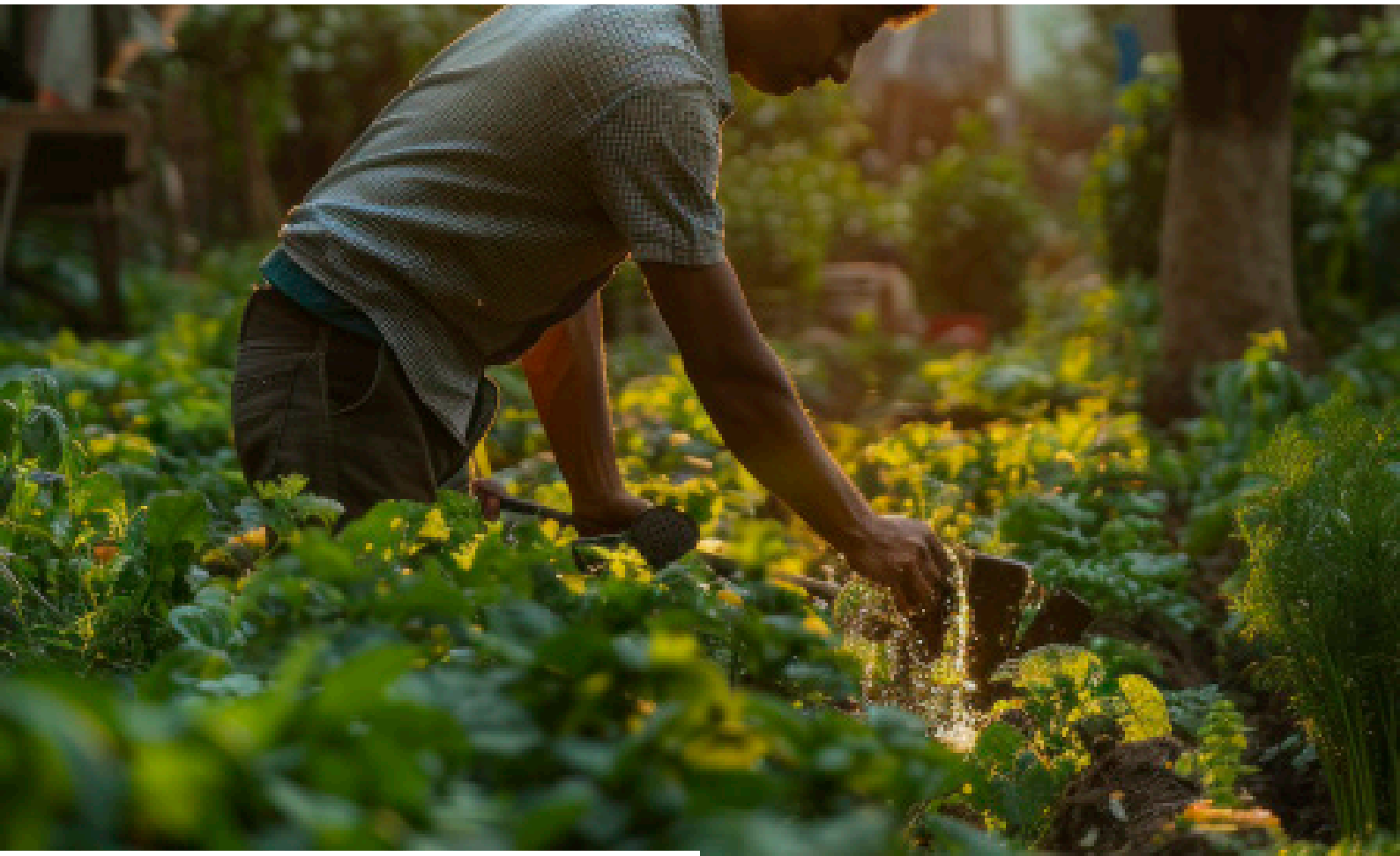
Organic Farming vs Conventional Farming

Pros, Cons, and Market Trends



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Organic Farming vs Conventional Farming—Pros, Cons, and Market Trends

Abhishek Singh Dehal

Department of Agriculture, Punjabi University, Patiala, Punjab-147002

In terms of any communication, correspondence is pertained to: **singh.dehal23@gmail.com**

