



AN ECONOMICS ANALYSIS OF SHYAM RICE PROCESSING MILL IN GONDIA DISTRICT OF MAHARASHTRA – A CASE STUDY

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ABSTRACT

A comprehensive study was conducted to evaluate the economic viability and value addition of paddy processing enterprises focus on the Shyam Rice Processing Mill in Arjuni/Morgaon, Gondia. The study emphasizes the importance of paddy processing in enhancing the usability and marketability of rice, which is a staple food for over 65% of India's population. India ranks second in global rice production and first in area under cultivation. The rice processing sector, critical to food security and rural employment, has evolved significantly with the advent of modern milling technology, especially in high-production districts like Gondia. The unit under study had a total capital investment of ₹690.45 lakhs and operated for 265 days in 2023–24. It processed 86,400 quintals of paddy, yielding fine rice (70%), broken rice (9.8%), husk (17%), and rice bran (3.2%). The total cost of production was ₹16.81 crores, while the total gross returns were ₹30.67 crores, resulting in a net return of ₹14.19 crores. The cost of processing per quintal of fine rice was ₹2,244, generating a net return of ₹2,255 per quintal, reflecting strong profitability. The benefit-cost ratio (BCR) was 1.90 overall, with a significantly higher return from fine rice (2.01). The internal rate of return was calculated at 26.09%, with a payback period (PBP) of just 1 year and 2 months. The break-even point analysis revealed that the unit operated well above the threshold level, confirming its financial sustainability. The study concludes that paddy processing units in the region are not only profitable but also contribute significantly to employment and regional economic growth.

KEY WORDS : Paddy; Cost; Return; Processing; BCR, PBP

INTRODUCTION

Rice is one of the most important cereal crops cultivated across the globe, playing a central role in ensuring food security, particularly in Asia and Africa. At the global level, rice is grown on approximately 162 million hectares, producing around 520 million tonnes of milled rice annually. The global average productivity of rice is estimated at 3,210 kilograms per hectare, with countries like China, India, Indonesia, Bangladesh, and Vietnam being the leading producers. Among these, India ranks second in rice production after China and is the largest exporter of rice in the world. In India, rice occupies a significant portion of the cropped area, covering around 45.2 million hectares, with a total production of approximately 135.5 million tonnes as per 2023–24 estimates. The average productivity of rice in the country stands at 2,998 kg/ha, reflecting steady improvements due to the adoption of high-yielding varieties, better irrigation, and modern farming practices in certain regions.

Within India, Maharashtra is one of the key rice-producing states, although its overall contribution is lower compared to eastern and southern states due to less irrigation coverage and a predominance of rainfed farming. In the 2022–23 agricultural year, Maharashtra recorded around 1.53 million hectares under rice cultivation, with a total production of 2.33 million tonnes.

The average productivity in the state was around 1,521 kg/ha, which is significantly lower than the national average, mainly due to frequent drought conditions, low fertilizer use, and dependence on traditional cultivation methods. However, Gondia district, located in the eastern part of Maharashtra and known as the “Rice Bowl of Maharashtra,” presents a contrasting scenario. It is one of the most intensively rice-cultivated districts in the state, with an estimated 165,000 hectares under paddy. In the same period, Gondia produced approximately 396,000 tonnes of rice, achieving a productivity level of 2,400 kg/ha. This is considerably higher than the state average and reflects the district’s relatively better access to irrigation, favorable agro-climatic conditions, and strong regional orientation toward paddy cultivation.

The relatively high productivity in Gondia has encouraged the development of several rice-processing mills, including the Shyam Rice Processing Mill, and has strengthened the district’s role in supporting the rice economy of Maharashtra.

Methodology

The present study provides an in-depth economic analysis of the Shyam Rice Processing Mill located in Arjuni/Morgaon tehsil of Gondia district. The primary objective of this research



was to assess the economic viability, cost structure, profitability, and financial sustainability of the rice mill over the financial year 2023–24. The study is based on primary data collected from the mill management and supplemented with secondary data from records spanning 2013–14 to 2022–23. A financial analysis was conducted using standard economic tools, including Compound Annual Growth Rate (CAGR), NPV, IRR, B:C ratio, and Payback Period.

RESULTS AND DISCUSSION

The processing mill under study was established in 1994 and operates as a privately owned enterprise. It specializes in

milling paddy into fine rice, broken rice, and by-products such as bran and husk. During 2023–24, the unit was operational for 265 days out of 365, amounting to a 72.6% annual utilization rate. Monthly working days peaked in August, October, and June, corresponding with higher paddy availability during those periods. Compound Annual Growth Rate (CAGR) analysis revealed stagnation in both production and sales volumes over the ten-year period (2013–14 to 2022–23), with CAGR values for production and sales being -0.0030 and -0.0028 percent, respectively. These findings were statistically non-significant and suggest limited expansion or change in output capacity over time.

