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**SN Suryawanshi**

Assistant Professor, Agricultural Economics and Statistics, college of Agriculture, Dr. P.D.K.V., Akola, Maharashtra, India

**BN Ganvir**

Professor & Head, Department of Agricultural Economics and Statistics, Dr. P.D.K.V., Akola, Maharashtra, India

**NS Nandeshwar**

Assistant Professor, Agricultural Economics and Statistics, Anand Niketan Agriculture College, Warora, Maharashtra, India

**NT Bagade**

Assistant Professor, College of Agriculture, Dr. P.D.K.V., Akola, Maharashtra, India

**SA Gawande**

Assistant Professor, Department of Extension Education, PGI, Dr. P.D.K.V., Akola, Maharashtra, India

## An economic analysis of value addition of paddy into flakes rice and puffed rice in eastern Vidarbha zone in Maharashtra state

**SN Suryawanshi, BN Ganvir, NS Nandeshwar, NT Bagade and SA Gawande**

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### Abstract

The present study was conducted in four districts namely Bhandara, Gondia, Chandrapur and Gadchiroli in eastern vidarbha zone of Maharashtra state, to value addition in paddy crop and selected products were, flakes rice and puffed rice. Benefit cost ratios of these products were greater than one *i.e.* 1.46 and 1.34, respectively. Paddy (*Oryza sativa*) belongs to the genus *Oryza* and the family gramineae. It is one of the important cereal crop in the world after wheat. Rice is the most important staple food for large part of the world because it produces a good yield per unit area, grows well in a temperate climate. The value addition in processing of paddy in rice flakes was the highest in large size (Rs. 1954.25) followed by medium (Rs. 1852.62) and small (Rs. 1688.57) size rice flakes mills. In puffed rice mills, overall value addition was Rs. 1506.12. Whereas, in small and large size puffed rice mills the value addition was Rs. 1469.45 and Rs. 1541.74, respectively. The gross returns were the highest (Rs. 2286.83) in rice flakes. The cultivators earn a good profit from paddy and there is also advantage of value addition in paddy and it gives good profit to processor and farmer also.

**Keywords:** Value addition, Paddy, Break-even point, B: C ratio, fixed cost, Variable cost

### Introduction

Processing and value addition are the important aspect for Paddy. In India, there is only cost addition no value addition in agricultural commodities. In developed countries, more than 80 per cent of the produce is processed. Value addition in agricultural products is one of the important means of creating time and form utility, adding value of the product and boosting up the demand and supply of food products. In Maharashtra paddy is the second important crop, which is grown over an area of 14.99 lakh hectares with an average paddy production of 32.37 lakh tonnes. The average productivity of the state is 2010 kg/ha. Maharashtra ranks 13<sup>th</sup> place in rice production in the country. The average production of Maharashtra state is low as compared to other rice growing states *viz*; Punjab, Tamil Nadu, Haryana, Andhra Pradesh, etc. (Anonymous, 2011) [1]. An economic analysis of processing industry is important from the point of view of development of processing industry. In view of this an attempt has been made to work out the value addition in paddy in eastern vidarbha zone. The specific objectives of this work are to assess the general profitability involved in value addition in rice processing.

### Materials and Methods

Eastern vidarbha zone was purposively selected as majority of paddy processing units were concentrated in the area. Therefore Bhandara, Gondia, Chandrapur and Gadchiroli districts were selected.

**Corresponding Author:****SN Suryawanshi**

Asstt. Professor, Agricultural Economics and Statistics, college of Agriculture, Dr. P.D.K.V., Akola, Maharashtra, India

### Classification of rice flakes mills, puffed rice mills on the basis of their installed processing capacities

Sl. No.	Size group	Installed processing capacity	
		Flakes rice mills (q/day)	Puffed rice mills (q/day)
1.	Small	4.00	1.50
2.	Medium	12.00	-
3.	Large	14.00	2.00

