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Economic viability and business potential of GI-tagged organic Jeeraphool rice in Chhattisgarh

[1]Priyanka Bhagat and [2]Hulas Pathak

[1]MBA (ABM) Student, Department of Agri-Business & Rural Management, Indira Gandhi Krishi Vishwavidyalaya, College of Agriculture, Raipur, Chhattisgarh, India

[2]Professor & Head, Department of Agri-Business & Rural Management, Indira Gandhi Krishi Vishwavidyalaya, College of Agriculture, Raipur, Chhattisgarh, India

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Corresponding Author: Priyanka Bhagat

Abstract

Jeeraphool rice, a traditional short-grain aromatic variety from Surguja district, Chhattisgarh, is organically cultivated and GI-Tagged, with significant cultural and market value. Despite premium potential, farmers face high labor costs, fragmented marketing, and limited branding. This study analyzed economic and business aspects using primary data from 150 farmers across six villages in Batauli block, representing marginal to large farms. Data were examined through averages, cost concepts, input-output ratios, and multiple response analysis. Results indicate profitable cultivation for all farm sizes (overall net return Rs. 65,369/ha; input-output ratio 2.10), with yield and income increasing with farm size. Traders dominate marketing channels (66.66%), though direct sales provide the highest farmer share. Strong consumer preference for GI-Tagged organic rice highlights opportunities for niche branding and value addition. The study concludes that Jeeraphool rice is economically viable and offers substantial business potential, which can be enhanced through premium branding, direct urban linkages, and value addition.

Keywords: Branding, economic viability, GI-tagged rice, input–output ratio, Jeeraphool rice, marketing channels, Faremer's share

Introduction

Rice (*Oryza sativa*) is the staple food for more than half of the world's population. According to FAO's Food Outlook report, global milled rice production in 2023/24 reached approximately 523.9 million tonnes, and is projected to climb to 543 million tonnes in 2024/25, driven by positive crop conditions in India, Cambodia, and Myanmar (WAM,). India remains the largest rice producer and exporter in the world. In 2023/24, India harvested 137.8 million tonnes from 47.8 million hectares (yield ~4.32 t/ha), and forecasts suggest production could reach 149 million tonnes in 2024/25 across 51.4 million hectares (The Times of India, FAO, 2024) [8].

India preserves over 2,000 traditional rice landraces, many of which are region-specific and aromatic—such as Jeeraphool (Chhattisgarh), Gobindobhog (West Bengal), Kala Namak (UP), Chakhao (Manipur), Tulaipanji, Kalanamak, and otheRs. These varieties often have Geographical Indication (GI) tags, adding both authenticity and export potential (FAO, The Times of India). While national statistics focus on high-yielding variants, specialty aromatic varieties often fetch two to three times premium price, making them attractive for smallholders despite lower yield per hectare. Consumers increasingly value attributes like aroma, local identity, healthfulness, and traceability.

Aromatic rice is superior-quality rice having fragrance along with other grain and cooking quality characteristics. Owing to these properties, they are popular among the consumers, realizing a higher market value (Bhuvaneswari *et al.*, 2020) [5]. Jeeraphool is an indigenous scented variety grown predominantly in the low-lying areas in Surguja region and almost every farmer cultivates this variety for their own use because of its heady aroma and delightful taste. Farmers say that the age-old practices, cropping situation and weather conditions of Surguja contribute greatly to its aroma, softness and taste and physical traits. It is a small size variety with an appearance of cumin (*jeera*) and hence known as Jeeraphool.

This tasty fragrant Jeeraphool rice received the Geographical Indication Tag (GI) in 2019. This study provided a comprehensive assessment of the economic, production, and business aspects of Jeeraphool rice.

Materials and Methods

The study was conducted during 2024–25 in the Northern Hills agro-climatic zone of Chhattisgarh, selected for its significant Jeeraphool rice cultivation. Surguja district, specifically Batauli block, was purposively chosen, and six villages (Salyadih, Kachhardih, Kudkel, Chawarpani, Bansajhal, and Tirang) were randomly selected to represent the cultivation area. Farmers were classified by landholding size—marginal, small, medium, and large—and 150 respondents (25 per village) were selected using stratified random sampling. Primary data were collected through

structured personal interviews on production, cost, and marketing practices, while secondary data were obtained from government records, journals, research papers, and online sources.

