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GROWTH, SPATIAL CONCENTRATION AND EXPORT COMPETITIVENESS OF INDIA'S TABLE-GRAPE ECONOMY: A LONG-RUN ANALYSIS, 1988–2026

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Abstract
Horticulture has become the fastest-expanding segment of Indian agriculture, yet the economics of individual high-value crops remains thinly documented. This paper examines the grape (Vitis vinifera) economy of India over nearly four decades (1987–88 to 2025–26), integrating long-run production series with state-level and destination-level trade data to assess growth performance, spatial structure and export competitiveness. Using official estimates from the Ministry of Agriculture and Farmers' Welfare, APEDA, the Directorate General of Commercial Intelligence and Statistics, and the FAO, the study computes compound growth rates, productivity dynamics and concentration measures. Three findings stand out. First, cultivated area and output grew rapidly (compound annual growth of 6.6% and 7.1% respectively), but yield rose at only 0.5% a year and has drifted below its late-1990s peak of about 26 MT/ha to 19.7 MT/ha in 2025–26 — a productivity paradox in which expansion has been extensive rather than intensive. Second, production is extraordinarily concentrated: Maharashtra and Karnataka together account for roughly 94% of national output, exposing the crop to correlated agro-climatic and market shocks. Third, although India ranks sixth in world grape output, it exports under a tenth of its production, export volume is volatile (falling about 21% between 2023–24 and 2024–25), and close to two-fifths of export value is routed through a single re-export hub, the Netherlands. The paper argues that yield revival, geographic diversification and cold-chain-led market widening are the binding constraints on the sector's competitiveness, and outlines targeted policy responses.

Keywords: *table grapes; horticulture; agricultural productivity; export competitiveness; spatial concentration; India; Karnataka*

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1. Introduction

Agriculture and allied activities remain central to India's economy, contributing about 17–18% of gross value added and supporting the livelihoods of roughly half the workforce. Within this broad aggregate, the composition of output has shifted steadily towards higher-value products. Horticulture now occupies a pivotal position: total horticultural output reached 369 million tonnes in 2024–25, exceeding foodgrain tonnage and reflecting a structural diversification away from cereal monoculture towards fruits, vegetables and plantation crops. This diversification is economically consequential because horticultural crops generate substantially higher value per hectare, are more employment-intensive, and command a growing share of both domestic discretionary spending and export earnings.

Grapes exemplify this transition. India is unusual among major producers in that its viticulture is oriented almost entirely towards fresh table grapes rather than wine, inverting the global pattern in which the overwhelming majority of grape output is vinified. The crop is capital-intensive, requires trellised training systems and precise canopy and water management, and generates dense employment across cultivation, grading, packing and cold-chain logistics. It is also strategically important for exports: grapes are among the highest-value fresh fruits India ships abroad and a flagship commodity in the country's ambition to expand agri-exports. Understanding the trajectory of the grape economy therefore offers a revealing window into the opportunities and constraints of India's wider horticultural push.

Despite this significance, the empirical literature on Indian grapes is fragmented. Much existing work is descriptive, confined to short windows, or focused on agronomy rather than the joint economics of production, spatial structure and trade. Policy commentary tends to celebrate aggregate expansion without interrogating whether growth has been driven by rising yields or merely by area extension, whether the crop's heavy geographic concentration constitutes a systemic vulnerability, or whether India's export performance matches its production standing. These are precisely the questions that determine long-run competitiveness.

This paper addresses that gap. It has three objectives: (i) to characterise the long-run growth of grape area, production and productivity from 1987–88 to 2025–26 and to test whether expansion has been intensive or extensive; (ii) to quantify the spatial concentration of production and assess the resulting exposure to correlated shocks; and (iii) to evaluate export performance — its volume, volatility, destination structure and global standing. By combining these dimensions in a single, data-driven analysis, the study contributes a coherent account of where the sector's competitive advantages and vulnerabilities lie, with particular attention to Karnataka, the second-largest producing state and the region most directly relevant to the author's research context.

