underleveraged.**
- **Apple imports exceed 0.5 million tons annually, reflecting gaps in productivity, grading consistency, and branding in Indian supply chains.**

This coexistence of import dependence and idle domestic capacity underscores a fundamental misalignment between upstream supply quality and downstream market requirements.

Vision 2030 is to convert this asymmetry into advantage—shifting decisively:

- **from volume-led growth to value-led growth,**
- **from import reliance to domestic value-addition, and**
- **from fragmented, scheme-driven interventions to a coherent, mission-mode platform.**

The ambition is to create an integrated national framework that simultaneously scales productivity, quality, processing utilisation, exports, and farmer livelihoods, positioning India as a reliable global supplier of premium, safe, and traceable horticulture products while strengthening domestic agri-industrialisation.

Delivering this vision requires moving beyond incremental improvements toward a system-level transformation of the horticulture ecosystem. Global experience and India's own implementation record clearly demonstrate that downstream investments i.e. cold chains, processing hubs, export infrastructure fail to deliver returns unless upstream issues of planting material and orchard health etc. are addressed first. The proposed roadmap therefore corrects the system at its root before intensifying capital deployment.

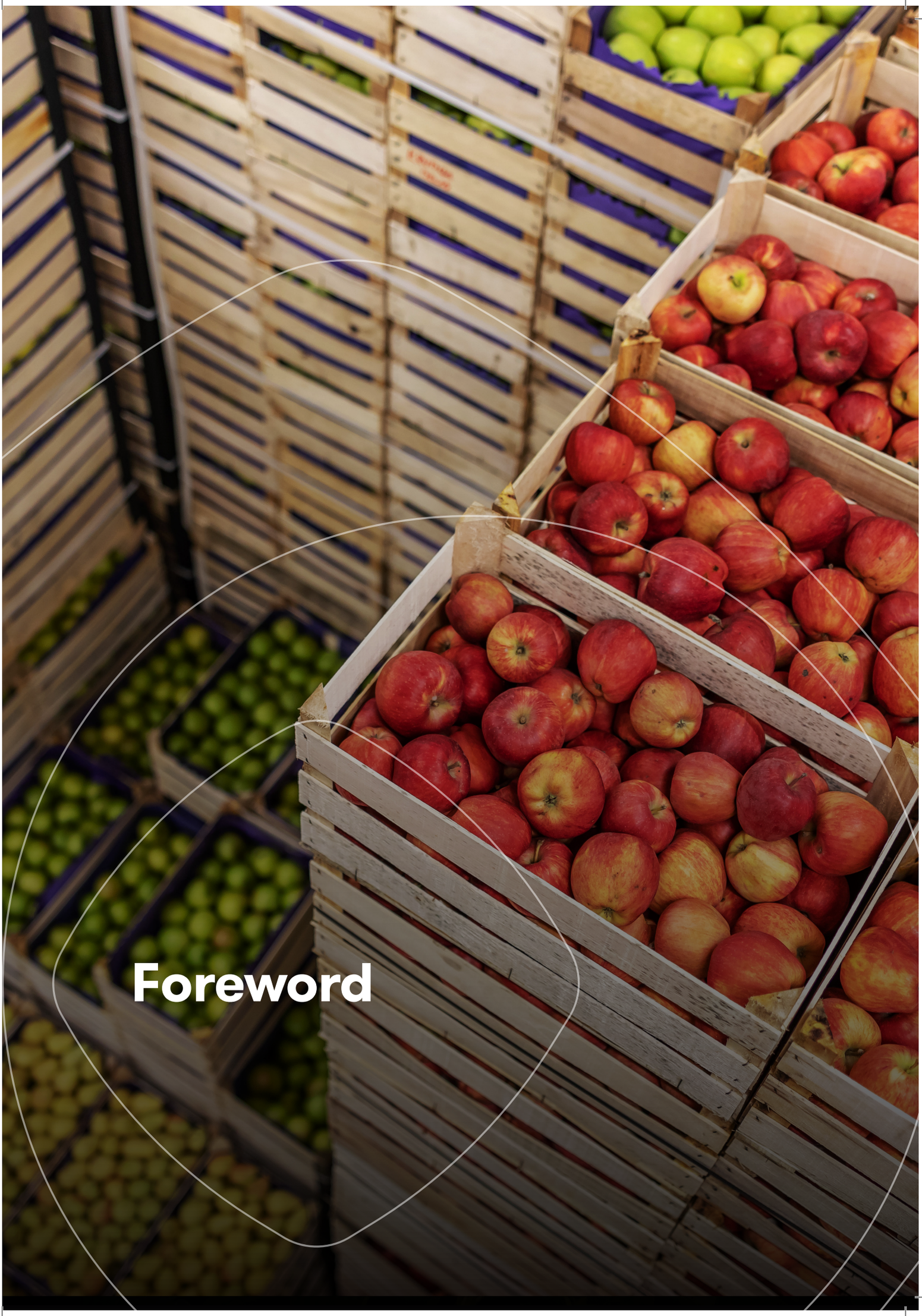
The strategy is structured into three sequenced phases: foundation, scale, and premiumisation, designed to systematically resolve upstream bottlenecks, strengthen post harvest and processing systems, and establish India's premium global positioning. Together, they provide a clear roadmap to unlock value, institutionalise scale, and enhance competitiveness across high value horticulture.

- **Foundation phase (2026-27): Pre-production and production**
  This phase focuses on fixing the root cause of low productivity by ensuring a reliable supply of clean, high quality planting material through dedicated R&D, along with expansion of polyclonal gardens and certified nurseries. Dedicated Centres of Excellence (CoEs) shall be established in Public Private Partnership (PPP) mode to advance varietal development, production of quality parent planting material, training and capacity building of farmers, and technology demonstration, etc. This phase also prioritises rejuvenation of old orchards, expansion of plantations on suitable marginal lands, strong extension support, scheme convergence, and customised cluster development (CDP 2.0) to enable premium, market oriented horticulture production at scale.
- **Scale (2027-29): Post harvest and processing**
  This phase focuses on addressing post-harvest inefficiencies and strengthening trade competitiveness by establishing cluster-based micro-processing hubs with advanced post-harvest management and processing infrastructure for better aggregation, quality control, scale, and efficiency. It enables farmers and agri-enterprises to access modern technology and infrastructure through blended finance models, promotes in-house processing through dedicated incentives, and improves the ease of doing business through simplified compliances, single-window clearances, and supportive fiscal measures for high-value crops, resulting in reduced wastage, higher value realisation, transparent supply chains, and increased private sector participation.
- **Premiumisation (2029-30): Exports**
  This phase focuses on positioning India as a reliable supplier of premium horticulture products by integrating small and marginal farmers, FPOs/FPCs/Co-operatives into global value chains through productive partnerships (long-term) with processors, agribusinesses, exporters and international buyers, etc. This phase also focuses on strengthening market credibility through GI based branding, enforcement of national quality standards, and digital traceability systems, while accelerating branded exports and attracting FDI into premium horticulture clusters, thereby reducing import dependence in high value categories and significantly improving unit value realisation across fresh and processed exports.

Together, the three phases lay the foundation for building Brand India across high value horticulture value chains, anchored in quality, credibility, scale, and global market trust. Realising this vision requires India to transition from fragmented, scheme-led interventions to a coherent, market-backed mission platform. Convergence across ministries, alignment of horticulture boards and state missions, integration of technology and finance, and disciplined public-private collaboration are central to this shift.

With coordinated execution, India can unlock a high-value horticulture ecosystem that delivers higher farmer incomes, global competitiveness, efficient domestic value-addition, and long-term resilience. The opportunity is not incremental improvement, but structural transformation positioning India as a trusted place of origin for premium horticulture by 2030.





# Foreword

# Foreword by Horticulture Commissioner

The next phase of India's agricultural leadership lies in premium, market-linked horticulture-where high-value crops, quality assurance, technology-driven systems, and strong productive partnerships together build Brand India and deliver sustainable income growth for farmers.



Horticulture has emerged as the most dynamic pillar of India's agricultural transformation, reflecting a structural shift in farmer preferences toward crops that are market-aligned, income-accretive, and responsive to changing consumption patterns. Today, the sector contributes nearly one-third of agricultural Gross Value Added and has overtaken food grains in aggregate output, underscoring its growing role in strengthening farm incomes and linking primary agriculture with processing, logistics, and organized markets. This evolution has been enabled by diversification, improved resilience, and steady investment across value chains, positioning horticulture as a central driver of India's next phase of agricultural growth rather than a peripheral subsector.

As the horticulture sector matures, the strategic emphasis is shifting from volume-led expansion toward high-value crops that can meaningfully accelerate farmer incomes and improve farmers share of value across supply chains. Recent budgetary priorities have reinforced this shift, placing high-value horticulture at the centre of national focus and signaling a clear move toward income scaling through stronger, market-linked and resilient value chains.

Realising the full potential of high-value horticulture will require strengthening the core enablers that support quality with productivity, scale, and market integration. Focused investments in research and development will improve varietal performance and planting material systems, while technology-driven practices across cultivation, post-harvest processes, and traceability systems will enhance consistency and compliance. Strong productive partnerships that link farmers and FPOs with markets, processing, and value addition are equally critical. Together, these enablers shall position Indian horticulture to compete more effectively in premium domestic and global value chains, enabling the emergence of Brand India as a trusted source of high-quality, market-ready horticultural produce.

In this context, this Knowledge Paper provides timely, data-backed insights to inform policy, investment, and industry action across key high-value horticulture value chains. It serves as a strategic reference for advancing technology-enabled, market-linked approaches that strengthen ecosystem development and reinforce India's credibility as a reliable supplier of high-quality horticultural produce in global markets. Effective execution will depend on disciplined collaboration among central and state governments, directorates, research institutions, industry, and producer organizations, with clear delineation of roles and accountability. Such coordinated, mission-mode implementation is critical to translating strategic intent into measurable outcomes across high-value horticulture value chains.


## Dr. Prabhat Kumar

Horticulture Commissioner,
Department of Agriculture, & Farmer Welfare,
Ministry of Agriculture & Farmers Welfare

# Foreword by FICCI

India's agriculture sector is at an important turning point. While it has demonstrated strong resilience and steady growth over the years, its future will increasingly depend on the ability to create higher value, enhance farmer incomes, and respond to evolving domestic and global market needs. In this context, horticulture has emerged as a key driver of agricultural growth, supporting income generation, nutrition, sustainability, and export potential.



Horticulture now contributes nearly one-third of agricultural Gross Value Added and has surpassed food grains in total production. This reflects a clear shift towards high-value crops such as fruits, vegetables, plantation crops, spices, and floriculture. Rising consumer incomes, changing food habits, increasing demand for fresh and processed produce, and expanding export opportunities are further accelerating this transition. High-value horticulture presents significant opportunities to enhance farmer incomes, generate employment across the value chain, and promote inclusive rural development.

However, realising this potential will require addressing several structural challenges. These include productivity gaps, fragmented land-holdings, climate risks, post-harvest losses, limited value addition, and uneven access to technology, finance, and markets. As India advances towards the goal of Atmanirbhar Bharat, a clear, coordinated, and forward-looking strategy for horticulture is essential.

This report, 'Accelerating High Value Horticulture for Atmanirbhar Bharat: Vision 2030,' offers practical recommendations to scale high-value horticulture through supportive policies, private sector participation, technology adoption, infrastructure development, and strong public–private partnerships.

FICCI remains committed to working with all stakeholders to build a resilient and sustainable horticulture ecosystem and hopes this report will serve as a useful reference for policy action and collaborative efforts across the sector.

**Jyoti Vij**
Director General, FICCI

# Foreword by FICCI

India's horticulture sector stands at a pivotal juncture. The country's vast agro-climatic diversity, strong smallholder ecosystem, and deep-rooted agricultural traditions provide a powerful foundation. The next phase of growth, however, will depend on our ability to combine this strength with innovation, value addition, and global competitiveness. This transition from volume-driven production to value-led transformation is both necessary and timely.



Encouragingly, recent policy direction and budgetary priorities reflect a clear and strategic intent. Increased allocations across agriculture, horticulture, food processing, and allied sectors underscore the Government's commitment to enhancing farmer incomes, generating rural employment, and building long-term resilience. Initiatives led by key ministries are steadily strengthening farmer support systems, promoting research and innovation, expanding processing infrastructure, and improving market linkages.

The latest budget announcements further reinforce this momentum by prioritising high-value crops such as coconut, cocoa, cashew, and other plantation and specialty segments. At the same time, the growing emphasis on technology—through AI-enabled advisory services, precision agriculture, and digital traceability—signals a shift toward a more modern, efficient, and transparent horticulture ecosystem. These efforts are critical in addressing persistent challenges including ageing orchards, climate variability, quality inconsistencies, and import dependence, while unlocking new income opportunities for farmers and rural enterprises.

This report presents a clear and actionable roadmap for accelerating the growth of high-value horticulture in India. It highlights the importance of coordinated policy support, deeper private sector participation, technology integration, and robust public–private partnerships.

Placing high-value, technology-enabled horticulture at the core of India's agricultural strategy will be essential to strengthening value chains, improving farmer livelihoods, and enhancing global competitiveness. With the right alignment of policy, investment, and innovation, India is well-positioned to emerge as a leading horticulture powerhouse by 2030.

**Syed Junaid Altaf**

Chairman, FICCI Task Force on Horticulture &
Group Executive Director, FIL Industries Pvt. Ltd.

# Foreword by FICCI

India's horticulture sector has evolved rapidly, emerging as a key source of agricultural value addition and income growth. However, several high-value segments continue to face structural constraints related to quality planting material, ageing orchards, fragmented post-harvest systems, and uneven standards and traceability.



These challenges have restricted value realisation, contributed to import dependence in select value chains, and limited the effective utilisation of domestic processing capacity. Vision 2030 seeks to address these gaps by enabling a decisive shift from volume-led growth to value-led, market-driven development.

This report outlines a clear and phased roadmap to achieve this transformation. It focuses on strengthening the production base through clean planting material, orchard rejuvenation, and cluster development; scaling value addition through localised processing, infrastructure, and regulatory reforms; and finally positioning Indian horticulture in premium domestic and global markets through branding, quality assurance, traceability, and strategic partnerships.

The success of this roadmap depends on coordinated action across government, industry, financial institutions, research organisations, and farmers. Infrastructure must be aligned with markets, technology with demand, and producers with institutions that reward quality and scale. Such alignment is essential to translate public investment into sustained private participation and durable income gains.

This report reaffirms our commitment to advancing high-value, technology-enabled horticulture. With focused execution and strong stakeholder collaboration, the sector can play a pivotal role in enhancing farmer incomes and strengthening export

**Saloni Goel**

Co-Chair, FICCI Task Force on Horticulture
& Senior Director – ESG Value Creation &
Commercialisation, Coca-Cola India Pvt. Ltd.

# Foreword by Grant Thornton Bharat

India's agricultural transformation is entering a decisive phase—one defined not by volumes, but by value. High value horticulture now stands at the centre of this shift, enabling higher farmer incomes, resilient rural growth, and deeper integration into global agri-value chains.




India's agricultural landscape is steadily shifting away from volume-driven production toward a value-oriented growth paradigm, where quality, market alignment, and income resilience are as critical as yields. Horticulture has emerged as a central engine of change, accounting for nearly one third of the country's agricultural gross value added. Farmers are increasingly adopting horticulture due to its higher income potential, shorter crop cycles, and stronger linkage with markets. This shift is reinforced by rising demand for fresh, nutrition-rich, and quality-differentiated produce, alongside sustained public investment in infrastructure, post-harvest systems, and technology. Together, these forces are shaping a more efficient, market-integrated, and income-enhancing agricultural model.