### Distribution of samples of flakes rice and puffed rice mills

Districts/taluka	Flakes Rice mills				Puffed rice mills		
	Small	Medium	Large	Total	Small	Large	Total
Bhandara							
a) Sakoli	1	1	3	5	3	3	6
b) Tumsar	2	1	2	5	2	4	6
Total	3	2	5	10	5	7	12
Gondia							
a) Gondia	3	2	1	5	4	2	6
b) Goregaon	1	1	3	5	2	4	6
Total	4	3	4	10	6	6	12
Chandrapur							
a) Chandrapur	2	1	3	5	4	2	6
b) Mul	1	3	1	5	3	3	6
Total	3	4	4	10	7	5	12
Gadchiroli							
a) Gadchiroli	2	1	2	5	3	3	6
b) Armori	1	2	2	5	4	7	6
Total	3	2	4	10	7	5	12
Total	13	12	17	40	25	23	48

**Table 1:** Average fixed capital investment in Flakes rice and puffed rice mills (Rs. / Lakhs)

Sl. No.	Particulars	Flakes rice mills				Puffed rice mills		
		Small	Medium	Large	Overall	Small	Large	Overall
1.	Land	0.68 (43.01)	0.89 (36.32)	1.32 (42.11)	0.96 (40.33)	0.68 (50.50)	0.89 (54.77)	0.78 (52.84)
2.	Building	0.63 (39.97)	1.10 (45.07)	1.25 (40.05)	0.99 (41.74)	0.49 (36.43)	0.54 (33.26)	0.51 (34.70)
3.	Machinery and equipments	0.25 (15.90)	0.42 (17.33)	0.51 (16.47)	0.39 (16.64)	0.16 (12.29)	0.18 (11.31)	0.17 (11.75)
4.	Miscellaneous expenditure	0.017 (1.12)	0.031 (1.28)	0.043 (1.37)	0.030 (1.29)	0.010 (0.78)	0.010 (0.66)	0.010 (0.71)
	Total investment	1.51 (100.00)	2.45 (100.00)	3.14 (100.00)	2.39 (100.00)	1.35 (100.00)	1.63 (100.00)	1.49 (100.00)

(Figures in parentheses indicate percentage to total investment)

It is revealed from the Table 1 that the average fixed capital investment in small, medium and large size flakes mills was Rs. 1.51 lakhs, Rs. 2.45 lakhs and Rs. 3.14 lakhs, respectively. In all categories of Flakes rice mills the investment in land and building was major item of the investment. Investment in land was 43.01 per cent in small mills followed by large 42.11 per cent and medium 36.32 per cent. While in building the highest investment was in medium rice flakes mills (45.07 per cent) followed by large (40.04 per cent) and small (39.97 per cent) rice flakes mills.

In puffed rice mills, the average fixed capital investment was Rs. 1.35 and 1.63 lakhs in small and large mills, whereas in overall the average fixed capital investment was Rs. 1.49 lakhs. The investment in land was accounted 50.50 per cent and 54.77 per cent in small and large mills respectively. While, in overall it was 52.84 per cent. Investment in building was the highest in small size puffed rice mills (36.44 per cent)

### Source of data

The primary data for the year 2011 related to processing of paddy were collected from selected processing units in a specially designed schedule by personal interview with the owners of processing units and their staff.

Simple tabular analysis was done to complete the objectives.

### Break-even analysis

Break-even point shows the minimum size of volume to recover the cost required after for processing in a year. Breakeven point for the paddy of different installed capacities was calculated with the following formula.

$$BEP = \frac{AFc}{P_s - V_c}$$

Where,

BEP = Break Even Point

AFc = Annual Fixed cost

P<sub>s</sub> = Selling price per quintal

V<sub>c</sub> = Variable cost per quintal

### Results and Discussion

This study was carried out to examine the concept of value addition as it applies to rice production and processing in eastern vidarbha zone of Maharashtra state.

Followed by large (33.26 per cent) to the total investment.

### Processing of paddy for Flakes rice and puffed rice

From the Table 2 the quantity of obtained by Flakes rice processing of paddy was 58.97 per cent, 60.25 per cent and 60.05 per cent in small, medium and large size mills, respectively, whereas in overall, the quantity of flakes rice was 59.97 per cent. The by-products obtained were husk, bran and broken flakes rice which accounted 24.32 per cent, 6.32 per cent and 9.39 per cent in overall size group, respectively.