2. Data and Methods

The analysis draws exclusively on official and multilateral data sources to ensure reliability and reproducibility. Long-run area, production and productivity series (1987–88, and 1991–92 to 2025–26) are taken from the Ministry of Agriculture and Farmers' Welfare (MoAFW), with 2025–26 figures based on First Advance Estimates. State-wise area, production and productivity for 2025–26 are drawn from the same source. Commodity-specific export series by destination (2018–19 to 2022–23, quantity in MT and value in ₹ lakh) are from the Directorate General of Commercial Intelligence and Statistics (DGCIS) as compiled by MoAFW; recent aggregate export figures are cross-checked against APEDA releases. India's position in world production (2024) is taken from the FAO. Contextual horticultural and macro-agricultural figures are sourced from the MoAFW advance estimates and the Economic Survey.

Four analytical measures are used. First, compound annual growth rates (CAGR) are computed as CAGR = (Vt / V0)1/n − 1 for area, production and productivity over the full 38-year window. Second, productivity dynamics are examined by tracking yield (MT/ha) against area and output to distinguish intensive from extensive growth. Third, spatial concentration is measured using production shares of leading states and a Herfindahl–Hirschman-type index (HHI = Σ s_i^2, where s_i is a state's share). Fourth, export concentration is assessed through destination value-shares and volume trends. All monetary values are reported in the units of the underlying source; no deflation is applied, and figures are treated as nominal. The study is descriptive-analytical rather than causal: it characterises structure and trend, and interprets them against the sector's institutional and policy environment.

3. Results and Analysis

3.1 The macro-horticultural context

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India's grape economy sits within a rapidly expanding horticultural base. Total horticultural output rose from about 281 million tonnes in 2013–14 to 369 million tonnes in 2024–25, with the area under horticulture reaching 29.5 million hectares. Fruit production alone approached 119 million tonnes. This expansion has been supported by a sustained rise in public investment in the sector, growing budgetary allocations for agriculture and allied activities, and infrastructure programmes targeting cold storage and post-harvest handling. Grapes occupy roughly 3.1% of the national fruit area — a modest footprint that nonetheless punches well above its weight in export value, underlining the crop's high value density and its relevance to the country's agri-export strategy.

3.2 Long-run growth: an extensive, not intensive, expansion

Over nearly four decades the physical scale of Indian viticulture expanded dramatically. Cultivated area rose more than eleven-fold, from 15.4 thousand hectares in 1987–88 to 172.5 thousand hectares in 2025–26, a compound annual growth of 6.6%. Production rose even faster in absolute terms, from 251 thousand MT to 3,395.7 thousand MT, a CAGR of 7.1%. Yet productivity — the decisive indicator of competitiveness — barely moved, growing at just 0.5% a year over the same period (Table 1, Figure 1).