Production and Output Distribution

1 Investment of Unit

The information regarding initial capital investment of Shyam Rice Processing mill is represented in Table 4.3.

Table 1 Investment of unit (Rs. Lakh)

Sr.No.	Particular	Amount	Percentage
1	Land	210.00	30.41
2	Building	437.00	63.29
3	Machinery and Equipments	15.65	2.27
4	Furniture and Computers	2.24	0.33
5	Vehicles	25.56	3.70
	Total	690.45	100.00

The total capital investment amounts to ₹690.45 lakhs, includes various fixed assets essential for the establishment and operation of the unit. The highest allocation is observed in the building infrastructure, which accounts for ₹437.00 lakhs (63.29 per cent), representing the most substantial portion of the total investment. This is followed by land acquisition, amounting to ₹210.00 lakhs (30.41 per cent). Investments in

machinery and equipment stand at ₹15.65 lakhs, reflecting the technological and operational backbone of the unit.

Total fixed and operating cost of unit.

The information related to total fixed and operating cost of unit in the year 2023-24 is presented in table 2 and 3.

Table 2.Total fixed cost of unit (Rs. Lakh)

Sr.No.	Particular	Amount	Percentage
1	Opportunity Cost of Land @5per Cent	10.50	7.74
2	Depreciation Of Building @10per Cent	43.70	32.23
3	Depreciation Of Machinery @10per Cent	1.57	1.16
4	Depreciation Of Furniture And Computers@10per Cent	0.22	0.17
5	Depreciation On Vehicles @10per Cent	2.56	1.89
6	Electrification	6.00	4.43
7	Interest On Fixed Capital @10per Cent	22.57	16.64
8	License Fees	0.37	0.27
9	Insurance	0.60	0.44
10	Taxes	47.50	35.03
	Total Fixed Cost	135.58	100.00

Table 3.Total operating cost of unit (Rs. Lakh)

Sr.No.	Particular	Amount	Percent
1	Salary	30.50	88.21
2	Fuel charges	0.80	2.31
3	Labour charges	0.55	1.59
4	Repair and maintenance	1.25	3.62
5	Telephone expenses	0.05	0.14
6	Travelling expenses	0.95	2.75
8	Stationary and Printing Expenses	0.03	0.09
9	Audit Fees	0.18	0.52
11	Miscellaneous expenses	0.07	0.19
12	Accounting Charges	0.20	0.58
	Total	34.58	100.00



Production of different products during processing of paddy

The information regarding production of different products during processing of paddy for year 2023-24 is given in table 4.

The total production from the rice milling process amounts to 86,400 quintals. This output comprises both the main produce and by-products, each contributing differently to the overall yield.

Table 4: Production of different products during processing of paddy

Sr.No.		Products	Production (qtls.)	Share of product (per cent)
1	Main Produce	Fine rice	60480.00	70.00
		Broken Rice	8467.20	9.80
2	By produce	Husk	14688.00	17.00
		Rice Bran	2764.80	3.20
		Total	86400.00	100.00

This distribution highlights the efficiency of rice milling, with the majority of the output (79.80 per cent) being usable rice (fine and broken), while the remaining 20.20 per cent comprises

by-products that may be utilized in other industrial or agricultural applications.

Table 5: Cost of raw material

(Rs. Lakh)

Sr. No.	Name of Product	Raw material (qtls.)	Rate per qtl.(₹)	Raw material total cost (Rs)
1	Paddy	86400	1,700	1,468.80

As shown in the table above, a total of 86,400 quintals of paddy is required as the principal input. At a unit rate of ₹1,700 per quintal, the cumulative cost of raw material procurement is computed as ₹14,68,80,000.

Total Revenue Receipt of the Unit (2023-24)

The information regarding total revenue receipt of the unit during processing of paddy for year 2023-24 is given in table 6.

Table 6: Total Revenue Receipt of the Unit

Sr. No.		Product	Unit	Value
1	Main Produce	Fine Rice	Quantity (qtls.)	60480.00
			Rate Rs/qtl.	4,500.00
		Subtotal (A)	Total Value (₹)	27,21,60,000.00
2		Broken Rice	Quantity (qtls.)	8467.20
			Rate Rs/qtl.	2500.00
		Subtotal (B)	Total Value (₹)	2,11,68,000.00
		Total(A+B)		29,33,28,000.00
3	By-produce	Rice Bran	Quantity (qtls.)	2764.80
			Rate Rs/qtl.	2200.00
		Subtotal (A)	Total Value (₹)	60,82,560.00
4		Husk	Quantity (qtls)	14688.00
			Rate Rs/qtl.	500.00
		Subtotal (B)	Total Value (₹)	73,44,000.00
		Total(A+B)		1,34,26,560.00

The total value generated from rice milling is ₹30.67 crore. Main produce (fine rice and broken rice) contributes ₹29.33 crore (approx. 95.6% of total value). By-products (rice bran and husk) contribute ₹1.34 crore (approx. 4.4%).

