



Plant Archives

Journal homepage: <http://www.plantarchives.org>

DOI Url : <https://doi.org/10.51470/PLANTARCHIVES.2026.v26.no.1.345>

SOCIO-ECONOMIC ANALYSIS OF COSTS AND RETURNS OF POTATO KUFRI JYOTI IN MIDNAPUR (WEST) DISTRICT OF WEST BENGAL, INDIA

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(Date of Receiving : 08-02-2026; Date of Revision : 29-03-2026; Date of Acceptance : 15-04-2026)

ABSTRACT

This study examines the socio-economic aspects of cost and returns in the cultivation of potato variety Kufri Jyoti in the Salboni block of Paschim Medinipur district, West Bengal, India. A three-stage random sampling procedure was adopted to select 60 potato growers from six purposively identified villages during the 2022–23 Rabi season. Primary data were collected through structured personal interviews using pre-tested schedules. Cost of cultivation was estimated using standard cost concepts recommended by Government of India expert committees. The total cost per hectare i.e. Cost C₃, including imputed family labor and managerial costs, averaged Rs. 223,632. The principal cost components were human labor (Rs. 56,841; 25.42%), manures and fertilizers (Rs. 6,337; 20.72%), and seed (Rs. 37,070; 16.58%), which together constituted approximately 62.72% of total production cost. Paid-out costs (Cost A₁) stood at Rs. 171,187 per hectare; no leased-in land cost was incurred (Cost A₂ = Cost A₁) as all sample farmers cultivated on owned land. Average yield reached 383.05 quintals per hectare, sold at Rs.700 per quintal, generating gross returns of Rs. 268,135 per hectare. Net returns were positive across all cost concepts, ranging from Rs. 96,948 (over Cost A₁) to Rs. 44,503 (over Cost C₃). The input-output ratio declined from 1.57 (Cost A₁) to 1.19 (Cost C₃), while farm business income and family labor income were estimated at Rs. 96,948 and Rs. 77,190 per hectare, respectively. The results indicate that Kufri Jyoti potato cultivation remains economically viable and moderately profitable in the study area despite high labor intensity, substantial seed and fertilizer expenditure, and limited use of farmyard manure. The variety contributes significantly to cash income and livelihood support for small and marginal farmers in the region.

Keywords : Potato cultivation, Kufri Jyoti, cost and returns, profitability, input-output ratio, farm business income, family labor income, Paschim Medinipur, West Bengal.

Introduction

Potato cultivation occupies a dominant position in West Bengal's vegetable sector, both in terms of area and production, making it one of the most important crops in the state's agricultural landscape. Favourable soil and climatic conditions provide high potential for potato production, positioning West Bengal as one of the leading potato-producing states in India. The crop is grown across approximately 4.6 lakh hectares (potatopro.com, article on potato production affected by unseasonal rains and heat wave in Bengal, 2022, though published around that period), with significant cultivation concentrated in districts such as Paschim

Medinipur, Hooghly, Bardhaman, Bankura, and several districts of North Bengal. Given its economic importance and widespread cultivation, potato production plays a crucial role in the livelihood and income security of farmers in the state.

This study aims to examine the economic aspects of potato production in West Bengal, with a specific focus on the popular variety Kufri Jyoti.

Materials and Methods

This study aims to analyze the costs and returns of potato cultivation in the Salboni block of the Paschim Medinipur district in West Bengal, India (Khamrai *et*

al., 2026). In line with the study's objectives, this chapter focuses on the methodological aspects, including the analytical tools used and the description of terms and concepts considered for data collection, analysis, and interpretation. The following sections discuss these aspects in detail.

1. The study area
2. Nature and collection of data
3. Analytical procedure as under

a. The analysis of cost of cultivation and their respective profitability from potato production

Study area

The study is specifically conducted in Paschim Medinipur district of West Bengal, as this area is deliberately chosen due to its significance in terms of area of potato cultivation.