This shift is reflected in farmers' choices on the ground. In several horticulture-producing regions, smallholders previously dependent on low-value crops are gradually moving into segments offering clearer market signals and better value realisation. For a woman farmer managing a small parcel of land, this transition often begins cautiously through limited diversification. Access to reliable planting material, basic crop management training, and assured buyers can improve outcomes. While challenges such as climate variability, labour availability, and input costs persist, higher value per unit of land strengthens cash flows and engagement with organised markets.

While the economic logic of moving toward higher value segments is clear, the ability to sustain and scale this shift remains uneven. Constraints such as inconsistent access to quality planting material, weak post-harvest systems, limited aggregation, and fragmented market linkages continue to restrict outcomes. Quality remains a central challenge, affecting both price realisation and access to premium markets. Addressing these gaps requires strengthening farmer institutions to support aggregation and consistency, alongside productive alliances across the value chain. The private sector has a critical role in enabling this through knowledge transfer, improved practices, and market access. Technology will be central to improving efficiency and transparency, while Centres of Excellence for high-value crops can drive research and innovation through public–private collaboration

This Knowledge Paper, Vision 2030: Focusing on High Value Horticulture for Atmanirbhar Bharat, presents an evidence-based assessment of India's high value horticulture ecosystem and outlines a strategic roadmap for the next phase of transformation. Through focused analysis of priority value chains such as cocoa, cashew, and coconut, it identifies key gaps and actionable pathways for coordinated ecosystem-wide action, supporting India's emergence as a trusted origin in global horticulture markets.


## Chirag Jain

Partner and Food Processing Industry Leader
Grant Thornton Bharat

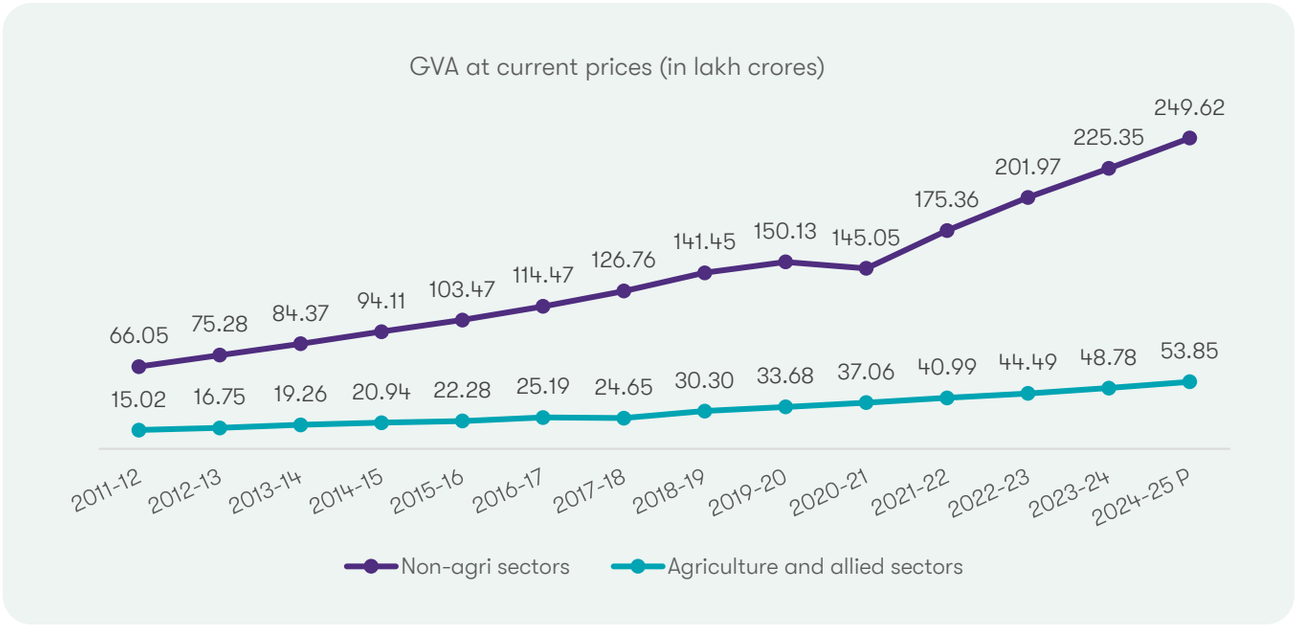


# **Introduction:** Strategic imperative for high-value horticulture

# Indian horticulture sector at a glance

India's agriculture sector continues to demonstrate strong structural resilience, underpinned by sustained growth of 4.41[1]% annually over the past five years, which is well above global averages.

Supported by sustained investments, enhanced rural infrastructure, focused government interventions, and improvements in technology adoption, the sector has maintained steady performance even amid climatic and market variability. Notably, the **gross value added (GVA)**[2] of agriculture and allied sectors at current prices has registered a growth of about **225%** (as per MoSPI data), rising from INR 1,502 thousand crore in FY 2011–12 to INR 4,878 thousand crore in FY 2023–24, and is further projected to increase by 10.4%[3] in FY 2024–25. Over this period, the gross value added of both agriculture and nonagriculture allied sectors grew at a compound annual rate of around 10-11%, underscoring sustained momentum and reinforcing the sector's role as a stable and expanding pillar of the national economy.




## 4.45%

Decadal growth rate of Agriculture Sector reflecting broad-based expansion across livestock (7.1%), fisheries and aquaculture (8.85), & crops sector (3.5%)

## 7.65%

Growth in foodgrain production, with output rising to **357.73 Mn MT** in 2024-25 — an increase of **25.43 Mn MT** over the previous year

## 14.53 Mn MT

Increase in horticulture output from previous year — with total output reaching **367.72 Mn MT** in 2024-25

1. PIB
2. Ministry of statistics and programme implementation
3. PIB

Building on this broad-based agricultural momentum, horticulture has emerged as the brightest engine of agricultural growth, contributing nearly 33% of agricultural GVA. It exhibited sustained momentum in output. In recent years, horticulture output has overtaken foodgrains (as per official estimates) marking a clear structural shift as farmers increasingly pivot towards high-value, market-responsive crops. This expansion has been broad based and spans across crops, with 114.51 million tons of fruits, 219.67 million tons of vegetables, and 33.54 million tons of other horticultural crops, underscoring the sector's deepening contribution to India's agricultural output and value creation. Rising domestic demand for horticulture produce driven by increasing disposable incomes, dietary diversification, and growing preference for nutrition-dense foods has further strengthened this momentum, creating sustained market pull for high-value horticultural produce.

Together, these drivers position horticulture as a critical lever for accelerating agricultural value addition and rural income enhancement. The sector's scale, productivity edge, and strong market orientation now make it central to India's transition towards a more diversified, resilient, and high-value agricultural economy.

## Why horticulture matters for farmer incomes and rural prosperity

Horticulture plays a critical role in strengthening farmer incomes, as these crops typically deliver higher value per acre[4] and generate larger marketable surpluses compared to staple cereals. Many horticultural crops also allow multiple harvests within a year, providing farmers with a more stable and predictable income stream.

This economic advantage is further reinforced by the declining profitability of cereal cultivation, which has increased the opportunity cost of remaining in low-return staples and encouraged a shift towards high-value horticulture. Additionally, horticulture promotes more diversified and resilient livelihoods, enabling farmers to cultivate a mix of fruits, vegetables, spices and plantation crops that help spread risk across seasons and markets.

Several horticulture crops, such as banana, mango, pomegranate, onion, garlic, green chili, cashew and coconut, offer significant export potential, allowing farmers to access premium prices driven by quality and global demand. Importantly, certain crops like cashew can be grown successfully on marginal or wasteland areas, transforming low-productivity terrain into economically viable assets.

Taken together, this combination of high returns, diversification opportunities and expanded market access enhances farmers' economic resilience, helping them mitigate price and climate-related risks. At the same time, the inherent climate sensitivity of horticulture highlights the need for robust, climate-smart production and post-harvest management practices.

| | Crop | Cost of cultivation/Ha | Productivity (Kg/Ha) | Gross income (INR) | Net income |
|---|---|---|---|---|---|
| | Rice | 30000 | 2873 | 66079[5] | 36079 |
| | Tomato[6] | 61000 | 45000 | 112500 | 51500 |
| | Watermelon | 50000 | 40000 | 120000 | 70000 |
| | Coconut | 527923 | 8674[7] Nuts/Ha (0.454 Kg/Nut) | 610389 | 82467 |

Primary research and Grant Thornton Bharat analysis

4. Institute of Economic Growth
5. MSP: Paddy
6. Horticulture: Cost of Cultivation
7. CACP

# Strengthening horticulture: Pathway to global markets

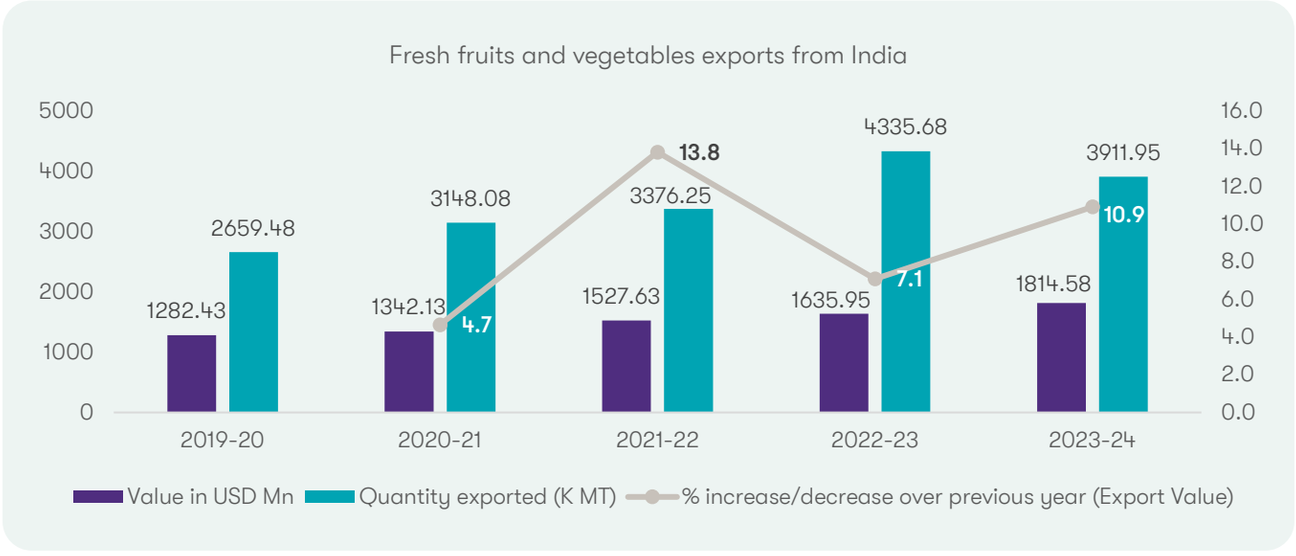
India's diverse agro-climatic zones provide a distinctive advantage — the capability to produce a wide spectrum of fruits, vegetables, spices, plantation crops and floriculture products across regions and throughout the year. This year-round production capacity ensures a reliable supply for international buyers and strengthens India's competitiveness in global markets.

The country already holds a strong global position in horticulture, ranking as the world's second-largest producer of fruits and vegetables, the third-largest producer of cashew and coconut, and a leading producer of several other commodities. This scale and diversity offer India a strategic edge in developing export-oriented supply chains and expanding its presence in high-value global horticulture trade.

To convert this natural strength into sustained export momentum, India's horticulture potential is being reinforced through significant upgrades in agri-export infrastructure.

Modern packhouses, ripening chambers, integrated cold-chain networks, and multimodal logistics systems are reducing post-harvest losses and improving product consistency. Parallel advances in post-harvest and shelf-life enhancement technologies, such as controlled-atmosphere storage, improved packaging solutions, and minimally processed product formats, are enabling exporters to access distant markets more efficiently.

Additionally, next-generation processing technologies, ranging from freeze-drying and vacuum dehydration to advanced aseptic pulp systems, are helping deliver superior product integrity, consistent quality, and export-ready formats aligned with evolving global buyer expectations. As a result of these developments, India's fresh fruit and vegetable exports are being steadily strengthened. These measures are building a more resilient export ecosystem and positioning India as a reliable and competitive supplier in global horticulture markets[8].




Fresh fruits and vegetables exports have grown at a robust CAGR of ~10% in export volumes between 2019-20 and 2023-24.

In value terms, F&V exports have expanded at a CAGR of ~7% over last 5 years, reflecting steady gains in market realisation.

8. PIB

In FY 2024-25, India exported fresh fruits and vegetables worth USD 1818.56 million[9]. The fruits exported primarily consisted of grapes, pomegranates, mangoes, bananas and oranges, while onions, mixed vegetables, potatoes, tomatoes and green chili constituted the major share of vegetable exports. Apart from the fresh fruits and vegetables exports, India exported USD 721.86 million worth of processed fruits (and juices) and USD 1752.03 million of processed vegetables (and pulses) in FY 2024-25. In addition to fresh fruits and vegetables, India also exports substantial amounts of horticultural products such as cashew kernels and coconut (both desiccated and fresh), along with other high-value plantation and spice crops.

An increasingly important driver of this scale and competitiveness is the rapid adoption of Agritech solutions across the horticulture value chain. Digital advisory platforms, precision-farming tools, IoT-based monitoring systems, satellite-enabled crop intelligence, and AI-driven quality grading are helping farmers achieve better compliance, high uniformity, and traceability-based production. Start-ups and export agencies are also deploying digital traceability tools, QR-linked farm records, MRL-compliance monitoring, and blockchain-based export documentation, strengthening India's credibility in markets that enforce stringent safety and quality standards.

The broader logistics ecosystem is also evolving, with increased use of air-freight corridors, reefer transportation, and temperature-controlled consolidation points to support the movement of perishable, high-value horticulture products into premium global markets.

Crucially, India's growing alignment with global quality parameters, good agricultural practices, and robust traceability systems, supported by deep technology integration, is enabling access to more demanding premium markets, especially in Europe. This shift towards quality-linked, standards-compliant production not only strengthens India's reputation in global horticulture but also positions farmers and exporters to capture value in emerging segments such as wellness foods, functional ingredients, natural extracts, and premium fresh produce.

## Case study: APEDA enabling exports ecosystem

Agricultural and Processed Food Products Export Development Authority (APEDA) is strengthening India's horticulture export ecosystem through a focused set of interventions that enhance infrastructure, quality systems, and global market access. Its efforts are organised around three core missions, infrastructure development, quality development and market promotion, which together address the most critical gaps faced by fresh produce exporters.

Under these missions, APEDA is supporting the development of modern packhouses, grading and packing lines, pre-cooling and cold-storage units,refrigerated transportation, and essential pre-shipment treatment facilities such as irradiation, vapour heat treatment (VHT), and hot-water treatment (HWT). In parallel, APEDA is improving compliance by expanding laboratory testing capacity, promoting the adoption of food-safety and quality-management systems, and enabling digital traceability tools that capture farm-level data.

Market access is being strengthened through enhanced participation in global trade fairs, structured buyer–seller interactions, and improved packaging standards, ensuring that Indian horticulture products are better positioned to meet international expectations and gain traction in premium markets.