It is observed that in overall puffed rice mills the plant were operated 219 days in a year and quantity of paddy processed was 690 quintals. The small size plants were operated for 215 days whereas, the large size puffed rice mills were operated for 232 days. It is observed that the total quantity of paddy processed for making puffed rice in large size mills was the highest (782 q) followed by small (598 q) size mills.

**Table 2:** Processing of paddy for rice flakes and puffed rice mills

Sl. No.	Category of unit	Plant operated days / year	Quantity of paddy processed (q)	Flakes rice mills				Puffed rice mills					
				Quantity of different products obtained (q)				Plant operated days / year	Quantity of paddy processed (q)	Quantity of different products obtained (q)			
				Rice flakes (Poha)	Husk	Bran	Broken rice flakes			Puffed rice (Murmura)	Husk	Bran	Broken puffed rice
1.	Small	215	1720 (100.00)	1014.28 (58.97)	427.76 (24.87)	100.97 (5.87)	176.99 (10.29)	215	598 (100.00)	361.19 (60.40)	149.38 (24.98)	33.07 (5.53)	54.36 (9.09)
2.	Medium	223	1784 (100.00)	1074.86 (60.25)	428.87 (24.04)	115.60 (6.48)	164.67 (9.23)	-	-	-	-	-	--
3.	Large	232	1856 (100.00)	1114.53 (60.05)	452.86 (24.40)	117.12 (6.31)	171.49 (9.24)	232	782 (100.00)	477.88 (61.11)	192.06 (24.56)	44.34 (5.67)	67.72 (8.66)
4.	Overall	223	1786 (100.00)	1071.06 (59.97)	434.36 (24.32)	112.88 (6.32)	167.70 (9.39)	219	690 (100.00)	419.45 (60.79)	170.78 (24.75)	38.64 (5.60)	61.13 (8.86)

(Figures in parentheses indicate the percentage to the total quantity processed)

The quantity of puffed rice obtained in small size mills was (60.40 per cent) and in large size mills the quantity of puffed rice was (61.11 per cent). In overall size mills, the quantity of puffed rice was 60.79 per cent. The by-products viz; husk, bran and broken puffed rice were 170.77, 38.64 and 61.13 quintals which accounted 24.75 per cent, 5.60 per cent and 8.86 per cent in overall size groups, respectively.

### 3. Cost structure of Flakes rice and puffed rice mills

#### Rice flakes mills

From Table 3 it is observed that the per quintal total fixed cost per year of overall size groups of the flakes rice mill was Rs. 54594.34 and per quintal fixed cost of overall size group of the flakes rice mills was Rs. 30.56. The casual labour charges was the major item of fixed cost in all size groups of the flakes rice mills which accounted to Rs. 25800 (58.35 per cent) in small, Rs. 26760.00 (41.10 per cent) in medium and

large Rs. 27840.00 (44.37 per cent) flakes mills, respectively. The per quintal fixed cost was investing proportional to the size of rice flakes mills and it was Rs. 25.71, Rs. 31.84 and Rs. 33.81 per quintal for small, medium and large size flakes mills

#### Puffed rice mills

It is revealed from the Table 3 that total fixed cost in overall group of puffed rice mills was Rs. 28494.31 and per quintal fixed cost was Rs. 41.30. In large size puffed rice mills, total fixed cost was Rs. 29702.03. It is observed that the casual labour charges was the major item of fixed cost for small and large puffed rice mills which shared 47.28 and 46.87 per cent of the total fixed cost. The per quintal fixed cost for small and large puffed rice mills was Rs. 45.63 and Rs. 37.98, respectively.