Data analysis included percentage analysis for respondent proportions and area under cultivation, calculation of mean yield, cost, and income, and estimation of gross and net returns. Input–output ratios were used to evaluate resource efficiency, and multiple response analysis examined marketing channels and cropping practices.

Results and Discussion

General Characteristics of Sampled Households

According to Table 1(2)**,** 95.33% households belonged to Scheduled Tribes (ST), followed by 2.67% OBC and 2.00% General category. All marginal farmers and a large share of medium and large farmers were from the tribal community. This confirms that Jeeraphool rice cultivation is tribally dominated, making it culturally and economically significant to the region's indigenous population.

According to Table 1(3), the total population of 854 members comprised 455 males (53.28%) and 399 females (46.72%), resulting in a male-to-female ratio of 1.14. Among marginal farmers, 55.56% were males and 44.44% females; small farmers had 57.25% males and 41.75% females; medium farmers showed a near balance with 50.67% males and 49.33% females, while large farmers had 52.88% males and 47.12% females. Male members slightly outnumber females across all groups, with the most balanced ratio among medium farmeRs.

As per Table 1(5), 87.35% of the population was literate, with the highest share educated up to higher secondary (28.57%), followed by secondary (25.06%) and primary (19.20%). Graduates and postgraduates formed 14.52% of the population. Educational levels were higher among medium and large farmers.

As shown in Table 1(6), out of 854 individuals, 56.44% were in the 18–60 age groups, followed by 27.63% below 18 years, and 15.93% above 60 yeaRs.

Based on Table 1(8), the average area under Jeeraphool cultivation was 1.01 hectares. Large farmers cultivated the most (1.90 ha), followed by medium (1.02 ha), small (0.67 ha), and marginal (0.43 ha). Jeeraphool is grown across all landholding categories, confirming its popularity.

Table 1: Demographic Feature of Sampled Households

S. No	Particulars	Marginal	Small	Medium	Large	Overall
1	Total number of households	16 (10.67)	33 (22.0)	67 (44.6)	34 (22.67)	150 (100.00)
2	Social group					
	(a) Schedule tribes	16 (10.67)	30 (20.0)	64 (42.6)	33 (22.00)	143 (95.33)
	(b) Other backward caste	0	2 (1.33)	1 (0.67)	1 (0.67)	4 (2.67)
	(c) General	0	1 (0.67)	2 (1.33)	0	3 (2.00)
3	Total family members	72 (8.43)	199 (23.3)	375 (43.9)	208 (24.36)	854 (100.0)
	(a) Male	40 (4.68)	115 (13.4)	190 (22.2)	110 (12.88)	455 (53.28)
	(b) Female	32 (3.75)	84 (9.84)	185 (21.6)	98 (11.48)	399 (46.72)
4	Average family size	4.50	6.03	5.60	6.12	5.69
5	Education					
	(a) Illiterate	10 (1.17)	27 (3.16)	28 (3.28)	43 (5.04)	108 (12.65)
	(b) Literate	62 (7.26)	172 (20.1)	347 (40.63)	165 (19.32)	746 (87.35)
6	Age Group					
	I. Below 18 Year	18 (2.11)	50 (5.85)	98 (11.48)	70 (8.20)	236 (27.63)
	II. 18-60 Year	44 (5.15)	119 (13.9)	212 (24.82)	107 (12.53)	482 (56.44)
	III. Above 60 Year	10 (1.17)	30 (3.54)	65 (7.61)	31 (3.63)	136 (15.93)
8	Average land under jeeraphool cultivation(ha)	0.43	0.67	1.02	1.90	1.01

Cost of Cultivation of Jeeraphool

Table 2 clearly depict that the cost of cultivation per hectare was highest for large farms (Rs. 63,889.19/ha) and lowest for marginal farms (Rs. 56,840.91/ha). A consistent increasing trend in input cost was observed from marginal to large farms. This increase is attributed to larger holdings incurring higher expenditure on improved farm inputs like quality seeds, manures, hired labor, and machinery use. The overall average cost of cultivation across all farm categories was observed to be Rs. 59,588.28 per hectare.

