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Economic assessment of paddy seed production in Eastern Vidarbha Zone

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Abstract

The present study examines the economic analysis of paddy seed production in Eastern Vidarbha zone to analyze the cost and returns, technical, economic and allocative efficiencies and constraints faced by grower of paddy seed production during the year 2025-26. Two districts i.e. Bhandara and Chandrapur were selected for the study. From each district two tehsils and from Each tehsil two villages were selected. From each village 15 growers i.e. total 120 growers were selected for the study. The primary data on selected paddy seed growers were collected by survey method. Results indicated that average cost of cultivation at Cost C₃ was estimated at Rs. 85,100.84 per hectare, while gross returns were Rs. 1,24,796.86 per hectare, resulting in a net return of Rs. 39,696.02 and a benefit-cost ratio of 1.47. High cost of fertilizers and plant protection inputs was the major constraint, followed by labour shortage during peak farm operations. Overall, paddy seed production was found to be economically viable and profitable in the study area.

Keywords: Paddy seed production, Economic analysis, Cost and returns, Constraints, Eastern Vidarbha Zone

Introduction

Seed is one of the most important agricultural inputs influencing crop establishment, productivity and quality of agricultural production. The availability of genetically pure, healthy and quality seed at the proper time is essential for obtaining good crop stand and higher productivity. Seed production is a systematic process of multiplication of seed under prescribed field and quality standards while maintaining genetic identity, physical purity and physiological quality. Among the major food crops, paddy (*Oryza sativa* L.) occupies an important position in India and plays a vital role in food security, employment and farm income. Paddy seed production is a specialized activity that involves multiplication of quality seed under suitable production conditions while maintaining varietal identity and seed quality. An efficient seed production system is therefore essential for increasing the availability of quality paddy seed and improving crop productivity. In India, paddy was cultivated over 512.70 lakh hectares with a production of 1,501.80 lakh tonnes during 2024–25. Maharashtra is also an important paddy-growing state, with about 16.82 lakh hectares under paddy cultivation and production of 40.03 lakh tonnes during the same period.

The Vidarbha region, particularly Eastern Vidarbha comprising Bhandara, Chandrapur, Gadchiroli and Gondia, is an important paddy-growing area of Maharashtra. The Maharashtra State Seeds Corporation Limited (MSSC), popularly known as Mahabeej, established in 1976, plays an important role in the production, processing, quality control, packaging and marketing of quality seeds. Bhandara, popularly known as the “Paddy Bowl of Maharashtra”, is an important centre of paddy cultivation and seed production. During 2025–26, an area of 128.56 ha was under paddy seed production in Bhandara, while Chandrapur accounted for 62.68 ha.

The major varieties cultivated under seed production programmes in the study area include MTU-1153, Suvarna and PDKV-Tilak. Thus, considering the importance of quality seed, paddy cultivation and organized seed production in Eastern Vidarbha, an economic analysis of paddy seed production in Bhandara and Chandrapur districts is essential to assess its profitability, resource-use efficiency and the constraints faced by seed growers.

Objectives follows.

1. To estimate the cost and returns of paddy seed production.
2. To analyze the various constraints faced by growers of paddy seed production.

Methodology

1. **Selection of area:** The present study was conducted in the Eastern Vidarbha Zone of Maharashtra, with Bhandara and Chandrapur districts selected purposively, where the area under paddy seed production was concentrated.
2. **Selection of Tehsils:** Two tehsils from each districts were selected i.e. Bhanadara, Pawani from Bhandara district and Sindewahi and Mul tehsils from Chandrapur district on the basis of potential area under paddy seed production.
3. **Selection of villages and paddy seed growers:** From each tehsils two villages were selected i.e. total 8 villages were selected from 4 tehsils. From each village 15 growers were selected i.e. total 120 growers were selected for the present study.
4. **Collection of data:** Primary data was collected from each selected growers through specially designed schedules to fulfill the objectives of the study. The list of paddy seed growers was obtained from the office of Mahabeej of respective districts. The data pertained to the Kharif season of paddy for the agricultural year 2025–26.