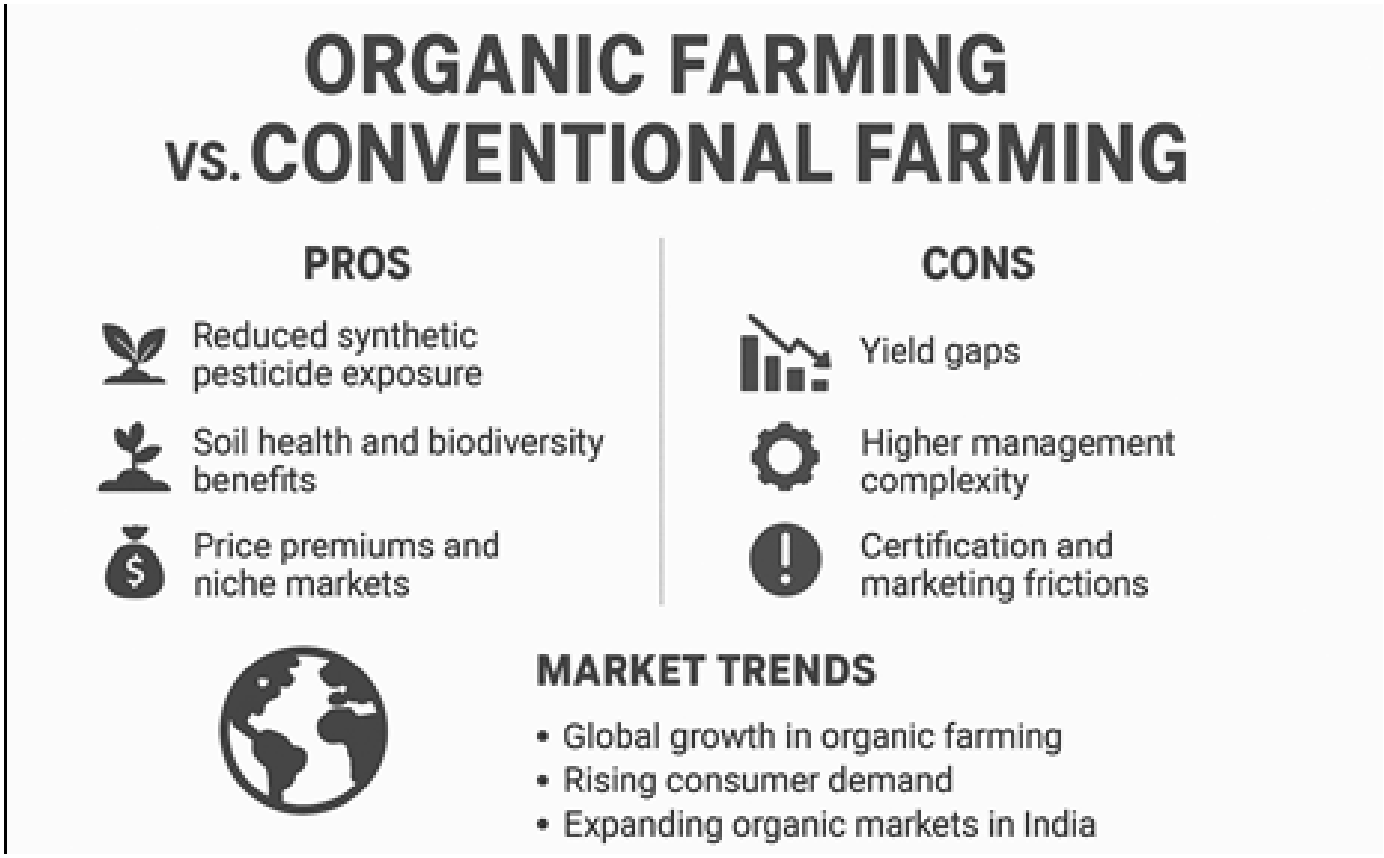
Abstract

Organic and conventional farming are often framed as opposites—one prioritizing ecological processes and input reduction, the other maximizing yields through synthetic inputs and mechanization. In practice, the trade-offs are nuanced and context-specific. This article compares agronomic performance, environmental footprints, economic outcomes for farmers, and current market trends in India and globally. Evidence suggests organic systems generally deliver lower yields (≈5–25% gap depending on crop and practice), but provide benefits for biodiversity, soil health, and reduced pesticide exposure. Profitability depends on premiums, transition support, and market access; without these, organic can underperform. Meanwhile, global organic retail sales and certified area continue to expand, with India emerging as a major producer and exporter. Policymakers are experimenting with certification innovations (e.g., PGS-India) and subsidies to lower barriers. To conclude, with a practical "best of both" roadmap: scale ecological intensification (cover crops, IPM, composting) across all farms, while reserving fully certified organic for markets where premiums and logistics are reliable.