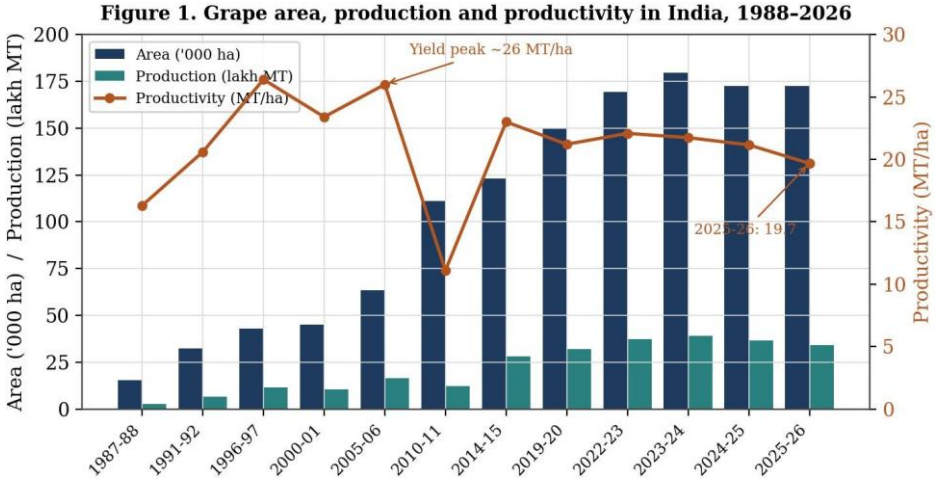
The productivity trajectory is not merely flat but non-monotonic. Yields climbed to an early peak of about 26.4 MT/ha in 1996–97 and hovered near 26 MT/ha in the mid-2000s, before retreating to the 21–22 MT/ha band through the 2010s and slipping further to 19.7 MT/ha in the 2025–26 First Advance Estimates. (The sharp 2009–10 and 2010–11 troughs reflect a combination of adverse weather and a discontinuity in area measurement, and are best read as anomalies rather than trend.) The pattern is unambiguous: recent output growth has been achieved predominantly by bringing new land under vines rather than by lifting yields on existing vineyards. This “productivity paradox” is the single most important finding for the sector's future — extensive growth is inherently bounded by land and water availability, whereas durable competitiveness depends on intensive, yield-led gains.

Table 1. Grape area, production and productivity in India, selected years (1987–88 to 2025–26)

Year	Area ('000 ha)	Production ('000 MT)	Productivity (MT/ha)
1987–88	15.4	251.0	16.3
1991–92	32.4	668.2	20.6
1996–97	42.9	1,134.6	26.4
2000–01	45.2	1,056.9	23.4
2005–06	63.5	1,649.6	26.0
2010–11	111.0	1,235.0	11.1
2014–15	123.0	2,823.0	23.0
2019–20	150.0	3,181.0	21.2
2022–23	169.4	3,739.7	22.1
2023–24	179.6	3,904.3	21.7
2024–25	172.6	3,652.1	21.2
2025–26 (1st AE)	172.5	3,395.7	19.7
CAGR 1988–2026	6.6%	7.1%	0.5%

Source: Ministry of Agriculture and Farmers' Welfare, Government of India. CAGR computed by the author. AE = Advance Estimates.

Vol. 12 Issue 4s (August 2026)
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Source: Author's construction from MoAFW data. Bars show area and production (production rescaled to lakh MT); the line traces productivity against the right axis.

3.3 Spatial concentration and systemic exposure

Indian grape production is among the most geographically concentrated of any major horticultural crop. In 2025–26, Maharashtra alone accounted for about 69.1% of national output and Karnataka for a further 25.6% — together roughly 94% of the total (Table 2, Figure 2). Andhra Pradesh (3.0%) and Tamil Nadu (1.7%) are distant followers, and no other state reaches even one percent. The implied production-share HHI is approximately 0.55, indicating extreme concentration by any competition-policy benchmark.

This concentration carries a clear economic risk. Because output is overwhelmingly sourced from two contiguous western and southern states sharing broadly similar agro-climatic conditions and harvest windows, a single adverse event — unseasonal rain during the critical berry-development and harvest months, a pest or disease outbreak, or a price collapse in a key export market — can transmit through almost the entire national crop simultaneously. The high measured yields in minor states such as Andhra Pradesh (30 MT/ha), Punjab (30.9 MT/ha) and Tamil Nadu (26.9 MT/ha), though built on very small areas, suggest agronomic headroom exists outside the core belt. Karnataka's position is strategically notable: with the second-largest area and output but a yield (18.6 MT/ha) below Maharashtra's, it represents both a pillar of national supply and an obvious target for yield-improvement investment.

