

RESEARCH ARTICLE

ECONOMICS OF ORGANIC FARMING: COST-BENEFIT ANALYSIS OF SUSTAINABLE AGRICULTURE PRACTICES

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Abstract: This study empirically examines the economic viability of organic farming in India through a cost-benefit framework and econometric analysis using farm-level survey data. Based on primary data collected from organic and conventional farmers across selected districts, the paper compares cost structures, yields, net returns, and sustainability outcomes. A multiple regression model is employed to estimate the impact of organic practices on farm income while controlling for socio-economic and institutional factors. The results indicate that although organic farming entails higher labor costs and transitional yield reductions, it generates higher net returns in the long run due to lower input costs, price premiums, and improved soil productivity. The findings support the argument that organic farming is economically viable when supported by market access, institutional support, and policy incentives.

Keywords: Organic farming, Cost-benefit analysis, Regression analysis, Sustainable agriculture, India.

Article Received: 26 Nov. 2025

Revised: 08 Dec. 2025

Accepted: 29 Dec. 2025

INTRODUCTION

Indian agriculture faces a dual challenge of sustaining productivity while mitigating environmental degradation caused by excessive chemical input use. Rising fertilizer costs, soil nutrient imbalance, declining groundwater levels, and farmer indebtedness have raised serious concerns regarding the long-term sustainability of conventional farming systems. Organic farming has emerged as a potential alternative that aligns economic viability with ecological sustainability.

Despite policy support through initiatives such as Paramparagat Krishi Vikas Yojana (PKVY), adoption of organic farming remains limited due to perceived risks, yield uncertainty, and lack of empirical evidence on profitability. This study addresses this gap by conducting a systematic cost-benefit and econometric analysis using Indian farm-level data.

OBJECTIVES OF THE STUDY

- To compare cost and return structures of organic and conventional farming in India.
- To estimate net profitability differences between the two systems.

- To analyze determinants of farm income using econometric methods.
- To evaluate long-term sustainability benefits of organic farming.
- To suggest policy measures for scaling organic agriculture.

DATA SOURCE AND SAMPLING DESIGN

Study Area and Sample Selection

The study is based on primary data collected during the agricultural year 2023–24 from three Indian states:

- Tamil Nadu
- Karnataka
- Maharashtra

A multistage stratified random sampling technique was used.

- Total sample size: 240 farmers
 - Organic farmers: 120
 - Conventional farmers: 120

Crops covered include paddy, millets, pulses, and vegetables.

Data Collection

Data were collected through structured questionnaires covering:

- Input costs
- Output and yield
- Prices received
- Labor use

- Certification status
- Access to credit and markets
- Farmer socio-economic characteristics

COST-BENEFIT ANALYSIS FRAMEWORK

Cost Components

Table 1: Table 1: Comparative cost structure per hectare

Cost Category	Organic Farming (₹/ha)	Conventional Farming (₹/ha)
Seeds	4,200	6,500
Fertilizers / Manure	6,800	18,400
Plant Protection	3,100	9,200
Human Labour	21,500	15,300
Machinery	7,600	8,200
Certification	2,400	–
Total Cost	45,600	57,600

Returns and Profitability

Table 2: Returns and benefit–cost comparison

Indicator	Organic	Conventional
Average Yield (quintals/ha)	24.6	27.8
Price per Quintal (₹)	3,200	2,200
Gross Returns (₹/ha)	78,720	61,160
Net Returns (₹/ha)	33,120	3,560
Benefit–Cost Ratio	1.73	1.06

ECONOMETRIC SPECIFICATION

MODEL

To assess the impact of organic farming on farm income, the following multiple linear regression model was estimated:

$$Y_i = \beta_0 + \beta_1 OF_i + \beta_2 Li_i + \beta_3 Ai_i + \beta_4 Ci_i + \beta_5 Mi_i + \beta_6 Ei_i + \epsilon_i$$

$$iY_i = \backslash beta_0 + \backslash beta_1 OF_i + \backslash beta_2 Li_i + \backslash beta_3 Ai_i + \backslash beta_4 Ci_i + \backslash beta_5 Mi_i + \backslash beta_6 Ei_i + \backslash varepsilon_i$$

$$Y_i = \beta_0 + \beta_1 OF_i + \beta_2 Li_i + \beta_3 Ai_i + \beta_4 Ci_i + \beta_5 Mi_i + \beta_6 Ei_i + \epsilon_i$$

Where:

- Y_i = Net farm income (₹/ha)
- OF_i = Organic farming dummy (1 = organic, 0 = conventional)
- Li_i = Labour cost (₹/ha)
- Ai_i = Farm size (ha)
- Ci_i = Access to credit (1 = yes, 0 = no)
- Mi_i = Market access (distance to nearest market)
- Ei_i = Farming experience (years)
- ϵ_i = Error term

REGRESSION RESULTS

Table 3: Estimated regression results

Variable	Coefficient	t-value
Constant	12,480	2.31
Organic Farming (OF)	18,960	4.87*
Labour Cost	–0.42	–2.15**
Farm Size	3,240	3.02**
Credit Access	5,760	2.64**
Market Distance	–1,180	–1.98*
Experience	410	1.76*
R ²	0.68	
F-Statistic	29.4	

(*significant at 10 %, ** 5%, *** 1%)

Interpretation

- Organic farming has a positive and statistically significant impact on farm income.
- Access to markets and institutional credit strongly improves profitability.
- Higher labor costs negatively affect income but are offset by price premiums.
- Farm size positively influences returns, indicating economies of scale.

SUSTAINABILITY AND EXTERNAL BENEFITS

Organic farms exhibited:

- Higher soil organic carbon levels
- Reduced chemical runoff
- Improved biodiversity indicators
- Lower health expenditure among farm households

These benefits represent positive externalities not captured fully in market prices, implying that private profitability underestimates true social returns.

POLICY IMPLICATIONS

- Provide transition-period income support
- Expand organic certification subsidies
- Strengthen farmer producer organizations (FPOs)

- Promote organic marketing infrastructure
- Integrate organic farming into climate-resilient agriculture policies

CONCLUSION

The empirical evidence from Indian farm-level data confirms that organic farming is economically viable and sustainable in the long run. Although transitional challenges exist, organic systems deliver higher net returns, income stability, and environmental benefits. With appropriate policy support and institutional backing, organic farming can play a critical role in India's sustainable agricultural transformation.

REFERENCES

1. Narayanan, S. (2005), Organic farming in India. ISEC Working Paper.
2. Pretty, J. (2008), Agricultural sustainability. *Philosophical Transactions of the Royal Society B*, 363(1491).
3. Reganold, J. P. & Wachter, J. M. (2016), Organic agriculture in the twenty-first century. *Nature Plants*, 2(2).
4. Ramesh, P., et al. (2010), Organic farming: Indian context. *Current Science*, 88(4).
5. Government of India (2023), *Agricultural Statistics at a Glance*.