**Table 3:** Annual fixed cost of rice flakes and puffed rice mills (Rs. /q)

Sl. No.	Particulars	Flakes Rice mills				Puffed rice mills		
		Small	Medium	Large	Overall	Small	Large	Overall
1.	Depreciation on machinery	3171.62 (7.17)	5536.76 (9.74)	6286.79 (10.02)	4998.39 (9.16)	2462.28 (9.02)	2721.29 (9.16)	2591.78 (9.10)
2.	Depreciation on building	2523.21 (5.71)	4258.92 (7.50)	5173.56 (8.24)	3985.23 (7.30)	1660.52 (6.09)	1850.54 (6.23)	1755.53 (6.16)
3.	Depreciation on furniture	178.59 (0.40)	312.05 (0.55)	431.66 (0.69)	307.43 (0.56)	105.07 (0.38)	108.54 (0.36)	106.80 (0.37)
4.	Interest on fixed capital	9045.03 (20.45)	15644.49 (27.54)	18178.77 (28.97)	14289.43 (26.17)	6690.15 (24.52)	7401.66 (24.92)	7045.90 (24.73)
5.	Casual labour charges	25800 (58.35)	26760 (47.10)	27840 (44.37)	268.00 (49.09)	12900 (47.28)	13920 (46.87)	13410 (47.06)
6.	Taxes and loan	3500.40 (7.92)	4300.38 (7.57)	4840.80 (7.71)	4213.86 (7.72)	3468.60 (12.71)	3700.00 (12.46)	3584.30 (12.58)
7.	Per quintal fixed cost (per year)	44218.85 (100.00)	56812.60 (100.00)	62751.58 (100.00)	54594.34 (100.00)	27286.62 (100.00)	29702.03 (100.00)	28494.31 (100.00)
8.	Quantity of paddy processed	1720	1784	1856	1786	598	782	690
9.	Fixed cost	25.71	31.84	33.81	30.56	45.63	37.98	41.30

(Figures in parentheses indicate percentage to total fixed cost)

#### Variable cost of Flakes Rice mills

It is observed from Table 4 that the per quintal total variable cost in small, medium and large size mills was Rs 1438.73, Rs.1436.04 and Rs.1426.85, respectively and for overall size groups of flakes rice mills the per quintal variable cost was Rs. 1433.86. The expenditure on purchase of raw material was the major item of variable cost which shared 82.95 per cent, 81.92 per cent and 81.66 per cent of the total variable cost in small, medium and large flakes rice mills, respectively. The interest on working capital was another major item of variable cost which shared 10.71 per cent for all size groups of flakes rice mills. The cost of packing material was Rs.

23.20 per quintal in overall size groups of flakes rice mills which shared 1.62 per cent of the total variable cost.

#### Variable cost of Puffed rice mills

It is evident from Table 4 that the per quintal average variable cost of puffed rice mills in overall size groups was Rs. 1429.04. In small puffed rice mill, the per quintal variable cost was Rs. 1437.62. The expenditure on purchase of raw material was the major item of the variable cost accounted to Rs.1185.00 (82.43 per cent). In large puffed rice mills, per quintal total variable cost was Rs. 1420.48. The cost of raw material was major item in large puffed rice mills which shared 82.40 per cent of the total variable cost. The recurring

expenditure in puffed rice mills includes sand and salt used for processing accounted for 1.59 per cent of the total variable

cost for overall size group of puffed rice mills.

**Table 4:** Variable cost of flakes rice and puffed rice mills (Rs/q)

Sr. No.	Particulars	Flakes Rice mills				Puffed rice mills		
		Small	Medium	Large	Overall	Small	Large	Overall
1.	Raw material	1193.48 (82.95)	1176.36 (81.92)	1165.10 (81.66)	1178.31 (82.18)	1185.00 (82.43)	1170.50 (82.40)	1177.75 (82.42)
2.	Casual labour charges	12.50 (0.87)	27.50 (1.91)	30.00 (2.10)	23.33 (1.63)	12.00 (0.83)	13.75 (0.97)	12.87 (0.91)
3.	Oil and lubricants	7.42 (0.52)	5.68 (0.40)	5.35 (0.38)	6.15 (0.43)	6.25 (0.43)	8.36 (0.59)	7.30 (0.51)
4.	Energy charges	20.00 (1.39)	22.00 (1.53)	23.14 (1.62)	21.71 (1.51)	15.00 (1.04)	15.12 (1.06)	15.06 (1.05)
5.	Repairs and maintenance	7.20 (0.50)	6.60 (0.46)	6.30 (0.44)	6.70 (0.47)	18.30 (1.27)	14.00 (0.99)	16.15 (1.13)
6.	Recurring expenditure	20.80 (1.45)	20.84 (1.45)	20.86 (1.46)	20.83 (1.45)	23.06 (1.60)	22.54 (1.59)	22.80 (1.59)
7.	Packing material	23.18 (1.61)	23.20 (1.62)	23.22 (1.63)	23.20 (1.62)	23.98 (1.67)	24.02 (1.69)	24.00 (1.68)
8.	Interest on working capital @ 12%	154.15 (10.71)	153.86 (10.71)	152.88 (10.71)	153.63 (10.71)	154.03 (10.71)	152.19 (10.71)	153.11 (10.71)
9.	Total variable cost	1438.73 (100.00)	1436.04 (100.00)	1426.85 (100.00)	1433.86 (100.00)	1437.62 (100.00)	1420.48 (100.00)	1429.04 (100.00)