Among various cost components, the major share was contributed by labor and power sources (bullock and machinery). Combined, they accounted for 54.85% of the total cost, with human labor alone contributing 34.72%, and bullock plus machine power adding 20.12%. The total variable cost constituted 82.00% of the overall cost, while fixed costs made up the remaining 18.00%. Within fixed costs, the rental value of owned land was the most significant component, contributing 17.03% to the total cost.

Table 2: Cost of Cultivation of Jeeraphool (Rs/ha)

S.No.	Particulars	Marginal	Small	Medium	Large	Overall
(A)	**Variable cost**					
1.	Human labor					
	a) Family Labor	10432.24 (18.35)	9070.96 (15.56)	7525.86 (12.69)	5989.51 (9.37)	8254.64 (13.85)
	b) Hired Labor	9099.77 (16.01)	11208.04 (19.22)	13250.14 (22.34)	17174.49 (26.88))	12683.11 (21.28)
	Total human labor	19532.01	20279.00	20776.00	23164.00	20937.75

		(34.36)	(34.78)	(35.03)	(36.26)	(35.14)
2.	Bullock and machinery power					
	a) Bullock	2696.75 (4.74)	1380.57 (2.37)	526.17 (0.89)	0 0.00	1150.87 (1.93)
	b) Machinery	7634.99 (13.43)	9511.37 (16.31)	10751.45 (18.13)	13006.63 (20.36)	10226.11 (17.16)
	Total Bullock and machinery	10331.74 (18.18)	10891.94 (18.68)	11277.62 (19.01)	13006.63 (20.36)	11376.98 (19.09)
3.	Seed	2117.87 (3.73)	2131.79 (3.66)	2139.89 (3.61)	2146.25 (3.36)	2133.95 (3.58)
4.	Manure & Fertilizers	9471.11 (16.66)	9490.99 (16.28)	9513.63 (16.04)	9521.63 (14.90)	9499.34 (15.94)
5.	Plant protection	2387.99 (4.20)	2408.76 (4.13)	2434.85 (4.10)	2439.9 (3.82)	2417.88 (4.06)
6.	Irrigation Charge	474.24 (0.83)	434.44 (0.75)	417.12 (0.70)	662.88 (1.04)	497.17 (0.83)
7.	Miscellaneous cost	200 (0.35)	250 (0.43)	300 (0.51)	350 (0.55)	275.00 (0.46)
8.	Interest on working capital	1825.15 (3.21)	1878.9 (3.22)	1915.58 (3.23)	2053.63 (3.21)	1918.32 (3.22)
	Total Variable Cost	46340.11 (81.53)	47765.82 (81.92)	48774.69 (82.23)	53344.92 (83.50)	49056.39 (82.33)
(B)	Fixed cost					
9.	Land revenue	12 (0.02)	12 (0.02)	12 (0.02)	12 (0.02)	12.00 (0.02)
10.	Depreciation	89.8 (0.16)	128.67 (0.22)	130.02 (0.22)	132.28 (0.21)	120.19 (0.20)
11.	Interest on fixed capital	399 (0.70)	399.9 (0.69)	399.93 (0.67)	399.99 (0.63)	399.71 (0.67)
12.	Rental value of owned land	10000 (17.59)	10000 (17.15)	10000 (16.86)	10000 (15.65)	10000.00 (16.78)
	Total Fixed Cost	10500.8 (18.47)	10540.57 (18.08)	10541.95 (17.77)	10544.27 (16.50)	10531.90 (17.67)
(C)	Total Cost (A + B)	56840.91 (100)	58306.39 (100)	59316.64 (100)	63889.19 (100)	59588.28 (100)

Different Cost Concept in Jeeraphool Cultivation

The per hectare cost of cultivating Jeeraphool rice was computed using standard cost concepts ranging from Cost A1 to Cost C3. As shown in Table 3, the estimated costs were Rs. 40,921.94 under A1 and A2, Rs. 41,321.64 under and A2+FL Rs. 49176.58, B1, Rs. 51,321.64 under B2, Rs. 49,576.28 under C1, Rs. 59,576.28 under C2, and Rs. 65,533.91 under C3.