Sampling techniques

A three-stage random sampling technique was employed to select the study area, villages, and potato growers. In the first stage, Salboni block was purposively selected from the 21 community development blocks in Paschim Medinipur district. This selection was based on its relatively higher area under potato cultivation compared to the other blocks. In the second stage, a list of villages with substantial potato production was compiled for Salboni block. From this list, six villages, namely Chaita, Krishnanagar, Bhabrigere, Rautara, Debagram, and Muchibere were selected on the basis of their maximum coverage under potato crop. In the third stage, a comprehensive list of potato growers from these six selected villages was prepared using records from the Assistant Director of Agriculture (Salboni block) and the respective village panchayat offices. Subsequently, a random sample of 60 potato growers was drawn from this compiled list to serve as the respondents for the study.

Nature and source of required data

The data required for the present study were both of primary and secondary in nature. The primary data were collected from the selected sample potato growers and recorded as follows:

1. Area under potato crops
2. Information related to cost of potato cultivation
 - (a) Types of labour engaged for different field operations
 - (b) Material cost involved
 - (c) Returns from different potato crops

- (d) Price of different potatoes.

Reference period

The collected data were related to the crop calendar year 2022-23 (Rabi season)

Method of inquiry

Data for the study was gathered through personal interviews with selected potato growers using pre-tested questionnaires and schedules. These tools were designed to cover various aspects that align with the systematic objectives of the study. The data collection process involved conducting surveys, and multiple visits were made to ensure contact with each selected sample of potato growers.

Analytical process described

The data gathered from the participants underwent a thorough review to identify any deficiencies or inaccuracies before being analysed in tabular form. The expenses and profits related to potato cultivation were calculated separately for different categories of potato growers.

Cost concepts

The determination of costs was based on the principles outlined by a designated committee of experts commissioned by the Government of India for estimating costs. The updated cost concepts utilized in this research as applied during the Rabi season of 2022-23 are outlined as follows:

Cost 'A1'

It includes:

1. Value of hired human labour
2. Value of hired bullock labour
3. Value of owned bullock labour
4. Value of owned machinery labour
5. Hired machinery charges
6. Value of seed (both farm produced and purchased)
7. Value of insecticides and pesticides
8. Value of farm yard manure (owned and purchased)
9. Value of fertilizers
10. Depreciation on farm assets excluding land
11. Irrigation charges
12. Land revenue, cesses and other taxes
13. Interest on working capital
14. Miscellaneous expenses, if any

Cost 'A₂' it includes:

Cost 'A₁' + Rent paid for leased in land.

Cost 'B₁' it includes:

Cost 'A₂' + Interest on value of owned fixed capital assets (excluding land).

Cost 'B₂' it includes:

Cost 'B₁'+ rental value of owned land (net of land revenue) and rent paid for leased-in land

Cost 'C₁' it includes:

Cost 'B₁'+ imputed value of family labour

Cost 'C₂' it includes:

Cost 'B₂'+ imputed value of family labour

Cost 'C₃' it includes:

Cost 'C₂' + 10 percent of cost C₂ to account for managerial input of the farmer

Profitability concepts:

For the estimation of profitability from potato, the following efficiency measures are used in this study:

- i. Gross income,
- ii. Farm business income,
- iii. Farm investment income,
- iv. Net farm income,
- v. Family labour income,
- vi. Input- output ratio

Results and Discussion

Table 1 : Estimation of Cost of cultivation of potato (Kufri Jyoti) on Sampled holding

(Rs.)

Sl. No.	Particulars	Rs.per hectare
1	Hired human labour	37070
2	Bullock labour	7414
3	Machinery	8649
4	Seed	37070
5	Manure	9267
6	Fertilizers	37070
7	Irrigation	7414
8	Plant protection chemicals	15446
9	Interest on working capital	9935
10	Depreciation	1853
11	Land revenue	0
	Cost A ₁	171187
12	Interest on fixed capital	1223
	Cost B ₁	172410
13	Rental value of own land	18535
	Cost B ₂	190945
14	Imputed value of family labour	12357
	Cost C ₁	184767
	Cost C ₂	203302
15	10% of Cost C ₂	20330
	Cost C ₃	223632

The table-1 shows the Cost Structure that underpins the cultivation of the crop on a per hectare

basis. From the table, an estimate of the cost to the farmers on an average basis for the cultivation of the crop on a per hectare basis amounts to Rs. 171,187, denoted as the Cost A₁. The other estimate, Cost A₂, does not exist as the farmers use their own land to cultivate the potatoes.

Additionally, the averaged cost B₁ for potato production varies around an amount of Rs. 172,410 per hectare. Similarly, averaged cost B₂ varies for potato production and equals an amount around Rs. 190,945 per hectare.