(Figures in parentheses indicate percentage to total variable cost)

**Table 5:** Total cost of flakes rice mills and puffed rice mills (Rs. /q)

Sl. No.	Particulars	Flakes Rice mills				Puffed rice mills		
		Small	Medium	Large	Overall	Small	Large	Overall
1.	Fixed cost	25.71 (1.76)	31.84 (2.17)	33.81 (2.31)	30.56 (2.09)	45.63 (3.08)	37.98 (2.60)	41.30 (2.81)
2.	Variable cost	1438.73 (98.24)	1436.04 (97.83)	1426.85 (97.69)	1433.86 (97.91)	1437.62 (96.92)	1420.48 (97.40)	1429.04 (97.19)
3.	Total cost	1464.44 (100.00)	1467.88 (100.00)	1460.66 (100.00)	1464.42 (100.00)	1483.25 (100.00)	1458.46 (100.00)	1470.34 (100.00)

(Figures in parentheses indicate percentage to total cost)

## 5. Total cost of rice flakes mills and puffed rice mills

### Rice flakes mills

It is evident from the Table 5 that per quintal total cost was Rs 1464.42 in overall size group of flakes rice mills. In small flakes rice mills per quintal total cost was Rs 1464.44 and fixed cost and variable cost was Rs 25.71 and Rs. 1438.73 per quintal, respectively which accounted 1.76 and 98.24 per cent of the total cost per quintal. In medium rice flakes mills, per quintal total cost was Rs. 1467.88.

### Puffed rice mills

In small puffed rice mills, the fixed cost was Rs.45.63 and variable cost was Rs. 1437.62 which shared 3.08 and 96.92 per cent of total cost, respectively. In large size per quintal total cost was Rs. 1458.46. The fixed cost and variable cost Rs. 41.30 and Rs. 1429.04 which shared 2.81 and 97.19 per cent of total cost. It can be concluded that in both the mills (flakes rice and puffed rice mills) the variable cost per quintal

Was more than the fixed cost.

## 6. Marketing cost of Rice flakes mills and Puffed rice mills

In overall size rice flakes mills per quintal marketing cost of rice flakes was Rs 100.29. In small rice flakes mills, the per quintal marketing cost was Rs 98.82, in medium rice flakes mills per quintal marketing cost was Rs. 105.13 and in large rice flakes mills, the per quintal marketing cost was Rs. 96.88. The marketing cost was the highest in medium rice flakes mills. Transportation charges and market fees and others charges were the main item of marketing cost of rice flakes mills.

It is revealed from the Table 6 that the per quintal total marketing cost was Rs. 103.61 in overall size puffed rice mills. In small and large size puffed rice mills per quintal marketing cost was Rs. 102.97 and Rs. 104.29, respectively. The per quintal marketing cost was higher in large size puffed rice mills due to highest cost of transportation.

