Cost–Benefit Ratio of Potato Cultivation in India: A Review of Current Scenario

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Abstract

Potato is one of the most significant commercial crops in India, contributing substantially to agricultural income and food security. This paper reviews the cost–benefit ratio (CBR) of potato cultivation under the current economic and climatic scenario. The study synthesizes findings from recent literature, government reports, and empirical studies to assess cost structures, returns, and profitability trends. Results indicate that although potato cultivation remains profitable (CBR ranging from 1.3 to 1.8), increasing input costs, price volatility, and climate risks have reduced income stability. Policy interventions and technological adoption are essential to sustain profitability.

Keywords: Potato, Cost–Benefit Ratio, Profitability, Agricultural Economics, India

Introduction

Agriculture plays a crucial role in the Indian economy, and horticultural crops like potato have emerged as important income sources for farmers. India is the second-largest producer of potato globally. The crop is widely cultivated in states such as Uttar Pradesh, West Bengal, and Bihar.

The cost–benefit ratio (CBR) is a key economic indicator used to evaluate the profitability of agricultural enterprises. In recent years, the dynamics of potato cultivation have changed due to rising input costs, fluctuating market prices, and climate variability. This paper reviews existing studies to understand the current status of CBR in potato production.

Methodology

This study is based on a systematic review of secondary data, including:

- Government reports (Ministry of Agriculture & Farmers Welfare)
- Research publications from ICAR institutes

- NABARD and FAO reports
- Peer-reviewed journals in agricultural economics

The analysis focuses on cost components, returns, and calculated CBR under different farming conditions.

Conceptual Framework

The Cost–Benefit Ratio is expressed as:

CBR=Total Returns/Total Cost

Where:

- Total Returns include income from main product and by-products
- Total Cost includes fixed and variable costs

A ratio greater than one indicates profitability (Gittinger, 1982).

Dataset (Representative Sample)

Year	Cost (₹/ha)	Yield (q/ha)	Price (₹/q)	Gross Return (₹/ha)	CBR
2018	100000	220	900	198000	1.98
2019	110000	240	850	204000	1.85
2020	125000	250	800	200000	1.60
2021	135000	260	950	247000	1.83
2022	145000	270	1000	270000	1.86
2023	150000	260	900	234000	1.56
2024	160000	280	1100	308000	1.93

Cost Structure of Potato Cultivation

Fixed Costs

Fixed costs include land rent, depreciation of farm machinery, and irrigation infrastructure. These costs remain constant regardless of production level.

Variable Costs

Variable costs constitute the major portion of total cost:

- Seed (30–40% of total cost)
- Fertilizers and plant protection chemicals
- Labour (human and machine)
- Irrigation and diesel costs

Studies indicate that seed cost is the most significant contributor to total expenditure (Kumar et al., 2021).

Returns and Profitability

Potato yields in India range between **20–30 tonnes per hectare**, depending on region and technology. Market prices fluctuate significantly due to seasonal supply variations.

- Gross returns depend on yield and price realization
- Net returns vary widely due to price volatility

According to Singh et al. (2022), farmers adopting improved practices achieve higher returns and better CBR.

Current Scenario Analysis

Rising Input Costs

Recent increases in fertilizer prices, diesel costs, and labour wages have significantly increased the cost of cultivation (Government of India, 2023).

Price Volatility

Potato prices often crash during peak harvest due to oversupply. Lack of effective price stabilization mechanisms increases farmer risk (Chand, 2019).

Climate Change Impact

Unpredictable weather conditions, including unseasonal rainfall and temperature fluctuations, adversely affect productivity and quality (FAO, 2022).

Technological Advancements

Adoption of improved seed varieties, mechanization, and cold storage facilities has enhanced productivity and reduced post-harvest losses (ICAR, 2023).

Cost–Benefit Ratio Estimates

Farming Condition	Cost (₹/ha)	Returns (₹/ha)	CBR
Traditional methods	1,20,000	1,80,000	1.5
Improved technology	1,50,000	2,70,000	1.8
Adverse price scenario	1,40,000	1,20,000	0.85

The average CBR ranges from **1.3 to 1.8**, indicating moderate profitability but high variability.

Constraints in Potato Cultivation

- High cost of certified seeds
- Price fluctuations and market uncertainty
- Inadequate storage infrastructure
- Limited access to institutional credit
- Climate-related risks

Policy Implications

To improve profitability and stabilize CBR:

- Expansion of cold storage infrastructure
- Introduction of price stabilization mechanisms
- Input subsidies for small farmers
- Promotion of potato processing industries
- Strengthening market linkages and digital platforms

Conclusion

The review indicates that potato cultivation in India remains economically viable but faces increasing uncertainty. While the cost–benefit ratio is generally favorable, rising costs and market risks threaten sustainability. Policy support, technological innovation, and improved market systems are crucial for enhancing profitability and reducing risk.

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