Analytical Tools

Cost and Returns Analysis

The cost and returns of paddy seed production was estimated using standard cost concepts, namely Cost A₁, Cost A₂, Cost B₁, Cost B₂, Cost C₁, Cost C₂ and Cost C₃.

Cost A₁ = Hired human labour + Machine labour + Seed + Manure + Fertilizers + Irrigation + Plant protection + Depreciation + Land revenue and taxes + Interest on working capital + Incidental charges

Cost A₂ = Cost A₁ + Rent paid for leased-in land

Cost B₁ = Cost A₁ + Interest on owned fixed capital excluding land

Cost B₂ = Cost B₁ + Rental value of owned land

Cost C₁ = Cost B₁ + Imputed value of family labour

Cost C₂ = Cost B₂ + Imputed value of family labour

Cost C₃ = Cost C₂ + 10% of Cost C₂

The B:C ratio was estimated separately at Cost A₁, A₂, B₁, B₂, C₁, C₂ and C₃ to assess the profitability of paddy seed production.

Constraints Analysis

The constraints faced by paddy seed growers were analyzed using Garrett's Ranking Technique. The growers were asked to rank the identified constraints according to their importance. The ranks were converted into scores using the following formula:

$$(R_{ij} - 0.5) \text{ Percent Position} = 100 \times \frac{R_{ij}}{N_j}$$

Where,

R_{ij} = Rank given to the *i*th constraint by the *j*th grower

N_j = Number of constraints ranked by the *j*th grower

The corresponding Garrett scores were obtained for each rank and the mean score for each constraint was calculated. The constraints were then ranked according to their mean scores, with the highest mean score receiving the first rank.

Results and Discussions

Per hectare input utilization pattern of selected paddy seed growers. The degree of the management of the resources can be judged for the utilization of resources, the choice and decision-making. Besides this, it also indicates the level of technology adopted by the growers. It is necessary to know the pattern of expenditure on various inputs on per hectare basis.

Table 1: Per hectare input utilization pattern of selected paddy seed production (per ha)

Sr. No.	Particulars	Unit	Inputs/ha
1	Hired human labour	a) Male	14.11
		b) Female	65.52
		Sub-total	79.63
2	Family labour	a) Male	5.12
		b) Female	21.37
		Sub-total	26.49
3	Machine labour	a) Owned	2.22
		b) Hired	5.10
		Sub-total	7.32
4	Seed	Kg	41.12
5	Manures	Qtls	7.10
6	Fertilizers	a) N	102.19
		b) P	52.10
		c) K	58.56
7	Irrigation charges	Rs.	1364.78
8	Plant protection	Rs	1522.34

It is concluded from Table.1 indicates that paddy seed production was relatively labour-intensive. Hired labour use was 79.63 days per hectare, while family labour accounted for 26.49 days, with female labour forming the major share. Machine labour utilization was 7.32 hours per hectare and seed use was 41.12 kg. Manure application was 7.10 quintals, while N, P and K application was 102.19, 52.10 and 58.56 kg per hectare, respectively. Irrigation and plant protection expenditure amounted to Rs. 1,364.78 and Rs. 1,522.34 per hectare. Overall, the input-use pattern reflects substantial dependence on labour, fertilizers and plant protection measures for maintaining crop growth and seed quality.

Per hectare cost of cultivation of paddy seed production

The share of each item in the total cost provides the necessary information to economize cost. The cost has been determined based on standard cost concepts i.e. Cost 'A₁', Cost 'A₂', Cost 'B₁', Cost 'B₂', Cost 'C₁', Cost 'C₂' and Cost 'C₃'. The different cost concepts have different utilities in research. Here an attempt has been made to estimate the figures of the cost of paddy seed production in the study area and represented in succeeding tables.