Keywords : organic farming, conventional farming, yields, biodiversity, pesticide residues.

Introduction

Conventional farming typically relies on synthetic fertilizers, pesticides, and improved seeds to achieve high, stable yields. Organic farming, as codified by standards (e.g., NPOP in India, USDA Organic, EU Organic), prohibits synthetic fertilizers and most synthetic pesticides,



emphasizing rotations, manures/composts, biological pest control, and soil health (Fig. 1). In India, organic certification for export follows the National Programme for Organic Production (NPOP) under APEDA; for domestic markets, the Participatory Guarantee System (PGS-India) provides a low-cost, peer-reviewed certification pathway, supported by schemes like Paramparagat Krishi Vikas Yojana (PKVY).

The European Union's Farm to Fork Strategy sets a political target to bring 25% of EU farmland under organic management by 2030, signaling strong policy momentum.

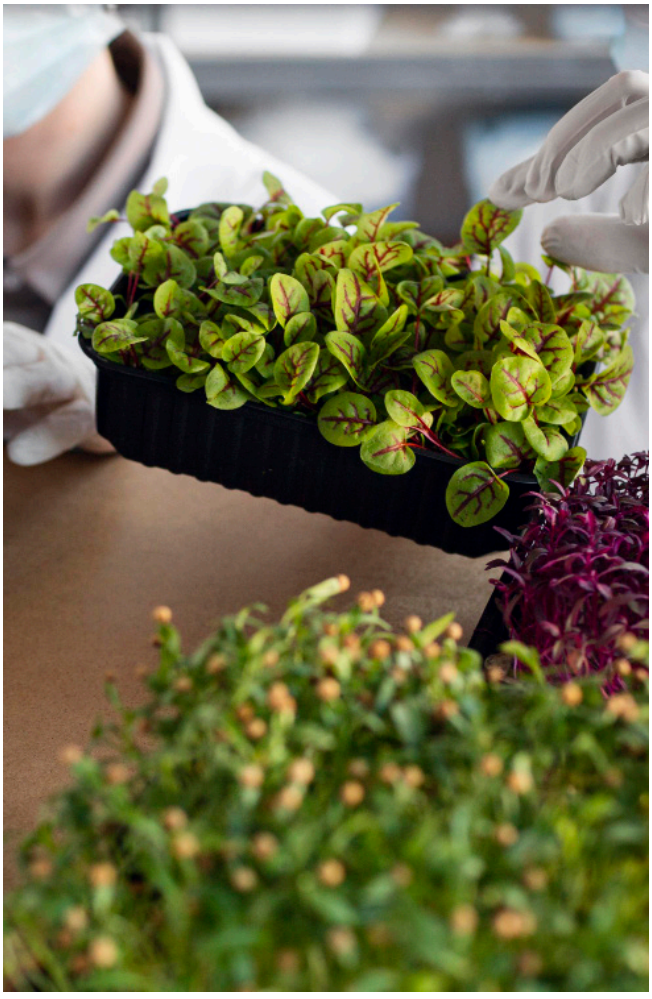
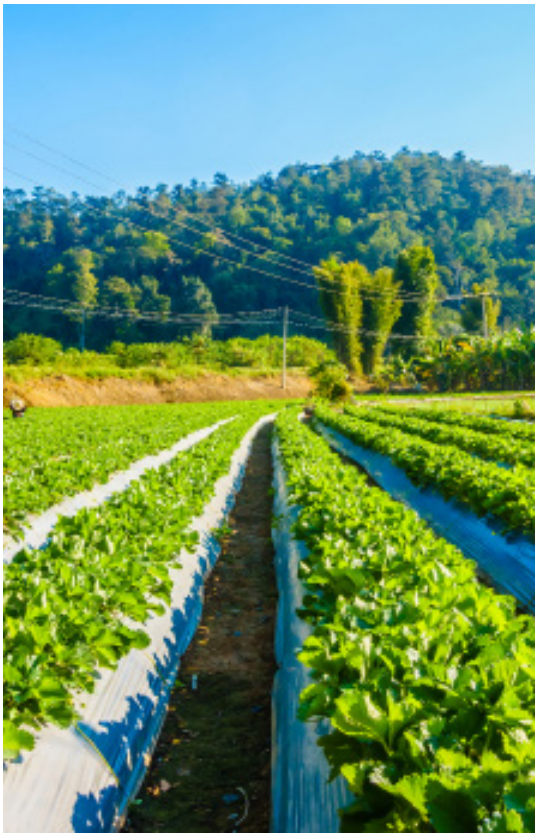