APEDA has identified 17[10] product-specific clusters across key horticulture belts, strengthening region-based value chains through improved packhouse accreditation, GI-linked branding, digital traceability, and residue-monitoring systems. These measures align closely with its broad cluster-based export approach to build a more integrated and globally competitive ecosystem. As a result, India's fresh fruits and vegetables exports recorded a 47.3%[11] rise in volume and a 41.5% rise in value between FY 2019–20 and FY 2023–24, reflecting the growing competitiveness of India's horticulture exports.

9. Fresh Fruits & Vegetables | APEDA
10. APEDA
11. PIB



## Positioning India in global value chains through heritage and innovation

India's position in global horticulture value chains is reinforced by a unique blend of heritage, climate diversity, and innovation. With one of the world's widest ranges of agro-climatic zones (15 agro-climatic zones), the country can produce fruits, nuts, spices and plantation crops across nearly all seasons, giving it a natural seasonality-agnostic advantage. This inherent diversity is increasingly complemented by a strong national shift towards sustainability and climate-positive production systems.

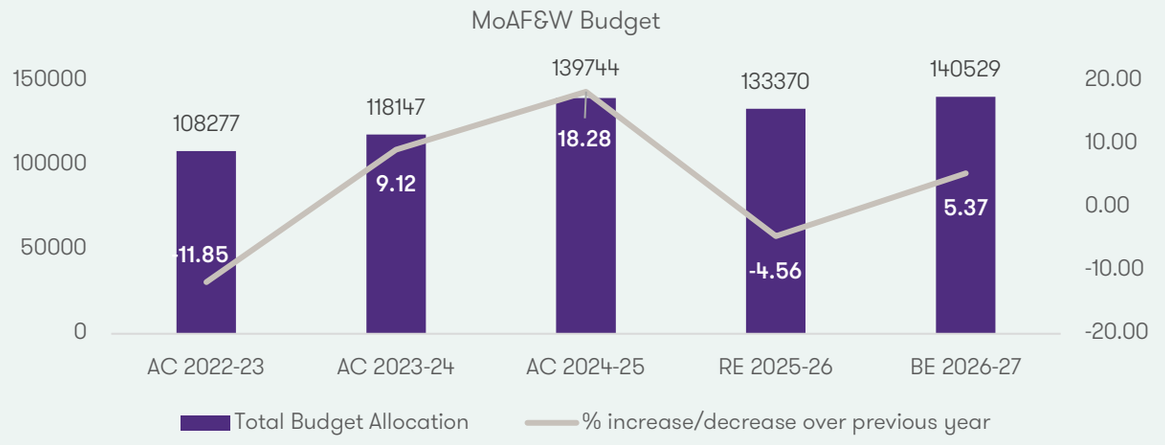
Perennial and plantation crops such as cashew, cocoa, coconut, arecanut, apple, mango, ber and amla (gooseberry) contribute meaningfully to carbon sequestration, enhanced soil health, and more resilient landscapes — offering global buyers a compelling sustainable value proposition. At the same time, India's small-holder-driven horticulture sector is anchored in commercial orientation, ethical practices, and strong social safeguards, with robust mechanisms to prevent child labour, unlike several competing origins.

Rapid adoption of mechanisation, precision agriculture, digital tools including traceability systems, and AI-enabled advisory platforms, together with globally accredited certifications, is further elevating product consistency, quality, and compliance with international standards. Collectively, these levers — heritage-driven diversity, climate-aligned production, ethical value chain and technology-enabled efficiency — position India as a responsible, differentiated, and innovation-led supplier in global horticulture.

This integrated approach is not only strengthening India's export ecosystem but also embedding the country more deeply into global value chains as a trusted, future-ready partner.

# Budgetary allocations

India's agriculture budget has seen a sustained year-on -year increase, underscoring the sector's expanding strategic importance for income enhancement, rural employment, and long-term productivity growth. In 2026–27, the Ministry of Agriculture & Farmers Welfare (MoA&FW) has been allocated INR 1,40,529 crore, marking a **5.4%**[12] **increase** over the previous year's revised estimate and reaffirming the Government's continued commitment to strengthening the sector's structural foundations.




**The MoA&FW budget reflects a steady expansion, growing at a CAGR of 6.75% between FY 2022-23 Actuals and the FY 2026-27 Budget estimates.**

| Particular | AC 2022-23[13] | AC 2023-24 | AC 2024-25 | RE 2025-26 | BE 2026-27 |
|---|---|---|---|---|---|
| Department of Agriculture and Farmers Welfare | 99877.01 | 108355.77 | 129933 | 123089 | 130561 |
| Department of Agricultural Research & Education | 8399.72 | 9790.78 | 9810.53 | 10280.83 | 9967.4 |

In FY 2025–26, the MoA&FW has allocated nearly 93% of its total budget to the Department of Agriculture and Farmers' Welfare, underscoring the Government's continued focus on frontline, farmer-centric programmes. This allocation is primarily directed towards flagship initiatives such as the PM-Kisan Samman Nidhi Yojana, which provides direct income support to farmers; the Pradhan Mantri Fasal Bima Yojana for crop insurance and risk mitigation; the Rashtriya Krishi Vikas Yojana for state-level agricultural development; and the Mission for Integrated Development of Horticulture, which drives cluster-based horticulture expansion.

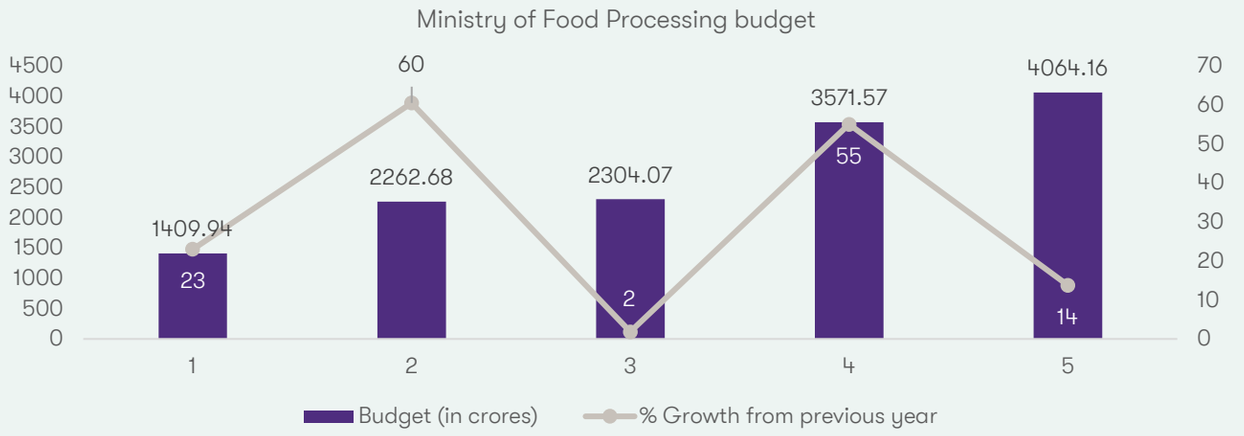
Complementing these efforts, investments are also being channelled into strengthening agriculture infrastructure through the Agriculture Infrastructure Fund, along with new initiatives such as Namo Drone Didi. The programme has been allocated INR 676 crore in the 2026–27 Budget to empower women self-help groups (SHGs) with drone-based precision agriculture services.

The remaining 7% of the Ministry's budget has been allocated to the Department of Agricultural Research and Education, which supports long-term productivity growth by funding the Indian Council of Agricultural Research and its nationwide network of institutes. This investment underpins climate-resilient crop breeding, technology dissemination through Krishi Vigyan kendras, and capacity building for future innovation — ensuring that immediate farmer support is complemented by sustained research and knowledge systems that strengthen the sector's long-term competitiveness.

12. India Budget
13. India Budget

As India reinforces the foundations of agricultural production through this balanced mix of farmer-centric support and long-term research investment, the next priority lies in unlocking greater value from this output. Moving beyond production to processing is now essential to convert volumes into value, reduce post-harvest losses, and expand income opportunities — an agenda that places the Ministry of Food Processing Industries (MoFPI) at the forefront.

The MoFPI has been allocated INR 4,064 crore in the FY 2026–27 Budget to drive value addition across agricultural and horticultural supply chains — representing a ~14% increase over the previous year's revised estimate. This enhanced allocation underscores the Government's focus on strengthening food processing capacity, enabling market-ready products and boosting farmer incomes through high-value products[14].




**The MoFPI budget has gone up by 30.32% between the actual spends in FY 2022 23 and the FY 2026 27 Budget Estimates, reflecting a strong policy shift from primary production towards processing-led value creation.**

This allocation is directed towards strengthening the processing and cold-chain infrastructure, modernising facilities, and supporting enterprise development through flagship schemes such as the Pradhan Mantri Kisan Sampada Yojana (PMKSY); the Prime Minister Formalisation of Micro Food Processing Enterprises (PMFME) scheme, which enhances the competitiveness of micro-food enterprises; and the Production-Linked Incentive (PLI) Scheme for Food Processing Industries. It is further complemented by targeted support for R&D and quality enhancement initiatives aimed at elevating the overall performance, efficiency, and global readiness of India's food processing enterprises.

In addition to allocations under the MoA&FW and MoFPI, the Union Budget 202627 has also directed significant resources to the Ministry of Fisheries, Animal Husbandry and Dairying (MoFAH&D) to strengthen allied sectors that are critical for rural incomes. The Department of Fisheries has been allocated INR 2,761.80 crore to advance sustainable aquaculture, inland fisheries development, and export-oriented value chains, while the Department of Animal Husbandry and Dairying has received INR 6,153.46 crore to enhance livestock health systems, dairy productivity, and employment generation across rural enterprises.

In previous budget cycles, the Government's priorities were centred on strengthening the foundations of agricultural productivity and resilience, with a sharper focus on improved crop varieties, climate-adaptive systems, and enhanced scientific support for farmers. Budgets also consistently reinforced investments in infrastructure upgradation, expanded storage and post-harvest systems, and advanced processing capabilities — laying the groundwork for greater value realisation across the value chain and enabling producers to shift from volume-driven to value-driven growth.

Over the last five years, farmer behaviour has also undergone a marked shift, influenced by better price realisation, stronger market linkages, and the rising opportunity cost of remaining in low-return cereals. This transition has accelerated movement towards horticulture — a trend that has enabled horticulture output to surpass foodgrain production and account for nearly one-third of agricultural GVA.

14. India Budget

Together, these shifts make it evident that the next phase of agricultural policy must move beyond stabilising production systems towards maximising value creation — an agenda in which horticulture naturally emerges as the central strategic lever. With rising market demand for premium, quality-differentiated produce and the growing adoption of technology-enabled cultivation practices, horticulture now offers one of the strongest pathways to enhance farmer incomes, strengthen value-chain competitiveness, and position India for greater participation in domestic and global premium markets.

This emerging shift has gained further momentum because of the notable progress achieved under the Mission for Integrated Development of Horticulture[15] (MIDH). The Mission has strengthened area expansion, enhanced productivity, improved planting-material systems, and upgraded post harvest infrastructure across states helping horticulture transition from scattered production pockets to more organised and market-ready value chains. These interventions established the foundational capabilities needed for quality-compliant, technology-enabled, and cluster-driven horticulture, setting the stage for the sector to play a far more strategic role in India's agricultural transformation.

## Progress made under MIDH

Total **58 Centres of Excellences** have been approved across the country With **55 clusters identified by MoA&FW** under Horticulture Cluster Development Programme (HCDP)

The government is setting up **9 centres for Clean Plant Programme (CPP)** and **4 Post-Entry Quarantine (PEQ) facilities**

More than **55K post- harvest management facilities** which includer cold storage, CA Storage, packhouses, ripening chambers and food processing units etc.

**~11K marketing infrastructures** have been established which includes vending carts, retail outlets, apni mandis, wholesale and terminal markets etc.

As per the 2nd advance estimates (2024-25), the productivity of horticulture crops has risen from 12.10 MT per hectare in 2019 20 to 12.56 MT per hectare in 2024—25.

15. PIB



In addition to these structural gains, MIDH continues to play a catalytic role by enabling states and Union Territories to deepen and modernise core production systems. This includes targeted support for quality parent seedling development through polyclonal gardens, advanced nurseries, and tissue-culture units, rejuvenation of old orchards, adoption of good agricultural practices (GAP) and the expansion of modern cultivation methods such as protected cultivation, organic farming, mechanisation, efficient water-management systems and integrated pest, nutrient, and weed-management protocols. The Mission also promotes beekeeping as a complementary livelihood opportunity, further diversifying income streams for horticulture-oriented farming households. Collectively, these interventions have established a robust systems backbone for the horticulture sector, positioning it for a decisive shift towards value-driven growth.

With the foundation for quality-compliant production and processing now being strengthened, the policy focus is pivoting towards value-led growth — placing high-value horticulture and technology integration at the centre of the sector's next phase of advancement and rural economic uplift, a direction reinforced in the recent budget announcements.

16. MIDH

## Key announcements: Budget 2026-27

### Bharat VISTAAR (AI-enabled advisory integration)

A multilingual AI enabled advisory platform will be launched to integrate AgriStack portals with ICAR's package of practices, backed by an allocation of **INR 150 crore**.

### Support for high value agriculture

Dedicated programmes have been proposed to strengthen production, processing, and export competitiveness of **coconut, cocoa, cashew, sandalwood,** and **agarwood, with INR 350 crore** earmarked specifically for high value agriculture. A dedicated Coconut Promotion Scheme has been introduced to replace old, low productivity palms with improved varieties across major coconut growing states.

These crops have been prioritised because they generate high value per unit of land, support millions of livelihoods through extensive downstream processing industries, and exhibit strong domestic consumption trends alongside significant export potential. However, they continue to face exposure to global supply-chain volatility, climate-linked production risks, and structural constraints such as limited availability of quality planting material, ageing orchards with declining productivity, high import dependence in value chains such as cashew and cocoa, domestic price pressures in coconut oil, and overall inconsistent quality stemming from inefficient post-harvest and processing systems.

Given their economic significance, role in rural employment, and importance across the food, FMCG, wellness, and industrial sectors, targeted government attention on these high-value crops is essential to stabilise supply, enhance competitiveness, and unlock substantially higher income opportunities for farming households. Alongside these priority value chains, crops such as apple, mango, banana, onion, green chilli, and makhana also present significant value-creation opportunities, driven by rising consumer demand, expanding processing applications, and strong export potential.

Technology integration has become a critical enabler across these value chains — improving production efficiency, enhancing quality consistency, strengthening traceability systems, and enabling closer alignment with evolving market and export requirements.

Taken together, these dynamics firmly position high-value horticulture as the Government's primary lever for scaling rural incomes. This focus aligns with growing demand for premium, quality-differentiated produce from consumers, retailers, processors, and export markets, as well as with farmers' increasing adoption of technology-enabled production systems to meet these expectations. It reflects broader efforts to deepen value-chain integration through digital traceability tools, improved planting-material ecosystems, cluster-development initiatives, and market-linked infrastructure.

By prioritising high-value crops and technology-driven horticulture, the Government is shifting from expanding production capacity to unlocking greater value per unit of land—placing high-value horticulture at the core of India's next phase of agricultural growth.