In this context, it is found that these costs, namely C₁, C₂, and C₃ are Rs. 184,767, Rs. 203,302, and Rs. 223,632, respectively, for each hectare. The pattern of investment in terms of expenditure incurred due to varying costs indicates a lower investment in plant protection measures and irrigation. The maximum expenditure incurred for each hectare for potato cultivation lies in employment, manures and fertilizers, and seed.

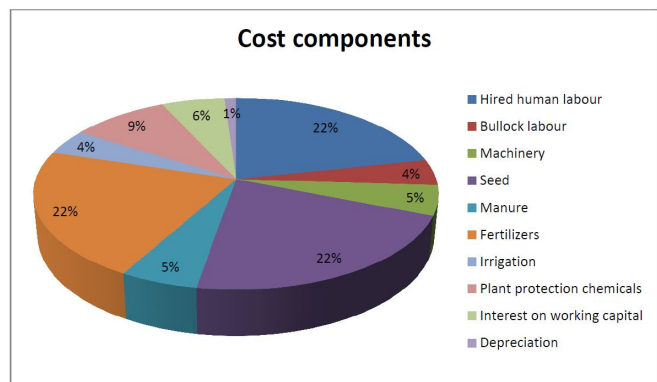


Fig. 1: Breakup of cost A₁ for Potato (Kufri Jyoti) cultivation

Table 2 : Cost involved in cultivation of potato (Kufri Jyoti) and their breakup on sampled holdings:

	Cost particulars	Rs. per hector	Percentage to total cost
1	Cost of seed	37070	16.58
2	Labour cost	56841	25.42
3	Cost of manure and fertilizer	46337	20.72
4	Total Cost	223632	100

The table-2 presents the major components of the total cost of potato cultivation per hectare, amounting to Rs. 23,632 (representing 100% of the total cost). Labor cost constitutes the largest share at Rs. 56,841 (25.42%), followed by manure and fertilizer at Rs. 46,337 (20.72%), and seed cost at Rs. 37,070 (16.58%). These three input categories together account for approximately 62.72% of the total production cost, highlighting the labor-intensive nature

of potato farming and the significant expenditure on essential inputs such as seeds and nutrients in the study area.

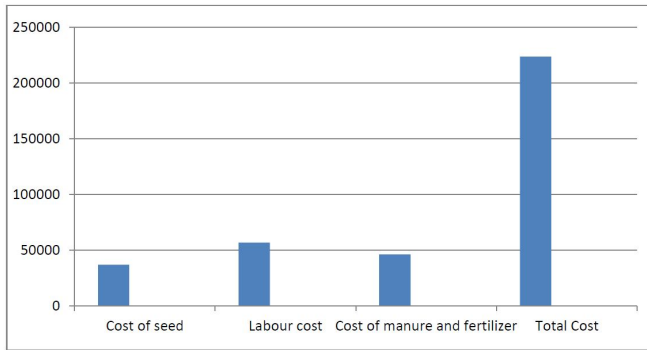


Fig. 2 : Breakup of major input costs involved in potato cultivation (Rs./ha)

Table 3: Economics of potato (Kufri Jyoti) cultivation on the basis of cost concepts on sampled holdings.

SI No.	Particulars	Per hectare
1	Total yield	383.05 quintal
	Price per quintal (Rs.)	700
2	Gross return (Rs.)	268135
3	Cost of cultivation (Rs.)	
	Cost A ₁	171187
	Cost B ₁	172410
	Cost B ₂	190945
	Cost C ₁	184767
	Cost C ₂	203302
	Cost C ₃	223632
4	Net return (Rs.)	
	Cost A ₁	96948
	Cost B ₁	95725
	Cost B ₂	77190
	Cost C ₁	83368
	Cost C ₂	64833
	Cost C ₃	44503
5	Cost of production per quintal	
	Cost A ₁	446.90
	Cost B ₁	450.09
	Cost B ₂	498.48
	Cost C ₁	482.35
	Cost C ₂	530.74
	Cost C ₃	583.81
6	Return per rupee	
	Cost A ₁	1.57
	Cost B ₁	1.56
	Cost B ₂	1.40
	Cost C ₁	1.45
	Cost C ₂	1.31
	Cost C ₃	1.19
7	Family labour income	77190
8	Farm business income	96948