Figure 1. Visual comparison of organic farming practices (manual, ecological inputs) and conventional farming practices (mechanized, synthetic inputs).

Agronomic Performance: Yields and stability

Meta-analyses find that organic yields are typically lower than conventional, although the gap varies by crop, management, and the use of diversification practices (e.g., intercropping). Seufert et al. (2012, Nature) reported an average yield gap, while Ponisio et al. (2015) estimated a ~19% lower yield in organic systems, with much of the gap narrowing when rotations and polycultures are used. Yield stability can also differ by context—organic may buffer input price shocks but can suffer during pest outbreaks if biological controls are insufficient.



From a land-use perspective, lower yields imply more land is needed to produce the same output if demand is fixed, potentially offsetting some environmental gains. This is the core of the “land sparing vs land sharing” debate and remains crop- and region-specific.

Environmental Outcomes: Soil, biodiversity, and emissions

Organic systems generally reduce on-farm synthetic pesticide use and fertilizer runoff, which helps biodiversity (pollinators, birds, soil biota) and water quality. FAO/WHO reviews highlight health and ecological risks from pesticide misuse, supporting the rationale for stricter management and exposure reduction.

Life-cycle assessments show mixed greenhouse gas outcomes: organic often has lower emissions per hectare but not always per kilogram of product because of yield differences. A 2022 meta-analysis found organic food has on average a lower climate impact per land unit and, in many cases, per product when rotations and nutrient management are optimized.

Field and dietary-exposure studies suggest lower pesticide residues in organic produce, which many consumers cite as a key reason for purchase. Recent investigative testing in the U.S. also found elevated residues on selected conventional crops, though most produce tested was low-risk; buying organic on the most residue-prone items remains a pragmatic consumer strategy.

Economic Outcomes for Farmers: Costs, premiums, and risk

Economic performance hinges on three levers: (1) yield, (2) costs, and (3) price premiums. Where premiums are robust and market access is reliable, organic can match or exceed conventional profits; without premiums, the lower yields can reduce margins.

- **India-specific evidence:** A multi-crop, farmer-survey study in the Ganga basin (2020–21) reported organic less profitable than conventional in sugarcane, wheat, and paddy, largely due to yield gaps and marketing frictions. Conversely, other cases show parity or advantage when premiums of ~20% or more are realized (Singh et al., 2024).

- **Transition period:** The 2–3 years conversion phase carries the highest risk: costs may rise (e.g., for composting, training, certification) before premiums fully materialize. India's PKVY and allied schemes provide financial support (e.g., ₹31,500 per ha over three years, with ₹15,000 DBT for organic inputs), and the PGS-India model reduces certification costs for domestic markets (PKVY, 2022).