The average net income per hectare from Jeeraphool rice cultivation was estimated across multiple cost concepts, as presented in Table 4. The income remained highest under Cost A1 and A2 at Rs. 84,035.57/ha, followed by Rs. 83,635.86/ha under B1, Rs. 73,635.86/ha under B2, Rs. 75,381.22/ha under C1, Rs. 65,381.22/ha under C2, and the lowest at Rs. 59,423.59/ha under Cost C3.

Table 3: Break-up of Cost on the basis of Cost Concept of Jeeraphool (Rs /ha)

S.no.	Particulars	Farm Size				
		Marginal	Small	Medium	Large	Overall
1.	Cost A1	35997.67	38823.53	41378.85	47487.69	40921.94
2.	Cost A2	35997.67	38823.53	41378.85	47487.69	40921.94
3.	A2+FL	46429.91	47894.49	48904.71	53477.20	49176.58
4.	Cost B1	36396.67	39223.43	41778.78	47887.68	41321.64
5.	Cost B2	46396.67	49223.43	51778.78	57887.68	51321.64
6.	Cost C1	46828.91	48294.39	49304.64	53877.19	49576.28
7.	Cost C2	56828.91	58294.39	59304.64	63877.19	59576.28
8.	Cost C3	62511.80	64123.83	65235.10	70264.91	65533.91

Table 4: Cost Concept wise Income Over Different Cost (Rs /ha)

S.no.	Particulars	Farm size				
		Marginal	Small	Medium	Large	Overall
1.	Income over cost A1	69924.83	85286.47	90903.65	90027.31	84035.57
2.	Income over cost A2	69924.83	85286.47	90903.65	90027.31	84035.57
3.	Income over cost B1	69525.83	84886.57	90503.72	89627.32	83635.86
4.	Income over cost B2	59525.83	74886.57	80503.72	79627.32	73635.86
5.	Income over cost C1	59093.59	75815.61	82977.86	83637.81	75381.22
6.	Income over cost C2	49093.59	65815.61	72977.86	73637.81	65381.22
7.	Income over cost C3	43410.70	59986.17	67047.40	67250.09	59423.59

Yield Value and Profit Measures of Jeeraphool

As shown in Table 5, the economic performance of Jeeraphool rice cultivation varied across different landholding categories. The gross income per hectare increased with farm size, from Rs. 1,05,922.50 for marginal farmers to Rs. 1,24,110.00 for small, Rs. 1,32,282.50 for medium, and Rs. 1,37,515.00 for large farmers, with an overall average of Rs. 1,24,957.50. Correspondingly, the cost of cultivation also rose from Rs. 56,840.91 for marginal farmers to Rs. 63,889.19 for large farmers, averaging Rs. 59,588.28 per hectare. Despite higher costs, larger farmers achieved better financial returns due to higher yields, resulting in rising net returns per hectare: Rs. 49,081.59 for marginal, Rs. 65,803.61 for small, Rs. 72,965.86 for medium, and Rs. 73,625.81 for large farmers, with an overall average of Rs. 65,369.22. The cost of production per quintal was highest for marginal farmers at Rs. 2,842.05 and lowest for medium farmers at Rs. 2,366.04, indicating greater efficiency at larger scales. Similarly, the input-output ratio improved from 1.86 for marginal farmers to 2.23 for medium farmers, with an overall ratio of 2.10, suggesting that every Rs. 1 invested yielded Rs. 2.10 in return. Medium and large farmers benefit most from economies of scale, yet Jeeraphool cultivation remains profitable for all categories, including small and marginal farmers