# Case study: Bharat VISTAAR[17]: India's digital public infrastructure for agriculture

Bharat Virtually Integrated System to Access Agricultural Resources (VISTAAR) is India's new AI-powered, multilingual digital public infrastructure (DPI) designed to unify all agricultural information, services, and advisory systems on a single platform. It aims to provide real-time, personalised, voice-enabled guidance to farmers across India through phone calls, chatbots, and mobile/web interfaces. Announced in the Union Budget 2026–27 and launched on 17 February 2026 by the Union Minister of Agriculture & Farmers' Welfare, Bharat VISTAAR is a major shift towards technology-driven, inclusive, farmer-first governance.

## Key features

**01** Unified digital gateway for all agricultural services

**02** Multilingual, voice-first farmer access (phone, chatbot, web, app)

**03** Federated architecture linking central and state agriculture systems

**04** Integrated scheme eligibility, benefits and grievance services

**05** Open APIs for startups, FPO platforms and innovation ecosystem

**06** Seamless data integration with ICAR, IMD and state portals

**07** AI-driven personailsed advisory system

**08** Real-time weather, market price and pest–disease intelligence

Farmers can access Bharat VISTAAR through the tollfree AI helpline 155261, a voice-enabled chatbot usable even on feature phones, the mobile/web interface, and the multilingual AI assistant "Bharati".

Built as a federated national platform, it brings together central and state agriculture systems, scientific institutions, and market databases onto a single interoperable backbone. This enables farmers to receive trustworthy, locally relevant information drawn from ICAR advisories, IMD weather intelligence, state agriculture portals and scheme repositories in an integrated manner. By opening its APIs to agriculture start-ups, farmer producer organisation (FPO) platforms and private solution providers, the platform also unlocks a collaborative innovation ecosystem capable of rapidly scaling digital agriculture services across the country.

Bharat VISTAAR has potential to reach over 140 million farmers, expanding inclusive access to trusted advisories and services through its voice-first, interoperable digital platform. Going forward, it is expected to transform farmer decision-making through personalised AI support, reduce information asymmetry, and drive large-scale digital innovation across India's agricultural ecosystem.

17. https://vistaar.da.gov.in/



# **High value horticulture produce:** India's pathway to global market



# Cashew

Cashew (Anacardium occidentale) is one of India's most important high-value plantation crops, known for its ability to thrive in poor soils, drought-prone geographies and degraded coastal lands. That is why it is often described as a "gold mine of wasteland[18]".

Introduced in India by the Portuguese, cashew has evolved into a diversified bio-economy system, delivering not only premium kernels but also a range of industrial co-products such as cashew nut shell liquid (CNSL) and cardanol, along with food-grade innovations derived from the cashew apple, including juices, fermented beverages, pectin and vinegar.

Beyond its economic significance, cashew is a resilient perennial crop with a long productive life. It performs well on marginal lands and helps stabilise soils in coastal regions. Its adaptability has supported its expansion across India's peninsular states over the past century, making cashew both a vital livelihood crop for smallholders and a strategic raw material for one of the country's most labour-intensive agro-processing industries.

India production
**~7.9 Lakh MT**
RCN equivalent

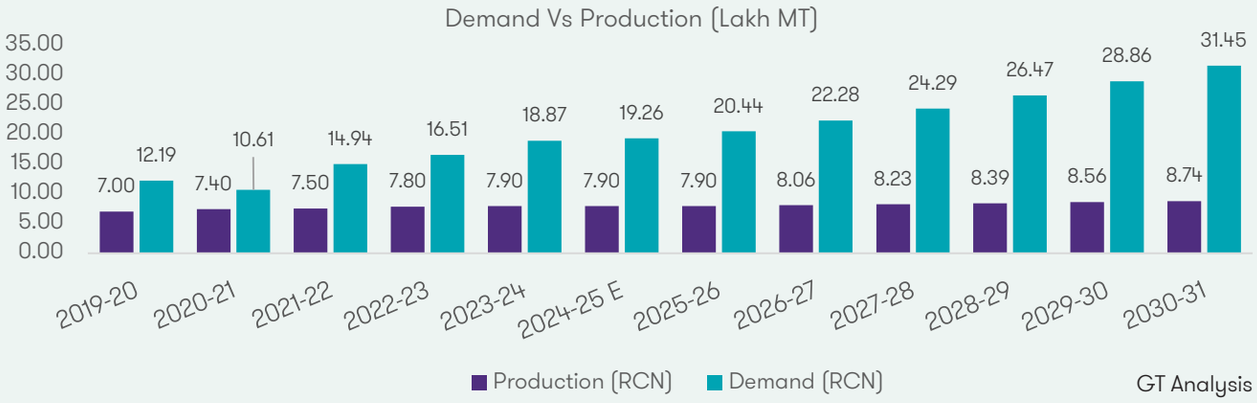
India acreage
**~12 Lakh Ha**

Currently, India is the world's third-largest producer of raw cashew nuts, after Ivory Coast and Cambodia. Cashew cultivation in India is concentrated in Maharashtra, Andhra Pradesh, Odisha, Tamil Nadu, Karnataka, Kerala, Goa, and West Bengal, and is gradually expanding into Chhattisgarh, the Northeastern states (Assam, Manipur, Tripura, Meghalaya, and Nagaland), as well as the Andaman & Nicobar Islands.

In FY 2025, India ranked fourth globally in exports of cashew nuts—fresh/dried and shelled (HS Code 080132)—with a 5% share of global exports, valued at approximately USD 300 million. At the same time, India stood as the world's second-largest importer of in-shell cashew nuts (HS Code 080131), with imports valued at around USD 1,620.86 million, reflecting a significant import bill and continued dependence on overseas raw material.

Because of strong rising demand in both domestic and international markets, India's raw cashew nut (RCN) requirement continues to exceed domestic production, resulting in a widening structural supply gap. Demand in 2024 25 stood at ~19.26[19] lakh MT (in RCN equivalents), against which domestic production lags significantly. To meet this shortfall, India imported ~11.6 lakh MT (in RCN equivalents), reflecting the sector's rising dependence on imports for meeting industry demand. Imports have been growing at 6–7% CAGR over the past five to six years, substantially outpacing the growth in the domestic production, which has grown at only ~2% CAGR during the same period.

18. Cashew | APEDA
19. Market Intelligence Cell (MIC) for APEDA




**This structural deficit makes end to end value chain mapping imperative to identify bottlenecks, diagnose value leakages, and identify the key enablers capable of delivering the highest sectoral impact**

# Value chain mapping

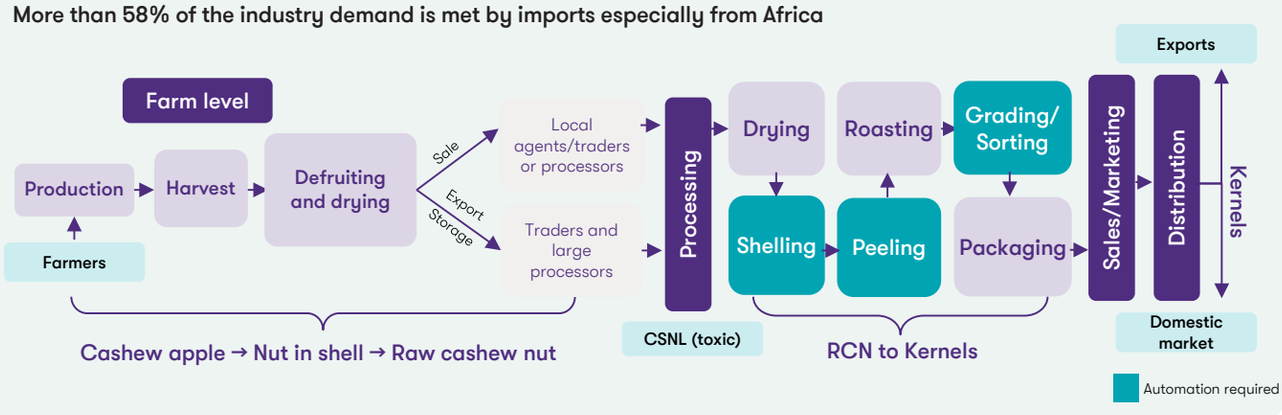
Cashew begins its journey in India's warm coastal belt, thriving in tropical climates with well-drained sandy or laterite soils and temperatures between 24°C and 28°C. Introduced by the Portuguese in the 16th century, cashew was initially planted for soil conservation before gradually emerging as a commercially significant crop. The tree bears a brightly coloured, pear-shaped cashew apple (the swollen receptacle), with a kidney-shaped nut attached at its base, encased in a hard shell.

Farmers harvest fully ripe cashew apples either from the ground or directly from the tree once the nut matures and turns greybrown. The nut is separated from the apple immediately to prevent spoilage. The cashew apple itself is highly perishable, decomposing within 24–36 hours, which limits its shelf life but creates opportunities for value-added products such as juices, fermented beverages like Goa's feni, vinegar and pectin extraction.

Once separated from the apple, the nut is carefully dried to 8–9% moisture content, transforming into RCN — an internationally traded commodity and the critical raw material for India's vast cashew processing industry. Despite being the third-largest producer of cashew in the world, India's domestic harvest is insufficient to meet demand, and ~58% of its RCN requirement is met through imports, primarily sourced from West African countries.

At the local level, farmers sell RCN to village agents, small processors, or large traders, who act as intermediaries in the supply chain. These players aggregate the nuts and channel them into India's extensive processing hubs, whichrange from small to medium scale enterprises to large industrial processors.

**More than 58% of the industry demand is met by imports especially from Africa**



The first step in processing is drying the RCN, ensuring it reaches the right moisture balance for safe storage and handling. Once adequately dried, the nuts move to shelling, a critical and hazardous operation because the shell contains CNSL which is corrosive but commercially valuable. Far from being waste, CNSL is extracted and refined into cardanol, which is widely used in paints, resins, brake linings, adhesives, and specialty chemicals, turning a hazardous by-product into a profitable industrial resource.

After shelling, the kernels move through peeling and roasting, processes that remove the thin testa covering the nut to enhance the flavour. Once these steps are complete, the kernels are graded and packaged as per international quality standards.

This stage yields shelled cashew kernels — the premium product that forms the backbone of India's cashew industry. These are supplied to the domestic market, where they are widely used in snacks, confectionery, and traditional sweets. These are also exported where India ranks fourth globally, exporting approximately 41,000 metric tons in 2024–25. The top destinations for Indian cashew exports include the UAE, Japan, the Netherlands, Saudi Arabia, and Spain. This underscores India's continued importance in global cashew supply chains.

| HS Code | Product | Export value (USD Mn) | Export quantity (MT) |
|---|---|---|---|
| 080132 | Fresh or dried cashew nuts, shelled | 108355.77 | 129933 |
| 080131 | Fresh or dried cashew nuts, in shell | 43.864 | 28462 |
| 130219 | Cashew nut shell liquid | 0.82 | 1096.75 |
| 130219 | Cardanol | 7.07 | 8448.14 |

Source: ITC Trade Map

**However, despite its resilience and diverse value streams, India's cashew sector still struggles with key challenges across production, processing, and trade — issues that constrain sector competitiveness and demand urgent interventions.**

| Phase | Challenges | Intervention |
|---|---|---|
| Production | Ageing plantations driving yield decline | Fast track rejuvenation of orchards and expand new plantations on wastelands |
| | Weak R&D slowing varietal release | Dedicated research &and development for region-specific, pest-tolerant, high-yielding, climate-resilient varieties |
| | Inadequate availability of quality planting material | Scale certified nurseries and clonal parks for quality planting material development |
| | Low adoption of GAP & improved varieties among farmers | Training and capacity building along with awareness campaigns |
| Post-harvest | Labour-intensive operations, rising costs, minimal mechanisation | Promote automation and mechanisation via shared cluster infrastructure, supported by doreign direct investment (FDI) and capital subsidies |
| | Skill gaps in post harvest handling | Training and capacity building for farmers and labour involved in post harvest processes |
| Supply chain | High dependence on imported raw cashew nuts | Development of production and processing clusters along with strengthening of FPO/ farmer producer companies (FPCs) |
| | Potential shortage for raw material for Cashew Processing Industry in future (African nations ramping up their own processing units) | |
| Branding | Weak global branding & declining competitiveness (India losing to Vietnam) | Launch "India Cashew" branding with GI tagging, premium packaging, and coordinated trade missions to reposition India in global markets |

# Case study: Côte d'Ivoire transforming into global cashew processing hub with World Bank Support

Côte d'Ivoire presents a strong example of how a how coordinated policy action can rapidly transform and unlock significantly higher value from a commodity sector. As the world's largest producer of raw cashew , contributing nearly 40% of global supply; the country historically exported most of its output with minimal domestic value addition. To capture more value from its leadership in raw nut production, the government envisioned transforming the country into a cashew processing powerhouse and set a target to process about 50% of national production domestically by 2030. This vision was supported by targeted incentives such as export incentives for kernels, tax exemptions on processing equipment, preferential raw nut allocation to local processors, and the development of agro-industrial zones. Complementing these measures, the World Bank supported the creation of specialized R&D[20] labs to strengthen nurseries and farmer training, modern processing zones to scale local manufacturing, satellite hubs to link farmers in remote districts with processors, and rehabilitated feeder roads to reduce logistics costs and improve farmgate prices. These combined efforts have already mobilised millions in investments, expanded processing volumes from 43,700 MT[21] in 2017 to 344,000 MT in 2024, and generated over 18,000 jobs, while improving yields and incomes across the value chain. With sustained momentum, Côte d'Ivoire is now firmly on track to become a global cashew processing hub by 2030, already processing nearly ~ 39% of its raw nut output and rapidly scaling capacity further.

1. Agri-processing adds value in Cote d'Ivoire's cashew industry
2. Africa Cashew Alliance



# Cocoa

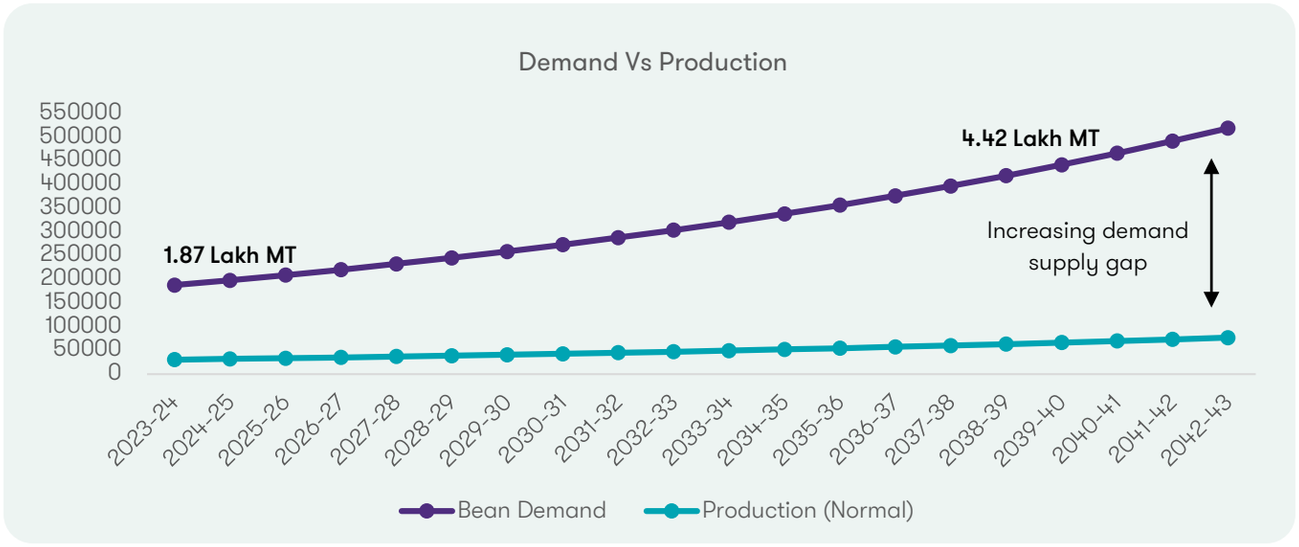
**Cocoa (Theobroma cacao),** literally meaning "food of the gods," is a globally significant tropical commodity and the backbone of the multi-billion-dollar chocolate industry. Grown predominantly in humid equatorial regions, cocoa is valued not only for its distinctive flavour profile but also for its expanding applications across food processing, cosmetics, nutraceuticals, and pharmaceutical sectors.

