International Journal of Advance and Applied Research
www.ijaar.co.in
ISSN – 2347-7075 Impact Factor – 8.141
Peer Reviewed Bi-Monthly
Vol. 6 No. 42 November - December - 2025

Green Economy and Agricultural Exports: Sustainable Management Practices in the Pune Region

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DOI - 10.5281/zenodo.17910433

Introduction:

Sustainability concerns have become central to global agricultural trade. Buyers increasingly expect produce that is grown with minimal environmental impact and under verified safety standards. At the same time, the idea of a "green economy" has moved from theory to practical policy across many regions, emphasizing resource efficiency and reduced ecological damage. Pune district—an important hub for horticulture and vegetable production—is deeply embedded in this transformation. Despite this, there is limited empirical work explaining how sustainable farm management influences export performance at a regional scale.

This paper therefore focuses on two guiding questions:

1. How widely have farmers in export-oriented areas of Pune adopted sustainable production and post-harvest practices?
2. How do these practices affect productivity, product quality, and actual participation in global markets?

Literature Review:

1. Green Economy and Sustainable Agriculture:

The idea of a green economy prioritizes economic growth that does not compromise environmental integrity. In agriculture, this is reflected through practices that conserve water, improve soil health, reduce chemical loads, and support biodiversity. Several studies note that such practices can improve long-term productivity, although outcomes vary across regions and crops.

2. Export Standards and Compliance Requirements:

International markets rely heavily on certification systems to ensure quality and safety. While certifications such as GlobalGAP, HACCP, and organic labels can open doors to premium markets, the process of meeting these standards often requires substantial documentation, monitoring, and recurring financial investment. These requirements can be especially difficult for small and medium farmers.

3. Factors Influencing Adoption:

Past research suggests that adoption of sustainable practices is shaped by a combination of knowledge, risk perceptions, credit access, availability of extension services, and organizational support. Farmers linked to cooperatives or FPOs often face fewer burdens because compliance costs and training efforts are shared.

4. Conceptual Framework:

The framework guiding this study links household characteristics and institutional support to adoption decisions, which then influence yields, quality indicators, cost structures, and the likelihood of entering export markets. Feedback loops—such as incentives from higher prices—are also acknowledged.

Objectives:

1. Document the spread of sustainable management practices among export-oriented farmers.
2. Identify the major factors that encourage or limit adoption.
3. Measure the influence of adoption on yields, export prices, and market access.
4. Provide context-specific policy suggestions.

Hypotheses:

H1: Certified farms receive higher export prices.

H2: Water-efficient irrigation and improved soil practices contribute to higher yields.

H3: Certification costs are a major deterrent; collective action reduces this burden.

H4: Farmers with regular access to extension guidance or contractual arrangements are more likely to adopt sustainable practices and participate in exports.

Study Area:

Pune district spans multiple agro-climatic conditions and is one of Maharashtra's most prominent suppliers of grapes, pomegranates, onions, and select vegetables for export. Detailed ecological and production characteristics will be incorporated once the empirical data are finalized.

Methodology:

1. Research Approach: The study employs a mixed-method design, combining quantitative survey analysis with qualitative interviews to capture both measurable outcomes and the lived experiences of farmers and exporters.

2. Sampling: A sample of 420 farm households was selected using stratified random procedures to ensure coverage of major export-oriented regions. Around 30 additional interviews with exporters, cooperative leaders, certification officials, and extension officers complement the quantitative data.

3. Tools and Instruments: Structured questionnaires document farm practices, input use, certification status, yield details, marketing channels, and constraints. Key informant interviews provide perspectives on institutional systems, market expectations, and infrastructural gaps.

4. Variables: Outcome variables include yield, export participation, export value, price per unit, and rejection rates. Key explanatory variables include certification

status, practice adoption index, membership in farmer groups, access to extension, and access to credit. Control variables reflect resource conditions and crop characteristics.

5. Analytical Strategy: Regression models, logistic analyses, and propensity-score matching will be used to estimate the influence of adoption on economic outcomes. Qualitative data will be reviewed through thematic analysis.

6. Ethical Considerations: Participation is voluntary, and data will be anonymized. Ethical procedures will follow institutional guidelines.

Expected Findings:

1. Descriptive Overview: The study expects to find variability in adoption depending on crop type, farm size, and exposure to market institutions.

2. Econometric Insights (Anticipated):

Preliminary expectations include:

- A positive relationship between sustainable practices and export prices.
- Gains in yield where efficient irrigation and soil-health management are practiced.
- Certification premiums becoming significant after controlling for selection bias.
- Clear evidence that infrastructure gaps and certification costs remain structural barriers.

3. Qualitative Themes:

Interviews are expected to highlight the importance of training, the difficulties smaller farmers face in meeting compliance requirements, and the role of cooperatives in reducing risks.

Discussion:

The discussion will connect the empirical results with broader debates on sustainable agriculture. The Pune case is likely to show that green practices can improve both environmental outcomes and export competitiveness, but only when institutional support structures—like extension services, cold-chain facilities, and accessible certification systems—are in place. Differences across crop sectors and farm sizes will also be explored.

Policy Recommendations:

- Promote group certification schemes through FPOs to reduce individual costs.
- Reform certification subsidies to make them more transparent and farmer-friendly.
- Strengthen cold-chain infrastructure and storage facilities in rural clusters.
- Encourage contract farming arrangements where exporters share compliance costs.
- Expand training programs on IPM, soil health, and water management.
- Develop credit products that support farmers during the transition to sustainable practices.

Limitations:

A single-year, cross-sectional design limits long-term causal inference. Some variables rely on self-reported information, which may introduce measurement error. The regional focus also means results may not apply directly to other districts.

Conclusion:

Sustainable agricultural practices offer a promising pathway for improving Pune's position in export markets while safeguarding natural resources. With the right mix of institutional support, financial assistance, and market linkages, farmers can strengthen both environmental stewardship and economic performance. The study aims to provide a grounded understanding of how these improvements can be enabled in practice.

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