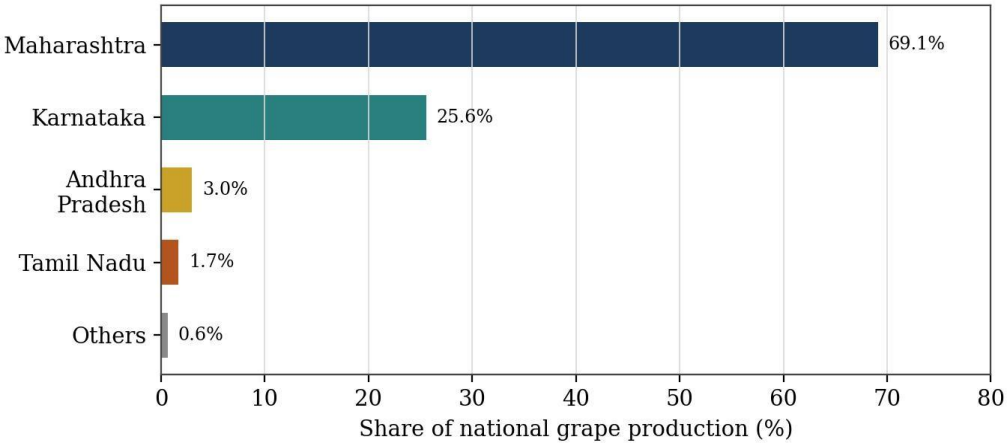
Table 2. State-wise grape area, production and productivity, 2025–26 (First Advance Estimates)

State	Area ('000 ha)	Production ('000 MT)	Productivity (MT/ha)	Share of output (%)
Maharashtra	117.77	2,347.32	19.9	69.1
Karnataka	46.79	868.03	18.6	25.6
Andhra Pradesh	3.38	101.25	30.0	3.0
Tamil Nadu	2.13	57.24	26.9	1.7
Punjab	0.25	7.75	30.9	0.2
Others	2.20	14.11	—	0.4
India	172.52	3,395.70	19.7	100.0

Source: Ministry of Agriculture and Farmers' Welfare, Government of India. Shares computed by the author; “Others” aggregates all remaining states/UTs.

Vol. 12 Issue 4s (August 2026)
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Figure 2. Spatial concentration of grape production, 2025-26



Source: Author's construction from MoAFW data.

3.4 Export performance, volatility and destination concentration

India is a significant exporter of fresh grapes, but its trade profile reveals three vulnerabilities. First, only a small fraction of output is exported — in 2023–24 India shipped about 343,982 MT worth roughly US$417 million, under a tenth of production — so the crop remains overwhelmingly domestically absorbed. Second, export volume is volatile: shipments fell to about 271,254 MT (US$354 million) in 2024–25, a decline of roughly 21% in a single year, reflecting sensitivity to weather-driven quality variation, currency movements and tightening phytosanitary requirements in premium markets. Third, and most striking, export value is highly concentrated by destination (Table 3, Figure 3).

In 2022–23 the Netherlands absorbed 37.6% of India's grape export value, functioning less as a final market than as a European re-export and distribution hub through which Indian fruit reaches the wider EU. Bangladesh, though large by volume, contributes far less value per tonne, underscoring a quality-and-price gradient between neighbouring bulk markets and high-value Western destinations. The United Arab Emirates, United Kingdom and Russia round out the leading buyers. This structure means that a regulatory change, a residue-standard tightening, or a logistics disruption at the Dutch gateway would ripple disproportionately through India's entire grape-export earnings — a concentration risk that mirrors, on the demand side, the production-side concentration documented above.