The beans, extracted from vividly coloured pods, undergo a series of post-harvest processes including fermentation, drying, and roasting. These steps transform raw beans into high-value derivatives such as cocoa liquor, cocoa butter, and cocoa powder — each of which serve a distinct industrial function in confectionery, beverages, personal-care formulations, and specialty food products.

India production
**~30,390 MT**

India acreage
**~1.1 Lakh Ha**

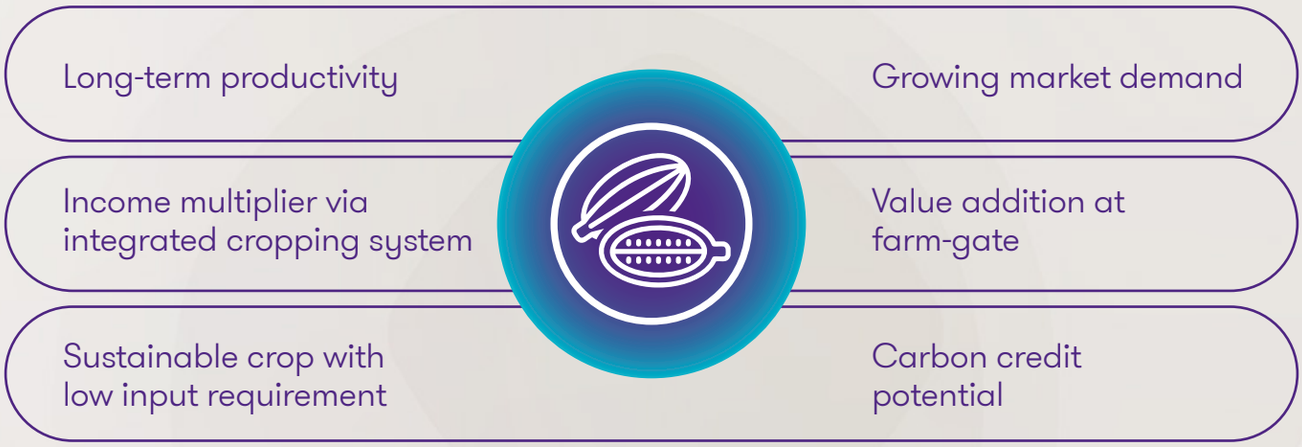
In India, cocoa cultivation is concentrated in four southern states, i.e., Andhra Pradesh, Kerala, Karnataka, and Tamil Nadu, which provides the ideal conditions for this shade loving crop. Cocoa thrives in warm, humid climates with annual rainfall between 1,500–2,000 mm and temperatures ranging from 25°C to 32°C. It prefers deep, well-drained soils with a slightly acidic pH (5.5–6.5). The crop is sensitive to waterlogging and drought, requiring efficient irrigation and drainage systems. Shade is essential, especially during the early growth stages, making cocoa ideal for intercropping under taller plantation crops like coconut, oil palm and arecanut. Cocoa is predominantly grown as an intercrop under these agroforestry systems, enabling farmers to diversify income while continuing to cultivate their main plantation crops.




Cocoa is a globally significant crop, supporting the livelihoods of an estimated 5 to 6 million smallholder farmers worldwide. While India is not yet a major global producer, its cocoa sector is becoming increasingly strategic as domestic demand estimated at ~1.87[22] lakh MT (bean equivalents ) in 2023–24, far outpaces domestic supply, forcing the country to rely on imports for more than 80% of its total requirement.

With domestic production at only ~30,390 MT in 2023–24 (growing at a modest CAGR of ~4–5% over the last five years), the widening demand supply gap underscores the urgent need to scale cocoa cultivation across suitable agro climatic zones, especially as India's cocoa bean demand is projected to rise to ~4.42 lakh MT by 2039-40, assuming a conservative 5% annual growth in demand. With consumption surging and new market avenues emerging, India is increasingly positioned to play a strategic role in the cocoa value chain, backed by significant headroom for sectoral development and value-chain upgrade .

## Cocoa: Enabler of doubling farmer income




20. Agri-processing adds value in Cote d'Ivoire's cashew industry

# Value chain mapping

Globally, the cocoa value chain moves through a clear sequence of activities from cultivation and pod harvesting to fermentation, drying, grading, and downstream processing into liquor, butter, and powder, which serve as critical raw materials for a wide spectrum of industries. In India, this chain mirrors the global structure but displays strong regional divergence in post-harvest practices. In Kerala and Karnataka, the double monsoon climate limits sun-drying capacity, prompting farmers to sell wet beans to local traders, who then move them to fermentaries and drying units primarily located in Tamil Nadu, where climatic conditions support reliable drying. Conversely, Andhra Pradesh and Tamil Nadu offer more favourable conditions that allow farmers to ferment and sun dry beans at the farm, enabling processors and traders to procure dry beans directly and reducing intermediary handling.




- Production
- Harvesting of pods
- Fermentation
- Drying
- Storage of dry beans
- Cleaning
- Roasting and grinding
- Processing of powder, butter and liquor
- Packaging
- Consumer

Once dried and graded, the beans enter formal processing units where they are converted into industrial cocoa derivatives such as liquor, butter, and powder, which then flow into chocolate manufacturing as well as broader confectionery, beverage, and personal-care industries before ultimately reaching consumers through retail and export channels. India's cocoa processing ecosystem has an installed capacity of around ~1[23] lakh MT installed capacity of which only ~60% is utilised due to limited domestic bean availability and an inverted duty structure that makes raw bean imports disproportionately expensive. As a result, the industry relies heavily on imported cocoa derivatives, which enter at 0% duty from countries such as, Indonesia, Singapore and Malaysia under the ASEAN-India Trade in Goods Agreement and Comprehensive Economic Cooperation Agreements (CECAs), while raw beans imports attract higher duties; disincentivising bean-based value addition within India.

According to APEDA, India imported over USD 880 million of cocoa and cocoa products in 2023–24, largely derivatives rather than beans, reflecting this structural distortion. Rationalising the duty inversion is therefore essential to improve bean availability, raise utilisation of domestic processing capacity, and enable India to transition from being a derivative-importing market to a bean-processing hub.

| | HS Code | Product | Value (USD Mn) | Quantity (MT) |
|---|---|---|---|---|
| Imports | 18050000 | Cocoa powder not cont. added sugar/other sweetening gents | 241.94 | 56844.35 |
| | 18040000 | Cocoa butter, fat and oil | 277.24 | 27436.84 |
| | 18010000 | Cocoa beans whole/broken, raw/roasted | 189.54 | 28774.21 |
| | 18031000 | Cocoa paste, excluding defatted | 31.055 | 2885.80 |
| | 18032000 | Cocoa paste, wholly or partly defatted | 0.49 | 884.99 |
| Exports | 18050000 | Cocoa powder not cont. added sugar/other sweetening agents | 4.55 | 1005.37 |
| | 18040000 | Cocoa butter, fat and oil | 77.39 | 10119.11 |
| | 18010000 | Cocoa beans whole/broken, raw/roasted | 0.35 | 43.60 |
| | 18031000 | Cocoa paste, excluding defatted | 0.43 | 36.23 |
| | 18032000 | Cocoa paste, wholly or partly defatted | 0.45 | 199.29 |
| | | Domestic production (Cocoa Beans-India) | - | 30390 |
| | | **Total beans demand equivalent** | | **187710.76** |

As per Grant Thornton Analysis (Trade Data:2023-24)

**Note:** Even if duties on raw cocoa beans are rationalised, higher bean imports will only improve raw material accessibility for processors and will not affect domestic farmers. India's demand far exceeds its production, and raw beans, even at zero duty are expected to remain 3–5% more expensive than the domestic produced beans, keeping Indian-grown cocoa naturally competitive. This modest price gap ensures that local cocoa continues to be the preferred choice for processors, while improved bean availability helps scale domestic processing without displacing farmers.

**Some of the broader challenges associated with India's cocoa value chain, together with the strategic interventions required to address them, are outlined below:**

| Phase | Challenges | Intervention |
|---|---|---|
| Production | Shortage of high-quality planting material<br>(Need for high quality parent seedlings for scaling nurseries) | • Polyclonal garden expansion<br>• (Additional ~250 hectares to be bought under polyclonal gardens in next 2-3 years )<br>• Scaling nurseries for seedlings propagation |
| | Lack of best practices adoption at farm level | Capacity building programmes with ICAR and state level institutes at cluster/ FPO/ Cooperative level |
| | Weak cocoa-specific R&D ecosystem slowing varietal development | Centre of Excellence (CoE) on Cocoa<br>(in public private partnership(PPP) mode to be operated on a hub and spoke model) |
| | Low area under cocoa cultivation, limiting scale and competitiveness | Promote cocoa as an intercrop through convergence with allied commodity boards (rubber, coconut, oil palm) and corporate partnerships; enhance targeted subsidies to incentivise area expansion and GAP adoption. |
| Post-harvest | Inconsistent bean quality due to poor post-harvest management practices and inadequate infrastructure | • Cluster development: Through FPO/FPCs enablement, GAP and other relevant training programs, shared infrastructure development (common fermentaries and reliable drying platforms etc.)<br>• Strengthening quality protocols and certification systems<br>• Single window subsidy system for streamlining subsidies |
| Supply chain | High dependence on imported cocoa derivatives (domestic processing units remain underutilised) | • Rationalise duty structure to improve raw material availability for processing industry<br>• Develop a 'Chocolate City' SEZ with targeted incentives, tax benefits, and plug-and-play infrastructure to anchor cocoa processing.<br>• (India as Cocoa Bean Processing Hub)<br>• Attract FDI through enabling policies, streamlined approvals and logistics along with competitive manufacturing advantages. |

To unlock the full potential of India's cocoa sector, it is essential to create a collaborative platform where industry players, government agencies, research institutions, and enabling organisations can jointly address the structural gaps that constrain the ecosystem. The value chain today remains fragmented and largely unorganised, making coordinated action critical for improving production systems, strengthening market transparency, and enhancing long-term sector competitiveness.

A unified, partnership-driven approach, anchored by the MoA&FW, the Directorate of Cashewnut & Cocoa Development, state governments, and the private sector, is imperative to drive strategic alignment, catalyse investment, and accelerate India's transition towards a strong, more self-reliant cocoa economy.

## Case study: Indonesia as regional processing hub for cocoa

Indonesia, the world's second-largest cocoa producer, produced ~6.32 Lakh MT[24] of cocoa beans in 2024, trailing only Côte d'Ivoire. Although it is a major producer, Indonesia's cocoa output has gradually declined from earlier peaks due to structural challenges such as aging plantations, weak planting material (limited replanting), pest pressures and climate change. For years, the country relied heavily on raw bean exports, which offered limited margins. To capture more value, the government shifted its strategy towards domestic processing, i.e., introducing export duties on raw beans that redirected supply to local grinders and significantly expanded processing capacity. This was supported by incentives for new manufacturing units, quality standards set by[25] (BSN) , research on better fermentation practices, stronger traceability and sustainability systems. In parallel, Indonesia also worked on productivity, focusing on better planting material, replanting, farmer training and pest and disease management etc. to stabilise upstream supply. As a result, Indonesia has emerged as the world's third-largest exporter of processed cocoa products in 2025, positioning itself as a competitive value-added processing hub even with declining raw bean output.



22. Grant Thornton Bharat Analysis
23. Grant Thornton primary research



# Coconut

Coconut (Cocos nucifera), revered as the “Kalpavriksha” or Tree of Life, is among India’s most strategically important plantation crops, celebrated for its biological versatility and its ability to deliver food, drink, fiber, fuel, timber and industrial raw materials from a single palm. Unlike most perennial crops, coconut performs exceptionally well in coastal, saline-prone and fragile ecosystems, where few other crops can sustain economic returns making it a foundational livelihood crop across India’s humid tropics. Its unique physiology, deep root system, and tolerance to high salinity and sandy soils position coconut as a natural stabiliser of coastal landscapes, while also supporting a thriving multiproduct bioeconomy ranging from edible oils to industrial fibers.

Beyond its cultural identity, coconut underpins one of India’s largest tree-based rural economies. India is the world’s third-largest coconut producer after Indonesia and the Philippines recording an output of 21,373.63[26] million nuts in FY 2024. The palm’s long productive life and year-round harvest cycle ensure stable income for millions of smallholders across Kerala, Tamil Nadu, Karnataka and Andhra Pradesh, with emerging belts in Odisha, West Bengal, Maharashtra and Gujarat.

India production
**147 Lakh MT**

India acreage
**21.65 lakh Ha**

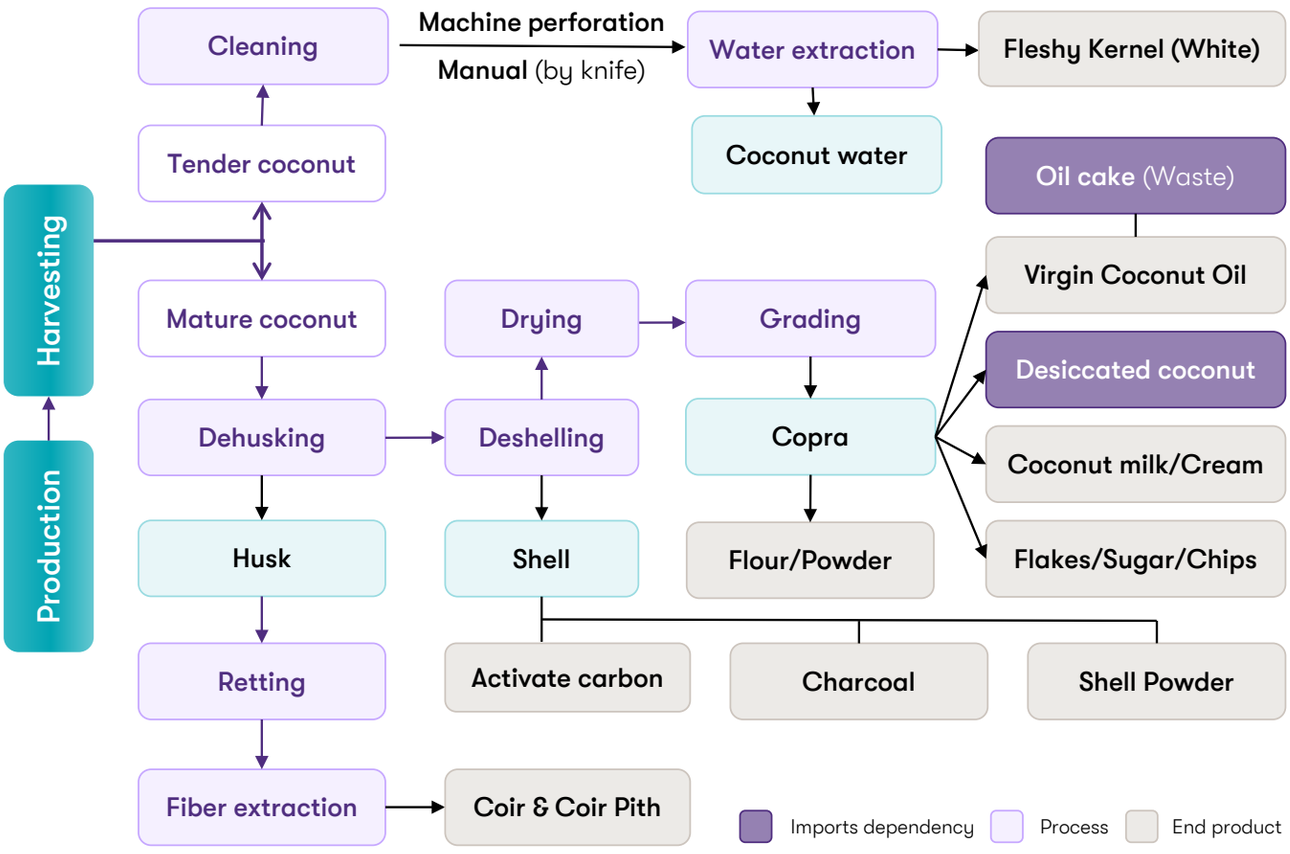
Over centuries, the crop has evolved from a household subsistence product to a diversified industrial system producing copra, coconut oil, tender coconut water, desiccated coconut, virgin coconut oil, coconut milk and cream, coconut sugar, chips and flour. Equally important are high-value co-products: coir, pith, geo-textiles, non-woven fibers, shell charcoal and activated carbon, which have positioned India as a global leader in fiber-based exports and green material innovation.