Table 5: Yield Value and Profit Measures of Jeeraphool

S. No.	Particulars	Marginal	Small	Medium	Large	Overall
1	Gross Income	105922.50	124110.00	132282.50	137515.00	124957.50
	Main yield (qt /ha.)	20.00	22.05	25.07	26.11	23.31
	Price/qt.	5000.00	5000.00	5000.00	5000.00	5000.00
	Return (Rs. / ha.)	100000.00	110250.00	125350.00	130550.00	116537.50
	By product yield (qt /ha.)	23.69	55.44	27.73	27.86	33.68
	Price/qt.	250.00	250.00	250.00	250.00	250.00
	Return (Rs. /ha.)	5922.50	13860.00	6932.50	6965.00	8420.00
2	Cost of cultivation (Rs. /ha.)	56840.91	58306.39	59316.64	63889.19	59588.28
3	Net Return (Rs. /ha.)	49081.59	65803.61	72965.86	73625.81	65369.22
4	Cost of production (Rs/qt.)	2842.05	2644.28	2366.04	2446.92	2574.82
5	Farm Business Income	59582.39	76344.18	83507.81	84170.08	75901.11
6	Input- output ratio	1.86	2.13	2.23	2.15	2.10

Marketing Channels and Price Pattern for Jeeraphool Rice in Selected Area

Marketing Channels

Three marketing channels were identified for disposal of Jeeraphool rice in the study area:

Channel I- Producer- consumer

Channel II- Producer- village trader- Processor/ wholesaler- Retailer- consumer

Channel III -Producer- agent/ cooperative society- consumer

Table 6 represents that the total of 175 responses were recorded through multiple response analysis from 75 farmers, reflecting their use of more than one marketing channel. The most widely used channel was Channel II, selected by 100 farmers, accounting for 66.66% of cases and 57.14% of total responses. This indicates that a majority of Jeeraphool producers depend heavily on this route—possibly through traders or rice millers—for selling their paddy.

Channel I was chosen by 50 farmers, making up 33.33% of farmers and contributing 28.57% to total responses. Meanwhile, Channel III had the lowest usage, with 25 farmers selecting it, representing 16.67% of cases and 14.29% of total responses.

Table 6: Marketing Channels for Jeeraphool Rice in Selected Area

S. no.	Marketing channel	No. of Farmers selecting	Percentage of Farmers (Cases)	Percentage of Total Responses	Rank
1.	Channel I	50	33.33	28.57	2
2.	Channel II	100	66.66	57.14	1
3.	Channel III	25	16.67	14.29	3
	Total Responses	175		100.00	

Analysis of Farmers Share in Consumer Price

In Channel I, farmers directly sell to consumers (e.g., farm-gate, local markets), retaining the entire consumer price—thus receiving a full 100% share. This reflects the absence of intermediaries and the most equitable pricing structure.

In Channel II, where rice is sold through millers or traders, the farmer's share drops significantly to 41.67%, indicating considerable margin absorption by intermediaries

In Channel III, although the consumer pays Rs. 120/kg, the farmer receives Rs. 80–Rs. 90/kg, resulting in a share of 75%. This channel includes packaging and semi-direct retail linkages, offering better returns than Channel II but still lower than Channel I.

Table 7: Analysis of Farmers Share in Consumer Price

S.no.	Marketing Channel	Price Received by Farmer (Rs. / kg)	Consumer Price (Rs. / kg)	Farmer's Share (%)
1.	Channel I	80	80	100
2.	Channel II	50	120	41.67
3.	Channel III	90	120	75.00

Conclusion

Jeeraphool rice cultivation is predominantly practiced by Scheduled Tribe farmers (95.33%), highlighting its cultural and economic importance. The average Jeeraphool cultivated area is 1.01 ha, with large farmers (1.90 ha) achieving higher yields (26.11 qt/ha) and gross income (Rs. 1,37,515/ha) compared to marginal farmers (0.43 ha, 20 qt/ha, Rs. 1,05,922/ha). Cost of cultivation rises with farm size, from Rs. 56,841/ha for marginal to Rs. 63,889/ha for large farmers, yet net returns remain positive across all categories (overall Rs. 65,369/ha) with an input-output ratio of 2.10. Marketing analysis shows Channel II is most used (66.66%), but Channel I provides the highest farmer share (100%). Overall, Jeeraphool cultivation is profitable and widespread across all landholding sizes, benefiting medium and large farmers most.

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