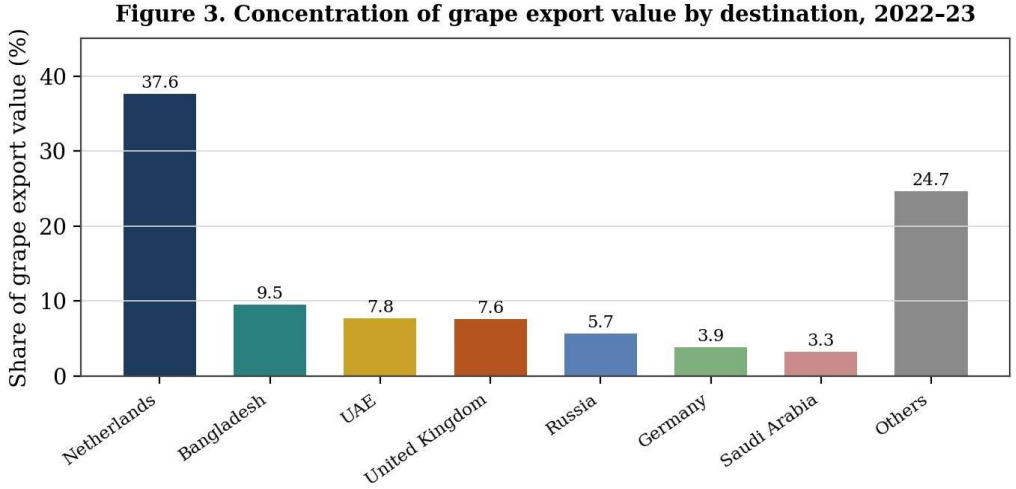
Table 3. Major destinations for Indian grape exports, 2018–19 and 2022–23

Destination	2018–19 Value (₹ lakh)	2022–23 Qty (MT)	2022–23 Value (₹ lakh)	Value share 2022–23 (%)
Netherlands	79,485.8	71,831.4	95,789.2	37.6
Bangladesh	20,385.3	72,713.0	24,316.2	9.5
UAE	11,210.1	20,791.7	19,764.6	7.8
United Kingdom	21,319.1	13,784.6	19,465.7	7.6
Russia	31,069.3	11,811.9	14,413.4	5.7
Germany	17,778.0	7,542.4	9,870.1	3.9
Saudi Arabia	7,520.1	8,288.6	8,309.0	3.3
Others	45,997.4	62,235.7	62,865.2	24.7
Total	233,765.1	268,999.3	254,793.4	100.0

Source: DGCIS / Ministry of Agriculture and Farmers' Welfare. Value shares computed by the author. Qty = quantity.

Vol. 12 Issue 4s (August 2026)
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Figure 3. Concentration of grape export value by destination, 2022-23



Source: Author's construction from DGCIS/MoAFW data.

3.5 India in the global grape economy

Placed against world production, India's standing is substantial but nuanced. In 2024 India produced about 3.90 million tonnes, ranking sixth globally behind China, Italy, Spain, the United States and France, and accounting for roughly 5.1% of world output of 75.9 million tonnes (Table 4). The apparent tension with trade commentary citing an "11%" share reflects a denominator difference: India's weight is far larger within the fresh table-grape segment than within total grape output, most of which — in leading producers — is vinified. India's distinctive specialisation in fresh grapes is thus both its niche and its exposure, since it competes directly in a narrower, quality-sensitive, seasonally-timed export window against Peru, Chile and South Africa.

Table 4. Leading grape-producing countries, 2024

Rank	Country	Production (MT)	World share (%)
1	China	16,821,674	22.2
2	Italy	7,637,640	10.1
3	Spain	5,387,270	7.1
4	United States	4,902,250	6.5
5	France	4,747,450	6.3
6	India	3,904,287	5.1
7	Turkey	3,468,000	4.6
8	Chile	2,453,897	3.2
9	Argentina	1,918,974	2.5
10	South Africa	1,870,973	2.5
	World	75,904,987	100.0

Source: Food and Agriculture Organization (FAO), 2024. World shares computed by the author.

4. Discussion

The three empirical findings — extensive-not-intensive growth, extreme spatial concentration, and volatile, gateway-dependent exports — are interconnected symptoms of a sector that has scaled faster than it has upgraded. Taken together they define the competitive frontier of Indian viticulture.