Coconut’s relevance continues to increase as global demand shifts towards natural, plant-based and functional products. The crop sits at the intersection of food security, circular bio-economy, sustainable packaging, climate-resilient livelihoods and export competitiveness making it a critical high-value horticulture sector for India’s next decade of growth.

# Value chain mapping

Coconut thrives in warm, humid tropical climates with temperatures of 27–32°C, annual rainfall above 1,500–2,500 mm, and well-drained sandy, alluvial or lateritic soils, enabling the palm to flourish along India's extensive coastline. These favourable agro-climatic conditions have kept India among the world's leading coconut producers, with productivity supported by the gradual adoption of improved planting materials, better water-management practices and ongoing replanting efforts across ageing plantations. The coconut economy sustains a large rural workforce, spanning farm cultivation, copra making, oil extraction, tender-nut marketing, coir processing, fibre-based manufacturing and activated carbon production, making it one of India's most integrated and employment-intensive plantation value chains.

Coconut moves through a multi-stream value chain beginning at the farm, where each harvested nut can enter several distinct commercial pathways. Tender coconuts are graded and supplied directly to fresh consumption markets or processed into packaged coconut water, a rapidly expanding functional beverage category driven by health conscious consumers. In addition, a small quantity of soft white kernel found in tender nuts is consumed fresh or blended into puree for culinary purposes. Mature nuts follow a different stream: they are fully de-husked and de-shelled to extract the kernel which is then processed into copra, with further careful grading and controlled drying reducing moisture to around 6–7% to ensure storability and high oil recovery efficiency. This copra forms the backbone of India's edible oil economy and is crushed to produce coconut oil, while the residual oilcake enters livestock feed markets. The white kernel simultaneously feeds an expanding value-added foods segment, producing desiccated coconut, coconut milk and cream, coconut flour, sugar, chips, flakes and spray-dried powders etc.; categories where India is strengthening its export footprint as global demand shifts towards plant-based and natural products.



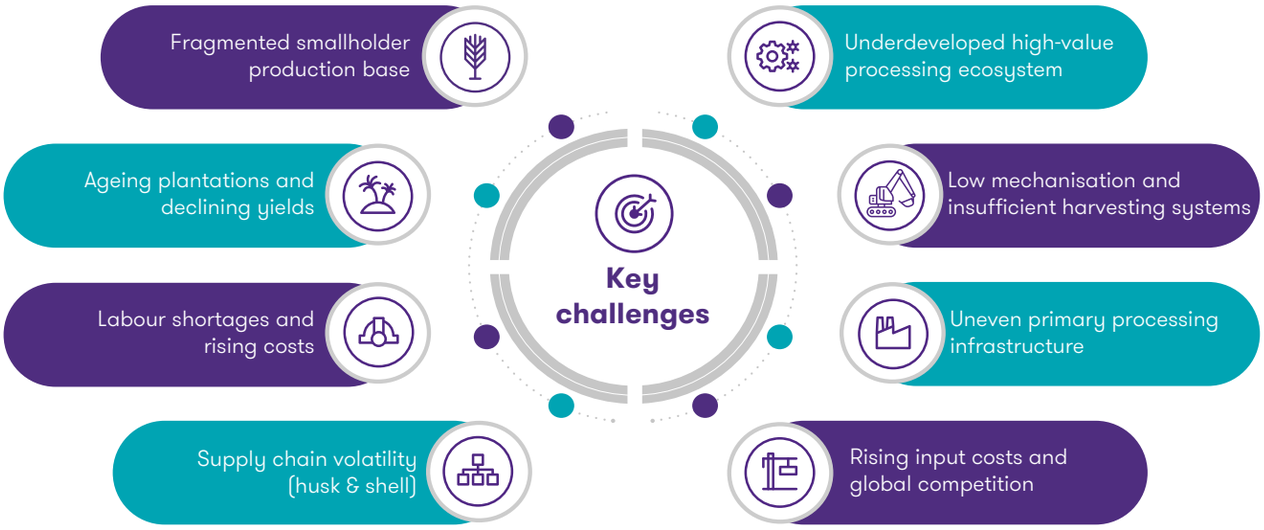
A second independent industrial chain originates from the husk. Coconut husk undergoes retting and fiber extraction to produce coir and coir pith, which serve as inputs for ropes, mats, mattings, geotextiles, nonwoven composites and horticulture grade cocopeat blocks. This coir ecosystem is one of India's largest women-led rural industries and a major contributor to nonfarm coastal employment. Another industrial value chain emerges from the shell, which is converted into charcoal, activated carbon, shell powder and a range of craft products. Activated carbon, in particular, is a high-value export product used in water purification, air filtration and industrial absorbents, where India has built a strong global presence in recent years.

| HS CODE | Product description | Value ( K $) | Quantity (MT) |
|---|---|---|---|
| 080111 | Desiccated coconut | 13,279 | 6359 |
| 080112 | Fresh coconuts in the inner shell "endocarp" | 31,110 | 55,247 |
| 080119 | Fresh coconuts, whether or not shelled or peeled excluding in the inner shell "endocarp" | 40,865 | 57,028 |
| 380210 | Activated carbon | 311,109 | 177,940 |
| 151311 | Crude coconut oil | 5,132 | 1,786 |
| 151319 | Coconut oil and its fractions, whether or not refined, but not chemically modified | 45,506 | 17,333 |

ITC Trade Map

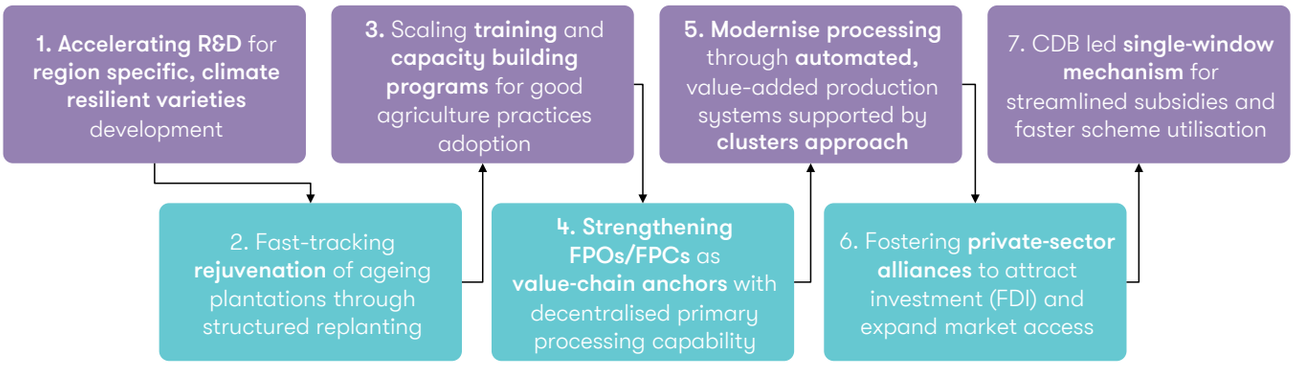
Together, these nut-based, husk and shell-based streams create one of the most diversified agricultural value chains in the country, supplying strong domestic markets while also feeding India's growing exports across food, fiber, industrial materials and sustainable products. Yet, even with this diversified footprint, the sector continues to face structural constraints that must be addressed to unlock productivity gains and deepen value-addition across the chain.

A large share of India's coconut area comprises ageing, low-yielding palms with slow replanting cycles, driven by weak commercial incentives and inadequate momentum in structured rejuvenation programs. Smallholders dominated production restricts adoption of new high yielding varieties, modern agronomical practices, mechanisation, and efficient harvesting systems, exacerbated by labour shortages especially trained climbers that inflate operational costs. Inadequate adoption of recommended agronomic practices often leads to quality variations and high maximum residue limits (MRL) levels, reducing farmers' ability to supply to premium markets. At the same time, tender coconut is witnessing strong market traction and premium prices, prompting many farmers to divert fresh nuts directly to this segment rather than channel them into traditional copra or oil value chains.



On the processing front, the primary-processing infrastructure remains uneven, resulting in inconsistent copra quality and moisture variability that erode reduce oil recovery . The ecosystem for high-value processing, i.e., VCO, coconut milk and cream, sugar, flour and functional products remain underdeveloped relative to global competitors, constraining India's ability to move up the value curve. Coconut oil prices in India remain highly volatile, as domestic realisations track the availability and price movements of substitute oils like palm, soy and groundnut, often pushing local prices above export parity levels and creating margin pressure for processors and farmers alike. Meanwhile, the coir and activated carbon industries grapple with irregular husk and shell availability, rising input costs and increasing competition from global exporters like Vietnam , all of which weaken India's export competitiveness across fiber and shell-based product lines.

Despite strong programme push from the Coconut Development Board (CDB) across productivity enhancement, skilling labour, technology enablement, value addition and market development; scaling transformation is hindered by limited private sector engagement in upstream supply chain development. Relatively low awareness and utilisation of MoFPI, NHB, Mission for Integrated Development of Horticulture (MIDH) and Cluster Development Programme (CDP) incentives among private sector stakeholders appears to be limiting the full potential impact of these government schemes.




## Case study: Transformation of the coconut sector in the Philippines

The Philippines, the world's second-largest coconut producer, has launched a coordinated, multiyear transformation programme to reverse declining productivity and strengthen farmer livelihoods. With coconut cultivated over 3.73 million hectares and supporting nearly 3 million farming households, the government enacted the landmark Coconut Farmers and Industry Development Act (Republic Act 11524) and established a ~PHP 75 billion trust fund to professionalise sector governance and finance long-term development. Strategic interventions include a massive replanting mission targeting 100 million palms (2023–2028) to replace old, senile trees and expand productive stands, along with a National Fertilisation Program backed by PHP 1.8 billion[27] to raise yields from current levels of ~40 nuts/tree/year towards biological potential exceeding 80-100 nuts/tree/year. Institutional partnerships with PCA and national farmer federations have further expanded services like seedlings production, farmer training, and extension services. These interventions have positioned the Philippines to scale up its coconut plantations and accelerate productivity gains, strengthening the country's long-term strategic edge in the global coconut economy.

25. FAO



# Mango: India's golden fruit and its global journey

Often hailed as the "King of Fruits," the mango known as Aam in Hindi, occupies a cherished place in India's cultural heritage, culinary traditions, and agricultural economy. India is the world's largest producer, contributing nearly 40% of global mango output, with around 28[28] million metric tons grown annually across 2.7 million hectares. The heart of this production lies across the warm belts of Uttar Pradesh, Andhra Pradesh, Bihar, Karnataka, Gujarat, Madhya Pradesh, and Tamil Nadu. Beyond its economic importance, the mango is part of everyday life; loved across regions, generations, and communities, making it a fruit every Indian holds dear.

The global mango trade is dominated by a distinct basket of premium varieties i.e. Ataulfo, Tommy Atkins, and Keitt from Mexico and Brazil; Nam Dok Mai from Thailand; Sindhri and Chaunsa from Pakistan; and India's own premium varieties such as Alphonso, Kesar, Dasheri, and Langra. Building on this strong varietal base and India's leadership in global production, the country has also emerged as a significant exporter of fresh mangoes. In FY 2024–25, India exported 29.94K MT[29] of fresh mangoes valued at USD 56.50 million, reflecting the steady international demand for its premium mangoes. These shipments were primarily directed to high-value destinations such as the UAE, the US, the UK, Kuwait, and Qatar, which continue to be India's strongest and most consistent markets for fresh mango exports.

Alongside fresh fruit exports, India has also developed a strong footprint in processed mango products, including pulp, purée, concentrate, dried mango and juices segments which cater to both industrial and retail demand globally. In FY 2024–25, India exported 63.25K MT[30] of mango pulp valued at USD 80.34 million, with Saudi Arabia, the US, the UK, Germany, and Canada emerging as the major destination markets.

26. Ministry of Agriculture and Farmers Welfare, Government of India

Despite India's vast mango production base, exports remain constrained as the fruit is highly perishable and long-duration sea shipments are challenging, making air freight the primary option for distant markets. Sea shipments are used for nearby destinations, while APEDA is developing dedicated sea protocols for fresh mango exports pertaining to premium distant markets to expand India's global mango reach. High domestic consumption further absorbs a large share of production, while stringent import compliances including MRL compliance, phytosanitary requirements, and mandatory irradiation for certain destinations etc. add operational complexity and restrict India's export potential.

India has established state of the art packhouses across major production zones to address these constraints and maintain the highest quality standards. These are complemented by internationally recognised post-harvest treatment facilities, including HWT, VHT, and irradiation units, located strategically along production belts to meet diverse country specific import requirements. A unique product identification system compliant with residue monitoring plan and traceability networking has been deployed by APEDA to ensure export-grade safety, transparency, and readiness for rapid product recall whenever required reinforcing India's ability to comply with global market protocols.

To complement fresh exports, India is also strengthening its value addition ecosystem in mango through focused efforts on processing, standardisation, and facility upgradation. Mango pulp remains the core processed product, and is perfectly suited for conversion into juices, nectars, drinks, jams, fruit cheese, and a wide range of beverages. It is also widely used in puddings, bakery fillings, fruit meals for children, flavors for the food industry, ice creams, yogurt, and confectionery, making it one of the most versatile mango-based ingredients in global markets.

India already hosts well established processing clusters, particularly in Chittoor (Andhra Pradesh) and Krishnagiri (Tamil Nadu), together supporting around 65[31] processing units with strong backward linkages for Alphonso and Totapuri varieties. Additional processing capacity exists in Maharashtra and Gujarat, further strengthening India's base for value-added mango products and enhancing future export readiness.