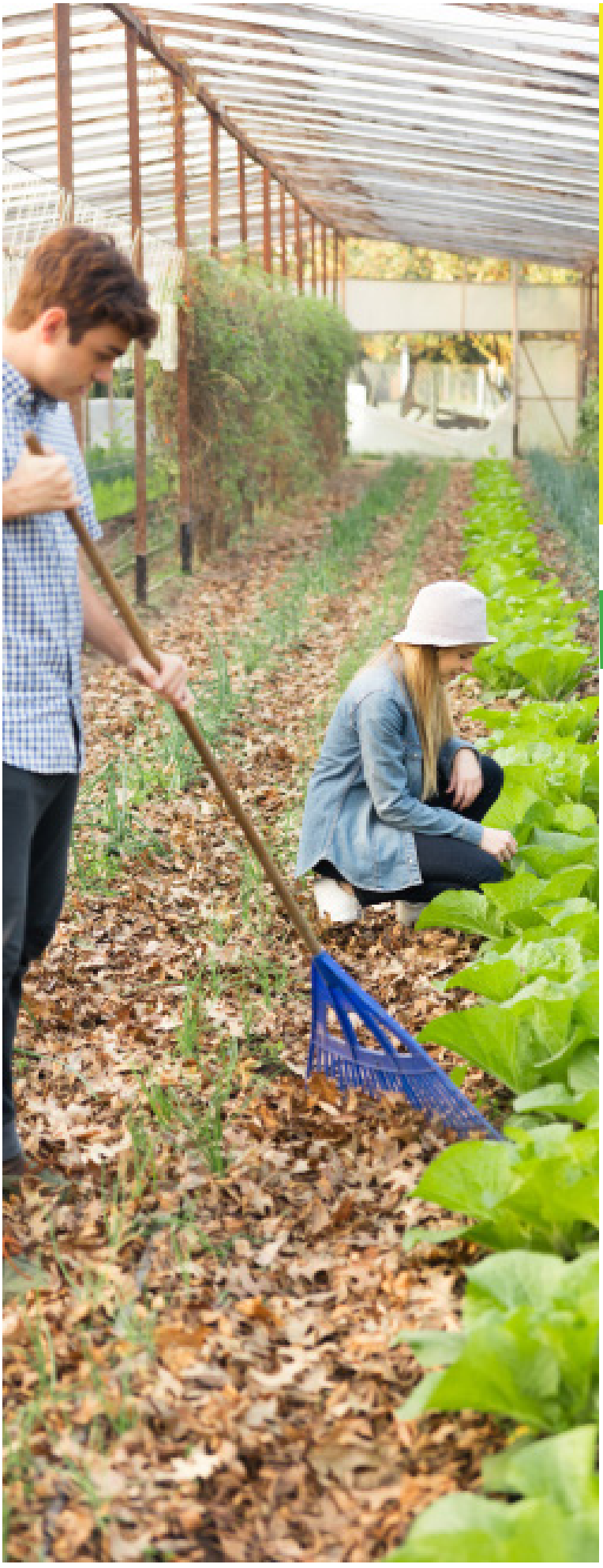
- **State examples:** Sikkim's organic push delivered branding and environmental benefits but also exposed challenges around input supply, certification costs, and market coordination—useful lessons for scaling.

Consumer Trends and Markets

According to FiBL/IFOAM's World of Organic Agriculture 2025, the organic area and retail sales continue to rise, reaching ~99 million ha and ~US$136 billion in global retail sales (latest consolidated year). Europe's 2030 organics target underpins growth, and policy support remains pivotal (FiBL & IFOAM, 2025).

The Organic Trade Association reports US$71.6 billion in organic sales in 2024, with growth outpacing the overall grocery market; USDA/ERS puts 2023 retail sales at ~US$69.7 billion, highlighting continued demand despite acreage constraints (Organic Trade Association, 2025).

India had ~7.3 million ha under organic certification in FY 2023–24 (4.5 m ha farm area; 2.8 m ha wild collection), produced ~3.6 million MT of certified organic products in FY24, and exported ~261,000 MT of organic goods in 2023–24 valued at ₹4,007.9 crore (~US$494.8 million). In 2024–25, organic exports reportedly rose 34.6% to US$665.96 million, indicating accelerating external demand (The Economic Times, 2025).



Despite policy supports, adoption can ebb and flow—e.g., a recent report from Haryana shows a sharp decline in area under natural/organic cultivation in FY 2025–26, reminding us that incentives, logistics, and market links must be consistent to sustain farmer interest (The Times of India, 2025).

Pros and Cons at a Glance

Strengths of Organic Farming

(i) Reduced synthetic pesticide exposure for farmers, communities, and consumers; supports pollinators and beneficial insects.

(ii) Soil health and biodiversity benefits from rotations, compost, and habitat diversification. (Evidence spans meta-analyses and field studies.)