**Table 6:** Marketing cost of rice flakes and puffed rice mills (Rs/q)

Sl. No.	Particulars	Flakes Rice mills				Puffed rice mills		
		Small	Medium	Large	Overall	Small	Large	Overall
A)	Marketing cost of raw material							
1.	Transportation	31.22 (31.59)	33.65 (32.00)	30.05 (31.02)	31.64 (31.55)	31.50 (30.59)	34.75 (33.32)	33.12 (31.96)
2.	Loading, unloading and weighing charges	6.00 (6.07)	6.00 (5.70)	6.00 (6.19)	6.00 (5.98)	6.00 (5.83)	6.00 (5.75)	6.00 (5.79)
3.	Market fees and others	9.77 (9.89)	9.16 (8.71)	9.38 (9.68)	9.44 (9.41)	9.80 (9.52)	9.05 (8.68)	9.42 (9.10)
B)	Market cost on disposal of final products							
1.	Transportation	30.25 (30.61)	34.25 (32.57)	30.08 (31.05)	31.53 (31.44)	33.67 (32.70)	32.22 (30.89)	32.94 (31.79)
2.	Loading, unloading and weighing charges	7.15 (7.24)	7.21 (6.89)	7.32 (7.56)	7.23 (7.21)	7.25 (7.04)	7.15 (6.86)	7.20 (6.95)
3.	Market fees and others	14.43 (14.60)	14.86 (14.13)	14.05 (14.50)	14.45 (14.41)	14.75 (14.32)	15.12 (14.50)	14.93 (14.41)
	Total marketing cost	98.82 (100.00)	105.13 (100.00)	96.88 (100.00)	100.29 (100.00)	102.97 (100.00)	104.29 (100.00)	103.61 (100.00)

## 7. Economics of flakes rice

It is revealed from Table 7 that in overall size group, the quantity of the processed rice flakes obtained was 59.97

quintals. The other products viz; husk, bran and broken flakes rice were 24.32, 6.32 and 9.39 kg from one quintal of paddy. The highest gross return (Rs 2340.45) was in large size rice

flakes mills. The net profit was more in large mills (Rs 782.91) followed by medium (Rs. 743.94) and small (Rs 620.02). The benefit cost ratio was the highest in large flakes rice mills (1.50) followed by medium (1.47) and small (1.40). In overall size rice flakes mills group the B: C ratio was 1.46. It is observed from Table 7 that the quantity of puffed rice obtained was 60.79 kg and by products viz; husk, bran and broken puffed rice was 24.75, 5.60 and 8.86 kg, respectively in overall size group. The gross returns of puffed rice was Rs. 2116.18 in overall size group of puffed rice mills. The net

profit was Rs. 505.97 and Rs. 575.86 in small and large size puffed rice mills, respectively. The benefit cost ratio was the highest (1.37) in large size puffed rice mills followed by small size puffed rice mills (1.32). Studied the economics of paddy processing and revealed that per quintal net returns from processing of purchased paddy has been found directly related to the size of rice mill. Also found that the benefit-cost ratio was 1.55, 1.52, and 1.55 for small, medium and large rice mill, respectively. In overall size group of puffed rice mills, the benefit cost ratio was 1.34.

**Table 7:** Economics of Rice flakes and puffed rice (Rs./q)

Sl. No.	Particulars	Flakes Rice			Overall	puffed rice		Overall
		Small	Medium	Large		Small	Large	
	Quantity of paddy processed	100 kg	100 kg	100 kg	100 kg	100 kg	100 kg	100 kg
A)	Processed products (kg)							
1.	Main produce							
a.	Puffed rice	58.97	60.25	60.05	59.97	60.40	61.11	60.79
2.	By products							
a.	Husk	24.87	24.04	24.40	24.32	24.98	24.56	24.75
b.	Bran	5.87	6.48	6.31	6.32	5.53	5.67	5.60
c.	Broken rice flakes	10.29	9.23	9.24	9.39	9.09	8.66	8.86
B)	Value in (₹)							
1.	Main produce							
a.	Puffed rice	1887.04	2030.42	2053.71	1997.00	1812.00	1863.85	1838.90
2.	By products							
a.	Husk	124.35	120.20	122.00	122.18	124.90	122.80	123.75
b.	Bran	58.70	64.80	63.10	62.20	55.30	56.70	56.00
c.	Broken puffed rice	113.19	101.53	101.64	105.45	99.99	95.26	97.46
C)	Gross returns (₹)	2183.28	2316.95	2340.45	2286.83	2092.19	2138.61	2116.11
D)	Total cost incurred (FC + VC + MC)/q	1563.26	1573.01	1557.54	1564.71	1586.22	1562.75	1573.95
E)	Net returns (C - D) (₹)	620.02	743.94	782.91	722.12	505.97	575.86	542.16
F)	Benefit cost ratio	1.40	1.47	1.50	1.46	1.32	1.37	1.34