To unlock India's full potential in the mango sector, the next phase of improvement must focus on better alignment, consistency, and efficiency across the value chain. Strengthening grower organisation systems ranging from individual farmers to FPOs/FPCs alongside contract farming or assured procurement arrangements can help ensure production of uniform, residue compliant, fully traceable mangoes aligned with global standards. Improved infrastructure for post-harvest processes near the source shall ensure raw material consistency within established as well as emerging processing clusters shall also enhance supply reliability for value addition.

## Strategic priorities for mango

**01**

### Productive alliances

Linking farmer FPOs with processors for saplings, inputs, and output uptake

**02**

### Precision Agri-tech

Deploying AI/ ML models and other digital tools for farm management

**03**

### Cluster development

FPO enablement for quality production along with infrastructure upgradation

**04**

### Cluster development

Premium positioning for GI based varieties for premium exports

**05**

### Exports logistics

Integrate multi modal logistics for seamless mango exports

Future competitiveness will further benefit from the adoption of new age Agritech solutions, i.e., farm management software, and traceability systems etc. to integrate data on inputs, practices and even carbon footprint, enabling transparent and sustainability aligned sourcing. Strengthening India's adaptation to globally recognised certification systems will further enhance credibility and market acceptance. Alongside this, improvements in logistics through dedicated air freight corridors and faster clearances, combined with the ongoing development of specialised sea shipment protocols, will expand India's ability to reliably serve high-value global destinations. On the market side, India can also gain by increasing its representation on global trade platforms, industry forums, and buyer engagement events to position Indian mangoes more strongly and secure better access to premium international markets.

India's mango sector is at an inflection point. The challenge ahead is not incremental improvement but orchestrating a system-level transformation that elevates mangoes from a fragmented commodity to a globally recognised premium brand. Achieving this requires disciplined execution, unified stakeholder alignment, and a clear narrative that positions India as the world's most reliable source of high-quality mangoes. The opportunity is to convert natural abundance into enduring global leadership i.e. a shift from being the largest producer to becoming the benchmark supplier in international mango trade.

28. APEDA



# Apple: The pride of India's temperate orchards

Often regarded as the pride of India's temperate orchards, the apple known as Seb in Hindi and scientifically called Malus domestica occupies a place of deep cultural, nutritional, and economic significance. Grown primarily across the cool Himalayan belts of Jammu & Kashmir and Himachal Pradesh, apple cultivation is not just an agricultural practice but a way of life that shapes local identity, livelihoods, and traditions. Both these states account for more than 95% of the apple production in the country and apple orchards in these regions largely consist of the Red Delicious, Golden Delicious, Ambri, McIntosh, Granny Smith, and Rich Red varietals. A few other states, i.e. Uttarakhand, Arunachal Pradesh, Nagaland, Manipur and Telangana, contribute the remaining share of the production.

India produced ~26.3 Lakh MT[32] of apples in 2024–25 across 3.04 lakh hectares, a growth supported by favourable climatic conditions in these high-altitude regions. On the global stage, India stands as the fifth-largest apple producer, following China, United States, Turkey, and Poland. Beyond its economic footprint, the apple holds a timeless emotional appeal: its crispness and aroma signal the arrival of the harvest season, its nutritional richness makes it a symbol of everyday wellness, and its presence in households across India reflects a bond that transcends regions, generations, and food cultures. From orchard festivals to family fruit baskets, the apple remains one of India's most beloved fruits, cherished not just for its taste but for the stories, livelihoods, and heritage it carries.

For catering the growing demand, India imported ~5.57[33] lakh MT of fresh apples in 2024–25, valued at USD 449.74 million from countries like Turkey, Iran, Afghanistan and United states, reflecting robust demand for high-quality-quality, uniformly graded produce. In contrast, exports remained minimal at ~34K MT, valued at USD 13.76 million primarily to countries like Bangladesh, Nepal, Bhutan, UAE and Saudi Arabia, indicating that India functions overwhelmingly as a net import-dependent market for apples. Imported apples dominate premium retail shelves due to consistent grading, packaging, and branding. Indian apples lack a unified identity, making collective branding through FPOs and cooperatives essential.

Around 60% of apples in India are consumed fresh[34], while the remaining 40% mainly low-grade fruit goes into processing for juices, sauces, and other ingredients. Imported apples see steady, year-round consumption, often with demand exceeding supply. This growth is driven by a younger population, rising incomes, improved health awareness, and the assured year-round availability of apples in retail markets. As health awareness rises across Indian households, apple products are increasingly preferred as a convenient and nutritious snacking option especially for children and youth strengthening demand for both fresh and processed formats. This shift is opening wider opportunities for value-added products such as juices, purées, minimally processed slices, dried snacks like candies, and other ingredient grade applications that can absorb fruit not destined for premium fresh markets. However, India's value addition potential in apples remains largely underutilised, with significant headroom for growth.

Yet, despite rising consumption and expanding applications in both fresh and processed forms, the sector continues to grapple with deep-rooted challenges that constrain gains in productivity, quality, and overall competitiveness. A central challenge is the overwhelming dominance of conventional orchards in the major producing regions like Jammu & Kashmir, which still form the bulk of the cultivated area.

29. Mango | APEDA
30. DGCIS
31. Mango Pulp | APEDA

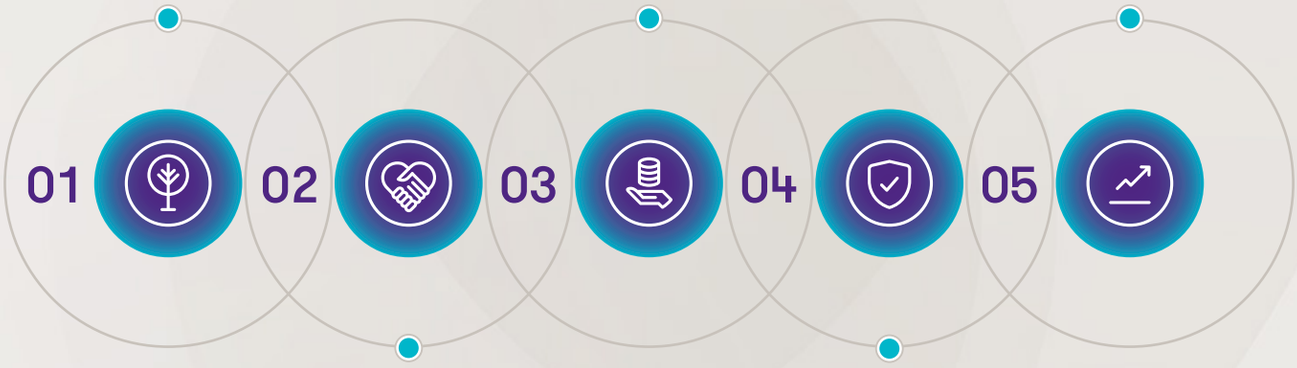
These traditional systems typically carry only ~250 trees per hectare, rely on tall seedling-based trees, and take 15–20 years to reach full fruiting. Their yields remain low at 10–15 tons per hectare, making them economically inefficient for small and marginal growers. In contrast, high- density orchards utilise dwarf rootstocks and can accommodate up to 3,000 plants per hectare, begin bearing fruit within 2-3 years, and reach full production in four to five years, producing 50–70 tons per hectare under proper management. However, progress remains slow because shifting to modern high-density systems demands substantial upfront investment, which many growers cannot afford due to high financing costs. This structural bottleneck is compounded by fragmented landholdings, which make high-density conversion, irrigation upgrades, and mechanised management financially challenging for small farmers. At the same time, climate variability including erratic rainfall, inadequate chilling hours, and unseasonal heat frequently disrupts flowering and fruit set in the Himalayan belt, adding volatility to annual yields. Addressing this requires climate-resilient varieties, micro-irrigation, and precision farming backed by strong policy support for R&D and sustainability.

These production constraints are further amplified by significant postharvest losses and cold chain infrastructure gaps, as many regions still lack efficient packhouses, grading lines, and storage infrastructure (cold storage and controlled atmosphere storage infrastructure etc.). The supply chain remains highly fragmented, with multiple intermediaries capturing much of the value; even though organised players like Reliance Retail and Adani Agri fresh procure directly from farmers, their coverage is limited and farmer realisation often remains compressed. Together, these constraints slow the sector's shift towards higher productivity and weaken its ability to compete with uniformly graded imported apples, making it essential to address them to enhance efficiency and strengthen the competitiveness of Indian apples.

**High-density plantation expansion**
Climate smart, disease tolerant high-density orchards with certified rootstocks, protected cultivation etc.

**Credit access for infrastructure and orchard conversion**
Blended finance models for cold storage, packhouses, and high-density plantation adoption (financing for productivity and quality)

**Processing diversification and incentives**
Incentives for juice, cider, vinegar, snacks, and nutraceuticals units using C/D grade fruit, FPO linked waste reducing models (higher income realisation for value chain)




**Cluster development**
FPO anchored clusters in collaboration with private sector with shared nurseries, storage, digital & other infrastructure (cluster drive scale and efficiency)

**GI -based branding**
Strengthen GI protection and branding for kashmiri ambri and himachali delicious etc. for premium positioning (identity builds premium value)



# Strategic enablers for sectoral transformation

A detailed analysis of multiple high-value horticulture value chains reveals a common set of structural levers that must be unlocked to drive India's next phase of sectoral transformation. Despite crop specific nuances, the diagnostics show that the underlying constraints converge around three foundational enablers that shape long-term sectoral competitiveness. These include strengthening the research and innovation ecosystem, building scalable partnerships between farmers, the private sector and government, and accelerating technology adoption together creating a clear pathway to improve productivity, deepen market linkages, and enhance value creation at scale.

## Strengthening the R&D and planting material ecosystem

A robust research and innovation ecosystem is fundamental for building climate-resilient, high-yield, region-specific varieties that can meet the evolving needs of India's high-value horticulture sectors. This requires dedicated Centres of Excellence (CoEs) to drive varietal research, modern seed garden development, scalable planting material production, and continuous farmer-centric training and advisory content. Strengthening this backbone ensures a reliable supply of superior genetic material, faster dissemination of best practices, and more resilient production systems across diverse agroclimatic zones.




To operationalise this, a CoE must be designed as a decentralised, yet integrated platform anchored in a hub-and spoke model, enabling both scale and last mile reach. The central hub has to be located in a major producing state and should focus on advanced research, elite planting material development, and creation of climate resilient, region-specific varieties, while also generating high-quality farmer training and advisory content. Regional spokes in key growing and expansion zones should deliver localised extension services, supply certified planting material, implement tailored agronomic packages, and support research trials for varietal testing and release to ensure consistent adoption across diverse agro climatic regions.



## Institutional framework

**Centre/State Government**
COE anchor, land and infrastructure support

**Private sector players**
Industry partner, funding, technical expertise, market ecosystem

**National Horticulture Board (NHB)**
Financial subsidy under COE scheme, policy support, monitoring and evaluation

**ICAR/State Universities etc.**
Host Institution, Local implementation, scientific leadership, extension activities

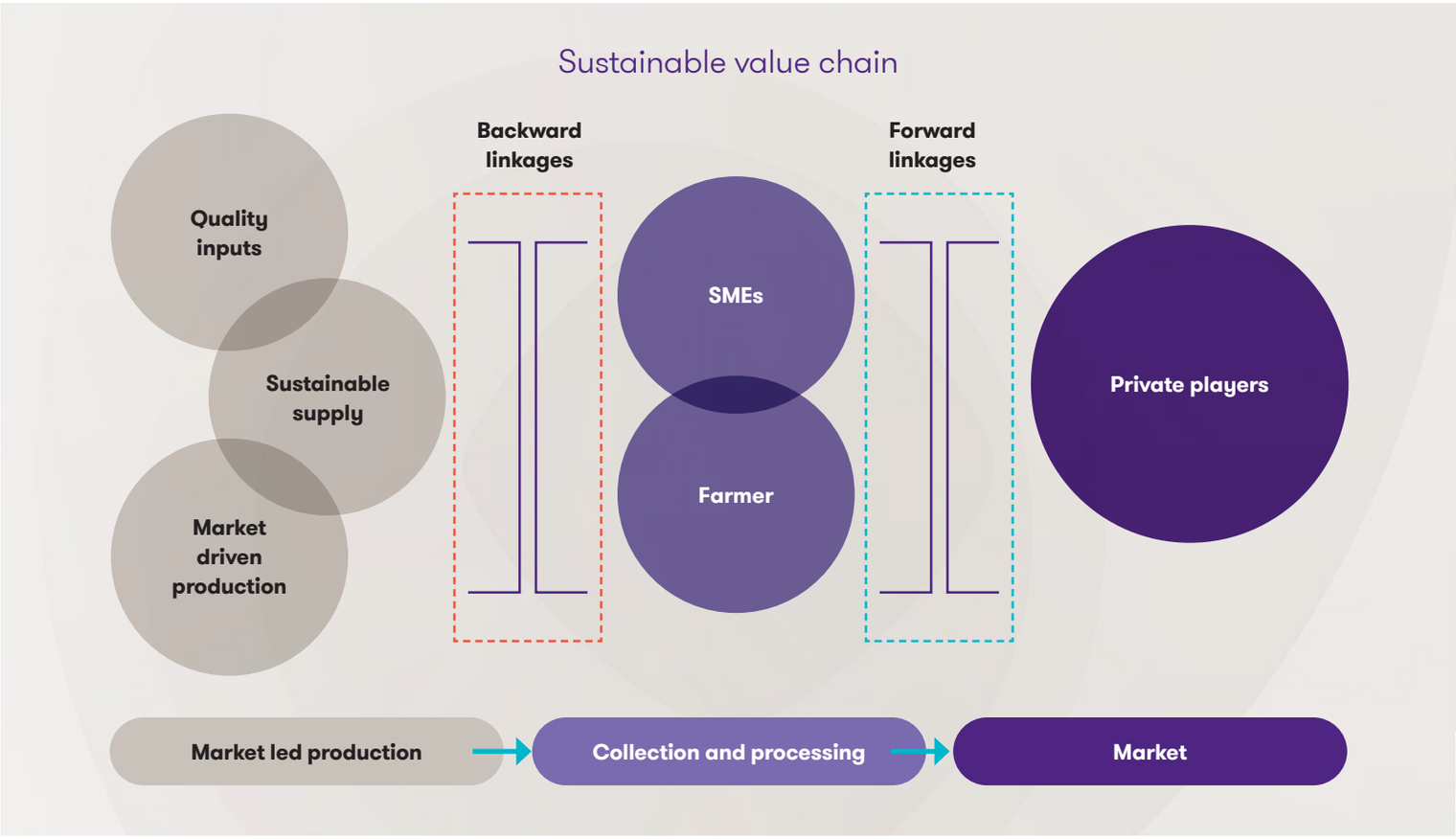
CoEs should be established in a PPP mode, where government provides land, core infrastructure, and operational support, while the private sector contributes cutting edge technology, innovation capabilities, and market-linked expertise. With a self sustaining operating model and jointly run governance structure, CoEs can drive faster technology transfer and long-term resilience across India's high-value horticulture crops.

To sustain this architecture, there is a clear need for dedicated, ringfenced R&D funding to support varietal improvement, seed garden upgradation, and climate resilience research. A structured funding window supported jointly by government and private sector can ensure predictable investment, while a centralised national knowledge repository which consolidates trial data, region-wise performance results, and best practice advisories can accelerate data-driven innovation and faster dissemination of best practices across regions.