(iii) Price premiums and niche branding opportunities (fair-trade, regional identity, tourism).

(iv) Certification pathways like PGS-India reduce costs for smallholders selling domestically (PGS-India, 2025).

Limitations of Organic Farming

(i) Yield gaps (average ~5–25% depending on crop/practice) can raise land pressure per kg of output.

(ii) Higher management complexity (knowledge-intensive IPM, composting, rotations) and transition risk.

(iii) Certification and marketing frictions—profitability depends on reliable premiums and buyer linkages.

Strengths of Conventional Farming

(i) Higher average yields and scalability, crucial for staple crop self-sufficiency (Seufert et al., 2012).

(ii) Lower per-unit costs where inputs are efficient and well-managed; extensive private R&D pipeline (Manteghi et al., 2023).

Limitations of Conventional Farming

(i) Pesticide-related risks to health and ecosystems when misused; residue concerns on certain crops.

(ii) Nutrient losses and water pollution from over-application of fertilizers; soil organic matter decline without regenerative practices (FAO, 2024).

India Policy Toolbox: Lowering Barriers to Organic

- PKVY (launched 2015): promotes cluster-based organic villages, links to PGS-India, and provides ₹31,500/ha over three years (including ₹15,000 DBT for on/off-farm inputs) (PKVY, 2017).
- PGS-India: community-based certification for domestic markets; reduces cost and increases farmer participation in quality assurance (PGS-India, 2025).
- NPOP: export-oriented certification regime under APEDA; India remains a major supplier of organic cotton, oilseeds, spices, and processed foods (APEDA, 2025).

Market Outlook: 2025 and beyond

- **Global growth persists as retail sales expand and EU policy targets accelerate conversion; supply alignment and credible certification remain central (EU Organic Action Plan, 2025).**
- **U.S. demand is strong (US$71.6 billion in 2024), but acreage lags; supply chains are tightening specifications (residue testing, traceability) (Organic Trade Association, 2025).**
- **India's opportunity lies in high-value exports (spices, tea/coffee, processed foods, organic cotton) and a steadily growing domestic niche, provided farmer clusters secure premiums and logistics (aggregation, cold-chain, branding). Recent export growth (34.6% y/y in 2024–25) is encouraging (The Economic Times, 2025).**

Practical Guidance for Farmers and FPOs

1. Start with "ecological intensification," even if you remain conventional. Add cover crops, farmyard manure/compost, residue incorporation, and IPM to reduce input needs and enhance soil while maintaining yields. This "no-regrets" pathway narrows the gap between organic and conventional (FAO, 2024).

2. Pilot organic on part of the farm. Use the PGS-India cluster model for domestic sales, or NPOP if export buyers are lined up; synchronize sowing and varieties within clusters to streamline peer reviews and marketing (PGS-India, 2025).

3. Chase premiums before paperwork. Identify buyers (retailers, online marketplaces, exporters) and confirm price and volume, then invest in certification and inputs. Evidence shows premiums (~20%+) often make or break organic profitability (Singh et al., 2024).

4. Leverage schemes. Enroll in PKVY for input support and training; link with state horticulture/agriculture departments and APEDA's export facilitation (APEDA, 2025).

A "Best of Both Worlds" Roadmap

The polarizing "organic vs conventional" framing is giving way to evidence-based blending:

This integrated pathway addresses food security and farm incomes while safeguarding ecosystems and consumer trust (Chiriacò et al., 2022; FAO, 2024).

1. **Scale regenerative practices across all farms (mulching, cover crops, integrated nutrient management, precision fertilizer use, IPM).**

2. **Reserve full organic certification for farmer groups that (a) have secure premium markets and (b) can manage certification and logistics collectively (FPOs/co-ops).**

3. **Invest in measurement—soil organic carbon, residue tests, and input records—so both organic and conventional farms can prove improvements to buyers and financiers.**

Conclusion

Organic and conventional systems each deliver value—and each has real limitations. The strongest strategy for India is plural and pragmatic: mainstream ecological practices everywhere, target certification where markets reward it, and keep policy supports predictable (PGS clusters, PKVY DBT, market linkages). With global organic retail sales and India's exports rising, well-organized FPOs and state programs can turn sustainability into steady income—if they prioritize agronomy first, premiums second, and paperwork third.

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