Table 2: Per hectare cost of cultivation of paddy seed production

Sr. No.	Particulars	Unit	Input per hectare	Cost per unit of input (Rs.)	Total cost per hectare (Rs.)	Percentage to total Cost 'C3'
1	Hired Human Labour					
	a) Male	Days	14.11	422.15	5,956.54	7.00
	b) Female	Days	65.52	256.19	16,785.57	19.72
	Sub-total	Days	79.63		22,742.11	26.72
2	Machine Charges					
	a) Owned	Hours	2.22	878.11	1,949.40	2.29
	b) Hired	Hours	5.10	878.11	4,478.36	5.26
	Sub-total	Hours	7.32		6,427.76	7.55
3	Seed	Kg.	41.12	70.54	2,900.60	3.41
4	Manures	Rs.	7.10	149.87	1,064.08	1.25
5	Fertilizers					
	a) N	Kg.	102.19	37.67	3,849.49	4.52
	b) P	Kg.	52.10	46.10	2,401.81	2.82
	c) K	Kg.	58.56	37.90	2,219.42	2.61
6	Irrigation charges	Rs.			1,364.78	1.60
7	Plant Protection	Rs.			1,522.34	1.79
8	Incidental charges	Rs.			522.89	0.64
9	Repairing charges	Rs.			478.78	0.56
10	Working capital (1 to 9)	Rs.			45,494.07	53.46
11	Int. on working capital @ 6% per annum	Rs.			909.88	1.07
12	Depreciation	Rs.			954.78	1.12
13	Land Rev. cess & other taxes	Rs.			89.44	0.11
14	COST A1 (10 to 13)	Rs.			47,448.17	55.76
15	Rent paid for leased land	Rs.			—	—
16	COST A2 (14 to 15)	Rs.			47,448.17	55.76
17	Int. on Fix. Cap. @ 10% per annum	Rs.			1,570.00	1.84
18	COST B1 (16 to 17)	Rs.			49,018.17	57.60
19	Rental value of owned land	Rs.			20,710.04	24.34
20	COST B2 (18 to 19)	Rs.			69,728.21	81.94
21	Family Human Labour					
	a) Male	Days	5.12	422.15	2,161.41	2.54
	b) Female	Days	21.37	256.19	5,474.78	5.06
	Sub-total	Days	26.49	678.34	7,636.19	8.97
22	COST C1 (18 + 21)	Rs.			56,654.36	66.57
23	COST C2 (20 + 21)	Rs.			77,364.40	90.91
24	10% of Cost C2				7,736.44	9.09
25	COST C3 (23 + 24)	Rs.			85,100.84	100.00
26	Yield per hectare					
	a) Main produce	Qtls	36.70	2,950.00	108,265.00	
	b) By-produce		69.52	237.80	16,531.86	
27	Gross value of produce				124,796.86	
28	Per qtl Cost of production	Rs.			1,868.36	

It is concluded from Table 2 that the total cost of paddy seed production was Rs. 85,100.84 per hectare at Cost C₃. Cost A₁, A₂, B₁ and B₂ accounted for 55.76, 57.60 and 81.94 per cent of the total cost, respectively. Hired human labour constituted the major cost component (26.72%), followed by fertilizers (9.95%) and machine charges (7.55%). Family labour accounted for 8.97 per cent of the total cost. The average yield was 36.70 quintals per hectare, generating gross returns of Rs. 1,24,796.86 per hectare. Overall, labour

and input costs constituted the major share of cultivation expenditure.

Economics of paddy seed production: The cost and returns structure per hectare of agricultural production, helps the growers in mapping adjustments in the organization and thereby secure the optimum level of production and income. Per hectare cost and returns of the paddy seed production were worked out for growers were presented in Table 3.