The table-3 summarizes the total yield averaged 383.05 quintals per hectare, sold at Rs.700 per quintal, generating a gross return of Rs. 268,135. Cultivation costs varied across cost concepts: Cost A₁ (paid-out costs) stood at Rs.171,187, increasing to Cost B₂ (including imputed land rent) at Rs.190,945 and Cost C₃ (including family labor at market rate) at Rs. 223,632. Net returns were positive across all concepts, with the highest over Cost A₁ (Rs. 96,948) and the lowest over Cost C₃ (Rs. 44,503), while the cost of production per quintal ranged from Rs.446.90 (Cost A₁) to Rs.583.81 (Cost C₃). The return per rupee invested declined from 1.57 (over Cost A₁) to 1.19 (over Cost C₃), and family labor income and farm business income were recorded at Rs.77,190 and Rs.96,948 per hectare, respectively, indicating moderate profitability despite high input intensity.

Conclusion

Based on the preceding results and discussions, the following conclusions can be drawn:

- Human labour was predominantly utilized in potato cultivation, surpassing the use of machines. Additionally, family labour played a significant role in potato cultivation.
- The average seed rate was 9-10 quintals per hectare.
- Only a few farmers in the area applied farmyard manure, resulting in a higher reliance on chemical fertilizers.
- The cost of cultivating one hectare of potato crop was found to be Rs. 171,187 for the Jyoti variety as cost A₁. There was no cost A₂ because farmers used their own land for potato cultivation.
- The average operational costs (cost B₁) were Rs. 172,410 and Rs. 142,569 per hectare for Jyoti. Similarly, for cost B₂, the average values were Rs. 190,945 per hectare for Jyoti potato production.
- The costs C₁, C₂, and C₃ were found to be Rs. 184,767, Rs. 203,302, and Rs. 223,632 per hectare for Jyoti.
- The investment pattern analysis revealed higher investments in manures and fertilizers, seeds, and labour, while comparatively lower investments were made in plant protection measures and irrigation.
- The average productivity of potato crops per sample holding was 383.05 quintals for Jyoti and 339.80 quintals for Pukhraj per hectare.
- The gross income per hectare was Rs. 268,135 for Jyoti and Rs. 169,900 for Pukhraj potatoes.

10. For the Kufri Jyoti variety, the average net return over cost A₁ was Rs. 96,948 per hectare, followed by Rs. 95,725, Rs. 77,190, Rs.83,368, Rs.64,833, and Rs.44,503 for costs B₁, B₂, C₁, C₂, and C₃ per hectare, respectively.
11. Family labour income was found to be Rs. 77,190 per hectare, followed by Rs. 96,948 per hectare as farm business income for the Jyoti variety.

The economics of potato cultivation in Salboni block of Paschim Medinipur district thus appears to be viable and profitable for the farmers in the study area. The long duration and labor intensity, largely contributed by human and family labour, along with heavy dependence on chemical fertilizers and purchased seeds, is paid off in form of attractive gross returns of the crop. In respect of Kufri Jyoti, it was estimated as 383.05 q/ha (quintals/hectare). It is further divulged by the cost structure that the Kufri Jyoti variety entails high seed investments, manures/fertilizers, and labor costs. The net returns over Cost A₁ worked out to Rs.96,948/ha for Jyoti, showing a progressive decline with the increase in cost concepts but remained positive even over Cost C₃ at Rs. 44,503/ha. These also bring into sharp focus the economic importance of potato as a cash crop that contributes positively to farm business income, Rs.96,948/ha, and family labor income, Rs.77,190/ha, thereby sustaining livelihoods in the study area.

Acknowledgement

The authors would like to sincerely thank all of the potato growers in the Midnapur (West) district who helped with the main data collection for this study and contributed important information. We express our sincere gratitude to each of our respective universities for providing the resources and assistance required to conduct this study. We also like to express our sincere gratitude to the local leaders and extension agents in the research region for their helpful support throughout the field survey. Lastly, we would want to express our gratitude to our friends and family for their unwavering patience, moral support, and encouragement during the research process. The authors did not receive any outside support for this study; it was entirely self-funded. The study's design, data collection, analysis, interpretation, and paper preparation were all independent of the sponsoring organization.

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