The productivity paradox is the deepest of the three. That national yields sit below their own late-1990s peak, even as area and output have multiplied, points to constraints that additional land cannot resolve: ageing

Vol. 12 Issue 4s (August 2026)
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vineyards, uneven adoption of improved rootstocks and canopy management, water stress in the semi-arid core belt, and post-harvest losses that erode effective marketable yield. Because grapes are perennial and capital-intensive, yield stagnation directly compresses returns on sunk vineyard investment and weakens the crop's ability to compete on landed cost in premium markets. The gap between the sub-20 MT/ha national average and the 27–31 MT/ha achieved in small high-performing states demonstrates that the ceiling is agronomic-managerial, not climatic — and therefore addressable.

Spatial concentration compounds this. A near-duopoly of Maharashtra and Karnataka delivers scale economies and dense supporting ecosystems (nurseries, exporters, cold chains), but it also means the national crop shares a common risk profile. The 21% single-year export drop into 2024–25 is consistent with exactly this fragility: when the core belt experiences an adverse season, there is no geographically decorrelated supply to buffer national output or export commitments. Diversifying production towards agro-climatically distinct regions — building on the demonstrated high yields in Andhra Pradesh, Tamil Nadu and Punjab — would raise systemic resilience even if those regions remain individually small.

On the demand side, the reliance on the Netherlands as a re-export conduit for close to two-fifths of export value reflects both the efficiency of the Dutch logistics hub and India's limited direct penetration of final EU and other high-value markets. Deepening direct market access — through mutual recognition of phytosanitary and residue standards, GI-based differentiation, and traceability systems — would let Indian exporters capture more of the value currently intermediated abroad, and would reduce single-gateway risk. India's specialisation in fresh table grapes, rare among large producers, is a genuine competitive asset in this respect, provided quality consistency and cold-chain integrity can be assured across the volatile harvest window.

5. Policy Implications

Three priorities follow directly from the analysis. First, a yield-revival agenda should take precedence over further area expansion: replanting programmes with improved rootstocks, precision irrigation and canopy-management extension, and investment in cold-chain and controlled-atmosphere storage to convert biological yield into marketable yield. Karnataka, with a below-average yield on a large area, is a high-return target for such intervention.

Second, geographic diversification of the production base should be actively encouraged, using the proven agronomic performance of non-core states to build decorrelated supply and reduce the systemic exposure created by near-total dependence on two states. Third, market-widening and value-capture measures — direct EU and Gulf market access, GI registration and branding for regional varieties, mandatory traceability and residue-monitoring systems of the GrapeNet type, and targeted export-infrastructure support — would reduce dependence on the Netherlands gateway and lift realised prices. These align with, and would sharpen the focus of, existing instruments such as APEDA's export-promotion schemes, the Agriculture Export Policy, cluster-based development, and the Agriculture Infrastructure Fund.

6. Conclusion and Limitations

India's table-grape economy is a paradox of scale without commensurate upgrading. Over 1988–2026 area and output grew at 6.6% and 7.1% a year, yet productivity advanced by only 0.5% and now sits below its historical peak; production is concentrated to the point that two states supply about 94% of the crop; and exports, though internationally significant, are volatile and routed disproportionately through a single European hub. India's sixth-place global ranking and its distinctive fresh-grape specialisation are real strengths, but they rest on a narrow and somewhat fragile base. The path to durable competitiveness runs through yield revival, geographic diversification and direct market access rather than continued extensive expansion.

Several limitations qualify these conclusions. The analysis is descriptive-analytical and does not estimate causal relationships between inputs, policy and yield; the 2025–26 production and area figures are advance estimates subject to revision; nominal trade values are not deflated; and destination-level export series were available to 2022–23 at the time of writing. Future research could integrate farm-level cost-of-cultivation and input-use data to model the yield stagnation directly, incorporate climate-risk projections for the core producing belt, and extend the trade analysis with unit-value and revealed-comparative-advantage measures to benchmark India against Peru, Chile and South Africa in the fresh-grape segment.

Vol. 12 Issue 4s (August 2026)
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