Table 3 Economics of paddy seed production

Sr. No.	Particulars	Total
1.	Yield of Main Produce (qtl/ha)	36.70
2.	Price of Main produce per qtl	2950.00
3.	Value of main produce per qtl	108265.00
4.	Yield of By-produce (qtl/ha)	69.52
5.	Price of By-produce per qtl	237.80
6.	Value of By-produce (Rs)	16531.86
7.	Gross Returns (Rs)	124796.86
8.	Cost of Cultivation at	
a)	Cost 'A ₁ '	47448.17
b)	Cost 'A ₂ '	47448.17
c)	Cost 'B ₁ '	49018.17
d)	Cost 'B ₂ '	69728.21
e)	Cost 'C ₁ '	56654.36
f)	Cost 'C ₂ '	77364.40
g)	Cost 'C ₃ '	85100.84
9.	Net return at	
a)	Cost 'A ₁ '	77348.68
b)	Cost 'A ₂ '	77348.68
c)	Cost 'B ₁ '	75778.68
d)	Cost 'B ₂ '	55068.65
e)	Cost 'C ₁ '	68142.49
f)	Cost 'C ₂ '	47432.46
g)	Cost 'C ₃ '	39696.02
10.	Benefit-cost ratio at	
a)	Cost 'A ₁ '	2.63
b)	Cost 'A ₂ '	2.63
c)	Cost 'B ₁ '	2.55
d)	Cost 'B ₂ '	1.79
e)	Cost 'C ₁ '	2.20
f)	Cost 'C ₂ '	1.61
g)	Cost 'C ₃ '	1.47

It is observed from Table 3 that paddy seed production yielded 36.70 q/ha of main produce, valued at Rs. 1,08,265 per hectare, while by-products contributed Rs. 16,531.86, resulting in gross returns of Rs. 1,24,796.86 per hectare. Net returns ranged from Rs. 77,348.68 at Cost A₁, A₂ to Rs. 39,696.02 at Cost C₃. The benefit-cost ratio varied from 2.63 at Cost A₁, A₂ to 1.47 at Cost C₃. Since the B:C ratio remained above one under all cost concepts, paddy seed production was economically viable and profitable for the selected growers.

Constraints faced by growers in paddy seed production

Constraints are the various problems or difficulties experienced by paddy seed growers during seed production that affects their production, quality, profitability or income.

Table 4: Constraints faced by growers in paddy seed production (N=120)

Sr. no.	Constraints	Mean score	Rank
1	High cost of fertilizers and plant protection inputs	77.50	I
2	Shortage of labour at peak time of farm operation	65.30	II
3	Seed lots failing certification sold at market price	58.70	III
4	Low procurement price for seed	51.40	IV
5	Adverse effects of natural calamities	44.20	V
6	Crop damage by wild animals	36.80	VI

The Table 4 revealed that the major constraints faced by the growers in paddy seed production was high cost of

fertilizers and plant protection inputs with a mean score of 77.50 ranked first, followed by Shortage of labour at peak time of farm operation with a mean score of 65.30 ranked second, followed by seed lots failing certification sold at market price with a mean score of 58.70 ranked third, respectively. Low procurement price for seed with a mean score of 51.40 was ranked fourth, followed by adverse effects of natural calamities with a mean score of 44.20 ranked fifth, followed by crop damage by wild animals with a mean score of 36.80 ranked sixth, respectively.

Conclusions

The study revealed that the per hectare cost of cultivation of paddy seed production increased progressively from Rs 47448.17 at Cost A₁ and A₂ to Rs. 85100.84 at Cost C₃. Cost A₁ and A₂ constituted the major share of the total cost (55.76 per cent), with hired human labour being the largest cost component (26.72 per cent), followed by fertilizers (9.95 per cent), machine charges (7.55 per cent), seed (3.41 per cent), plant protection (1.79 per cent), irrigation charges (1.60 per cent), and manures (1.25 per cent). Cost B₁ and Cost B₂ accounted for 57.60 and 81.94 per cent, respectively, of Cost C₃, while family labour contributed 8.97 per cent to the total cost. The average productivity of paddy seed was 36.70 quintals per hectare, with a gross return of Rs. 1,24,796.86 per hectare, indicating the economic potential of paddy seed production. The benefit-cost ratio for paddy seed production was 1.47. The major constraints were high cost of fertilizers and plant protection inputs (77.50%), shortage of labour during peak operations (65.30%), and failure of seed lots in certification (58.70%). Other

constraints included low procurement prices, natural calamities and crop damage by wild animals.

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