Cost of processing

A breakdown of the cost of processing per quintal for fine and broken rice is presented below:



Table 7: Net cost of processing

Sr. No.	Item	Value (Rs.)
1	Total Fixed cost (₹)	1,35,58,000.00
2	Total Operating Cost	34,58,000.00
3	Variable cost (₹)	14,68,80,000.00
4	Packaging cost(₹)	42,47,908.57
5	Total cost (₹)	16,81,43,908.57
6	Value of by-product (₹)	1,34,26,560.00
7	Net Cost (₹)	15,47,17,348.57

The total cost of rice milling is ₹16.81 crore, including fixed, operating, packaging and variable costs. After accounting for by-product revenue of ₹1.34 crore, the net cost reduces to

₹15.47 crore, indicating improved cost efficiency through by-product utilization.

Table 8: Cost for Processing of rice (per quintal)

Sr. No.	Particulars	Fine Rice	Broken Rice
1	Net Cost(₹)	13,57,18,058.17	1,89,99,290.40
2	Percentage	87.72	12.28
3	Quantity Produce (qtls.)	60480.00	8467.20
4	Per Quintal cost(₹)	2244.02	2243.87
5	Rate per qtl	4,500.00	2,500.00
6	Net Return per qtl	2255.98	256.13

The analysis reveals that fine rice constitutes the majority of production and cost (87.72 per cent) and yields a significantly higher net return per quintal (₹2,255.98) compared to broken Rice (₹256.13). Despite similar per quintal production costs, the higher market rate for fine rice (₹4,500) results in substantially greater profitability.

Revenue and Profitability

The revenue and profit derived from various product categories are shown below:

Table 9: Returns and Net Profit (₹ per quintal)

Sr. No.	Product	Sale Price	Cost Price	Net Return
1	Fine Rice	4,500.00	2,244.02	2,255.98
2	Broken Rice	2,500.00	2,243.87	256.13

The significant difference in profitability demonstrates the superior financial contribution of fine rice compared to broken rice.

Financial Performance analysis

Key financial indicators assessed for the rice mill's performance are summarized in Table 10,11 and 12:

Table 10: Financial Performance Indicators

Sr. No.	Particulars	Value
1	Net Present Value (NPV)	₹22.18 lakh
2	Internal Rate of Return (IRR)	26.09%
3	Payback Period	1 year 2 months

NPV is used in capital planning to assess the profitability of an investment or project. The purpose of this analysis is to evaluate how profitable the investment is expected to be throughout its projected lifespan. It is observed from Table 10. that, the unit had NPV was at discount factor @25 per cent which is 22.18 lakh. The overall Internal Rate of Return (IRR) was found to be

26.07 percent, indicating that for every ₹100 invested in the production and sale of products, the unit owner earns ₹126.09. The payback period analysis reveals that the initial investment of ₹6.90 crore (₹690.45 lakhs) is recovered within approximately 1 year and 2 months.

Table 11: B:C Ratio

Particulars	Fine rice	Broken Rice	Total
Net cost	13,57,18,058.17	1,89,99,290.40	15,47,17,348.57
Total return	27,21,60,000.00	2,11,68,000.00	29,33,28,000.00
B:C Ratio	2.01	1.11	1.90



From above table the benefit cost ratio of fine rice and broken rice is 2.01 and 1.11 respectively. as 1.90 is overall benefit cost ratio of unit which show higher profitability of unit indicating for every Rs. 1 invest has return of Rs.1.90.

Break-Even Analysis

A break-even analysis is a financial calculation that weighs the costs of a new business, service or product against the unit sell price to determine the point at which you will break even.

Table 12: Break-even Estimates

Sr. No.	Particulars	Value
1	Break-even Quantity (q)	45,279
2	Actual Output (q)	60,480
3	Break-even Revenue (₹ lakh)	203.75
4	Actual Revenue (₹ lakh)	2,721.60

The data from the table shows that the break-even production level for processed rice 452.79 tonne, while the unit actually produces 6048.00 tonnes, indicating a low-risk operation for this product. The break-even revenue levels for processed rice is ₹203.75 lakh. In comparison, the actual revenue levels for ₹2721.60 lakh. This suggests that the unit maintains a financially secure position.

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Problems in processing of rice with suitable measures

1. Non availability of quality raw material

To improve supply of quality raw material from farmers the unit must promote better agricultural practices, provide quality inputs, enhancing farmer education and supporting sustainable farming techniques.

2. Inadequate skilled manpower

Organization of regular training programs and skill development workshops should help to improve skilled manpower

3. Inadequate power supply

By promoting use of renewable energy sources like solar energy, the dependency of power will be reduced.

4. Attack of storage pests

By implementing proper pest management techniques and fumigation protocols, attack of storage pests will be minimized.

5. Inadequate infrastructure

By seeking government support under schemes like PM formalization of Microfood processing enterprises unit should expand infrastructure and storage facility.