# Productive partnerships

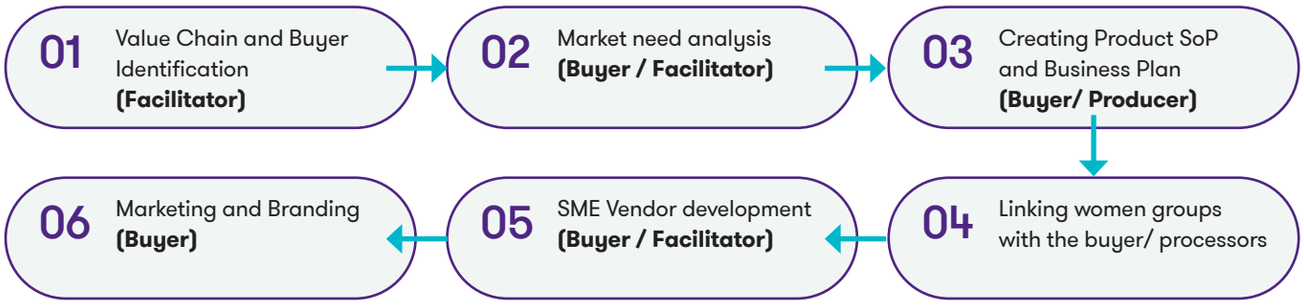
**Productive partnerships** are a strategic lever for sectoral transformation because they unify farmers, FPOs, private players, and government around a shared, market-driven growth agenda. By anchoring production to real market demand, these partnerships shift the sector from fragmented supply chains to integrated, competitive, and value creating ecosystems.

**Productive partnership** is defined as a collaboration between farmers/FPOs/cooperatives and organised private market players with the objective of enhancing productivity, capacity building, and infrastructure creation to enable scale and develop product as per market demand. By engaging large buyers to buy from farmers/FPOs/cooperatives at a consistent quality and quantity, it will create stable demand and will also provide the required support to the producers. This will lead to an increase in business activities of producers and in turn increase in the income of producers and promote upgradation of facilities, infrastructure, and production activities.
Such development of **producers as vendors** will ultimately support in their transformation into Small and medium sized entreprises(SMEs), hence positioning them for further growth in formal markets both domestic and overseas. The aim is to build strong linkages based on market intelligence with respect to opportunities and challenges faced by the stakeholders.



Productive partnership involves three core agents: Producer (Farmers/FPOs/cooperative), market (buyers), and facilitators (either the Government itself or an implementing agency supporting the Government). Facilitators strengthes the linkage between producers and buyers through the provision of core inputs, financial credit, infrastructure setup, technical assistance, training, and business development. It promotes horizontal alliance amongst farmers/FPOs/FPCs to coordinate collective production, aggregation, and sales. Furthermore, it incentivises a vertical alliance between producers and buyers to understand the market and each other's needs where the government plays the role of the convener who brings all parties together.

For productive partnerships to be successful a proven methodology needs to be adopted. This is illustrated below:




The proposed methodology for promoting productive partnerships follows a structured six-step approach. It begins with value chain and buyer identification led by the facilitator, followed by a market need analysis conducted jointly by buyers and facilitators. Based on these insights, product-specific standard operating procedures (SoPs) and business plans are developed collaboratively by buyers and producers. Facilitator then plays a critical role in linking farmer groups with buyers and processors, enabling direct engagement and partnership. The next phase focuses on SME vendor development, supported by buyers and facilitators to build entrepreneurial capacity. Finally, the model is strengthened through marketing and branding initiatives led by buyers, ensuring visibility and market access for women-led enterprises.

Productive partnerships can become a powerful lever for sectoral transformation when combined with last mile delivery of government incentives, ensuring farmers and FPOs can fully utilise support for upgrading production and quality. Public–private collaboration is essential to build shared infrastructure, strengthen certification and quality systems, and connect producers to distant domestic and export markets. By aligning incentives with market demand and leveraging private sector expertise, these partnerships help farmers meet processing requirements, secure stable markets, and transition towards more competitive, value-driven horticulture ecosystems.



# Technology as a catalyst for efficiency, quality and scale

Technology can play a pivotal role in transforming high-value horticulture by improving efficiency, reducing losses, and ensuring consistent quality across every stage of the value chain. From mechanising labour-intensive farm operations to automating postharvest processes and strengthening traceability and sustainability systems, technology helps producers meet the quality, safety, and compliance standards demanded by organised domestic markets and global buyers. By enabling better productivity, transparent supply chains, and export-ready produce, technology becomes a critical lever for building competitive and future-ready horticulture ecosystems.

As this transformation accelerates, promoting Agritech innovations becomes equally important. Start ups developing solutions in mechanisation, automation, traceability, sustainability monitoring, and AI-based advisory must be supported with platforms that help them validate , pilot, and scale their technologies. Dedicated incentives for Agritech innovation are already encouraging early pilots and adoption, but the ecosystem must evolve further so that a greater share of project costs especially for emerging and high - potential technologies can be supported through blended public private financing and scale up support. Proactive handholding, market access, and scaleup support for Agri tech innovators will ensure that proven technologies reach the last mile and deliver measurable impact across value chains.

## Key technology touchpoints in the value chain

**On-farm Production**

- Mechanised tools for pruning, inter-culture and harvesting
- Drones and sensors (IoT) for real-time crop monitoring
- Precision irrigation for optimal water use
- AI-based crop advisory and pest/disease detection

Higher productivity and uniform crop quality

**Post harvest handling**

- Automated grading and optical sorting for quality consistency
- Packhouse-level cleaning and primary handling
- Cold-chain, warehousing and short-term storage
- Hygienic bulk handling to reduce contamination

Lower losses and improved shelf life

**Processing**

- Automated roasting, grinding, drying & fermentation controls
- Sensor-based quality assurance and food-safety systems
- Standardised processing lines for uniform output
- Energy-efficient machinery for cost-effective operations

Consistent quality and higher throughput

**Market and export readiness**

- Digital traceability for full farm-to-fork transparency
- Sustainability and residue-compliance logs
- Integrated certification workflows (GAP, organic, export norms)
- Digital platforms for market linkage and quality-based pricing

Stronger buyer trust and access to premium markets

As India's horticulture sector modernise, it will be essential to ensure that these technologies and innovations are not only available but also accessible and affordable to producers at scale. This requires deeper integration of digital tools into extension systems, wider deployment of shared mechanisation and automation services through FPOs and service providers, and a supportive regulatory environment that encourages interoperability and transparent data flows. With stronger institutional capacity, market pull from organised buyers, and an enabling financing ecosystem, technology can evolve from isolated pilots into a core driver of sectoral competitiveness, creating resilient, efficient and future-ready value chains that deliver higher incomes and better market access for producers.



# Roadmap to achieve vision 2030

India's horticulture sector now accounts for a disproportionately large share of agricultural value-addition and has surpassed foodgrains in total output. Yet, premium segments continue to be constrained by bottlenecks in planting material, fragmented post-harvest systems, and uneven standards and traceability. As a result, India remains import-dependent in several high-value chains even though significant domestic processing capacity remains underutilised.

Vision 2030 seeks to turn this asymmetry into an advantage — shifting the sector from volume to value, from import dependence to domestic value-addition, and from fragmented schemes to an integrated mission platform that simultaneously scales productivity, quality, exports and livelihoods.

The next step is to articulate a clear, actionable pathway for achieving this vision. The roadmap below breaks the journey into practical stages, outlining priority actions and expected outcomes that build sequentially: strengthening production, improving processing and quality systems, and positioning India's horticulture sector more competitively in global markets.

| Phase | Key challenges addressed | Strategic pillars | Priority actions | Expected outcome |
|---|---|---|---|---|
| **Foundation (FY 2026-27)**<br>**Pre-Production & Production** | • India's productivity gap in high-value horticulture crops is fundamentally a genetic and planting-material problem. Across crops, yield differentials of 2–4× relative to global benchmarks are common due to poor varietal quality and disease incidence.<br>• More than 40–50% of plantation area in crops like coconut, cashew and apple etc. is estimated to be ageing and low-yielding | **Key stakeholder: MoAF&W**<br>• Clean and elite planting material production (Dedicated R&D)<br>• Systemic rejuvenation and area expansion | • Setting up CoEs for priority crops<br>• Establishing polyclonal gardens and certified nurseries etc.<br>• Replanting ageing orchards across priority crops along with new plantations in suitable areas including marginal/wastelands.<br>• Providing convergence across schemes and directorates (DCCD, CDB, MIDH, MoFPI etc.) to drive area expansion and cluster development<br>• Customising CDP 2.0 for high-value horticulture crops to align cluster development with premium market demand<br>• Scaling extension programmes (GAP training, technology demonstrations etc.) to raise baseline productivity levels, technology adoption and improve quality compliant production across clusters | • Reliable supply of elite planting material<br>• Revitalised orchards with higher yields<br>• Premium production through clusters aligned with market productivity<br>• Clusters enable scale and efficiency |
| **Scale (FY 2027-29)** | • India loses 8–15% of horticulture output post-harvest, with losses significantly higher in high-value perishables.<br>• While India exports nearly USD 4.3 billion in horticulture and processed products annually, premium market penetration remains limited because of quality and compliance gaps. | **Key Stakeholder: MoFPI**<br>• Micro-processing clusters (with advanced post-harvest and processing infrastructure)<br>• Trade competitiveness | • Operationalising cluster-based, micro-processing hubs for better aggregation, quality, scale and efficiency<br>• Enhancing farmer access to latest technologies (production), post-harvest infrastructure, value addition and market opportunities<br>• Providing dedicated incentives for in-house processing (Conditioned: Assured raw material supply from clusters, FPOs, or through trade agreements)<br>• Introduce ease of doing business reforms for agri-processing and trade (single-window clearances, simplified compliance, tariff rationalisation, GST exemption etc. for high value crops) | • Efficient post harvest and processing ecosystem<br>• Reduced wastage and higher domestic value realisation<br>• Transparent, compliant supply chains<br>• Improved investor confidence and private sector participation |

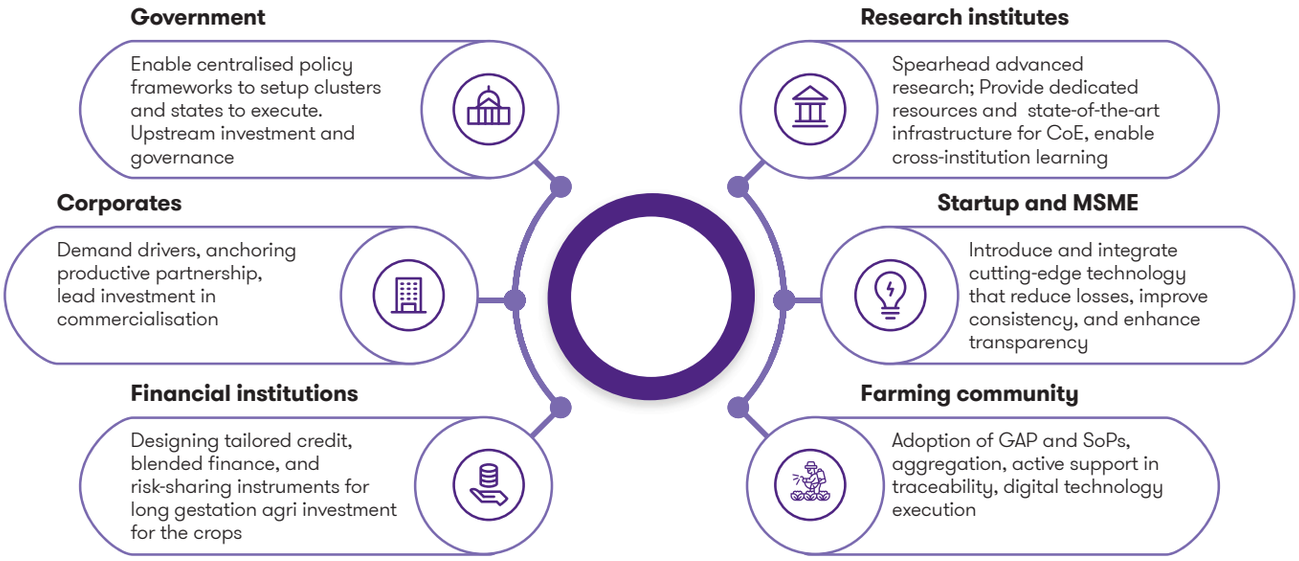


| Phase | Key challenges addressed | Strategic pillars | Priority actions | Expected outcome |
|---|---|---|---|---|
| Premiumi-sation (FY 2029–30) | • More than 80% of horticulture producers are small and marginal farmers, operating independently, with limited ability to adopt technology, comply with standards, or signal volumes and consistency to markets.<br>• High import dependency for meeting industry demand, limited global presence and uneven brand positioning | **Key stakeholders: APEDA**<br>• Productive partnerships execution | • Forge productive partnerships (long term) with FPOs, processors, and global buyers to coinvest in branding, certification, and market access etc.<br>• Develop GI-based branding for premium horticulture crops (mango, spices, nuts, and plantation crops) to establish global identity and protect origin value<br>• Enforce national quality standards and digital traceability systems (block chain enabled, QR etc.) to meet global compliance requirements and consumer trust<br>• Strengthen national quality infrastructure (labs, certification, etc) to align with Codex/ISO and other benchmarks<br>• Accelerate exports in high-value categories through branded lines rather than bulk commodity trade<br>• Attract FDI into premium horticulture clusters and branded export ventures | • Distinct global identity for Indian horticulture<br>• Verified origin and quality assurance for premium crops<br>• Reduced import dependence in high-value categories<br>• Higher unit value realisation from processed as well as fresh produce exports |

Translating this vision into reality requires a decisive shift from fragmented, scheme-driven interventions to a coherent, market-backed development pathway that strengthens both supply-side capabilities and demand-side positioning. This roadmap represents a transition to a coordinated mission aimed at building an **"Brand India"** in global horticulture value chains, with the central objective of scaling farmer incomes by linking producers directly to value chains that reward quality, identity, and scale. The success of this transformation will hinge on how effectively different stakeholders act together. Recognising that infrastructure without markets, technology without demand anchors, or farmers without institutional linkage cannot deliver scale and efficiency. Well-defined roles across governments, industry, financial institutions, research bodies, start-ups and farming communities are therefore essential to align individual strengths into one high-performing ecosystem.



## Role of stakeholders




With public-private alignment and strategic investments in research, production, technology, infrastructure and market development etc., the vision of an integrated horticulture ecosystem becomes actionable — elevating high-value horticulture as the sector's strongest lever for scaling rural incomes and strengthening India positioning in global value chains.

# Conclusion

Achieving India's premium horticulture ambition ultimately rests on orchestrating policy alignment, industry investment, and farmer adoption into a single, reinforcing execution engine. India's high-value horticulture sector has the scale, market demand, and policy momentum to become a central driver of farmer income growth and agri-industrialisation. However, persistent upstream weaknesses, fragmented value chains, and weak market anchoring have limited the realisation of this potential.

This paper demonstrates that a mission-led, market-backed transformation anchored in clean planting material production, orchard rejuvenation, localised processing, export readiness, and productive partnerships is essential to unlock durable value. Sequenced correctly and executed through partnerships, these pillars can convert public investment into sustained private participation, improve asset utilisation, reduce import dependence, and position India as a trusted global supplier of premium horticulture products.

The imperative now is coordinated action. With disciplined execution and alignment across government, industry, and producers, high-value horticulture can deliver structurally higher incomes, stronger exports, and lay a strong foundation for Atmanirbharta in the next decade.

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