FC = Fixed cost, VC = Variable cost, MC = Marketing cost

**Table 8:** Value addition in Flakes rice and puffed rice (Rs./q)

Sl. No.	Particulars	Flakes Rice				Puffed rice		
		Small	Medium	Large	Overall	Small	Large	Overall
1.	Gross returns	3200	3370	3420	3330	3000	3050	3025
2.	Cost of processing	317.95	340.99	300.65	334.10	345.55	337.76	341.13
3.	Cost of raw material	1193.48	1176.36	1165.10	1178.31	1185.00	1170.50	1177.75
4.	Value added	1688.57	1852.65	1954.25	1817.59	1469.45	1541.74	1506.12
5.	Per cent increase over the raw material	268.12	272.02	274.65	271.57	253.16	256.30	254.72

It is observed that value added in processing of paddy for flakes rice was the highest in large size (Rs 1954.25) followed by medium (Rs. 1852.65) and small size flakes rice mills (Rs.1688.57). The percentage increase in value added products over the raw material was the highest in large mills (274.65) followed by medium (272.02) and small (268.12) flakes rice mills. In puffed rice mills, the cost of raw material was more in small size puffed rice mills (Rs 1185.00) and lowest in large size puffed rice mills (Rs. 1170.50) whereas in overall the cost of raw material was Rs.1177.75. Processing cost was more in small (Rs. 345.55) followed by large (Rs. 337.76) size puffed rice mills. Shweta *et.al* (2011) revealed in their study that total processing cost per quintal of paddy amounted to Rs. 127 per quintal for conventional and Rs.196.40 for modern units to process rice from paddy and

Rs. 35.30 for conventional & Rs. 41 for modern unit to process paddy in to poha. Sahu L.K. and Ayub M.A. (2017) [9] reported that the total value added cost of paddy in rice flakes was involved to be Rs. 254 per q. during the processing of flakes rice; the major cost was registered in bagging of flakes rice and found to be 39.37 per cent. The gross return was Rs. 3000 and Rs 3050 in small and large puffed rice mills, respectively. It was inferred from the table that the percentage increase in value addition over the raw material was more in large size 256.30 than small 253.16 puffed rice mills. In overall the per cent increase over the raw material was 254.72 per cent.

## 9. Break-even analysis for flakes rice and puffed rice mills



**Table 9:** Break-even analyses for flakes rice and puffed rice mills

Sl. No.	Size group	Total annual fixed cost (Rs./q)	Selling Price (Rs/q)	Variable cost (Rs./q)	Break-even quantity (q)
A. Rice flakes mills					
1.	Small	44213.85	3200	1438.73	25.10
2.	Medium	56812.60	3370	1436.04	29.38
3.	Large	62751.58	3420	1426.85	31.48
4.	Overall	54594.34	3330	1433.86	29.79
B. Puffed rice mills					
1.	Small	27286.62	3000	1437.62	17.46
2.	Large	29702.03	3050	1420.48	18.22
3.	Overall	28494.31	3025	1429.04	17.85

It is revealed from the Table 9 that the break-even quantity in flakes rice was the highest in large size rice flakes mills (31.48 q) followed by medium (29.38 q) and small size flakes rice mills (25.10 q). In overall break-even quantity was 29.79 quintals. The total annual fixed cost was Rs. 44213.85, Rs. 56812.60 and Rs. 62571.58 in small, medium and large size rice flakes mills, respectively. While in overall size groups the annual fixed cost was Rs. 54594.34.

It is observed from the Table 9 that the break-even quantity in processing of puffed rice was more in large size puffed mills (18.22 q) followed by small (17.46 q), while in overall break-even quantity was 17.85 quintals. The variable cost was more in small size puffed rice mills (Rs. 1437.62) followed by large size puffed rice mills (Rs. 1420.48). It is observed that the break-even quantity in all the size of the unit was found to be at increasing rate as the size of unit increased.

### Conclusions

It was concluded that is the net returns per quintal from processing of paddy was the highest in flakes rice mills (Rs. 722.12) followed by puffed rice mills (Rs.542.16). Benefit cost ratio was the highest in flakes rice mills (1.46) followed by puffed rice mills (1.34). Value addition per quintal of paddy was the highest in rice flakes (Rs. 1817.59) followed by puffed rice (Rs. 1506.12). Break-even quantities increases with increase in the size of mills.

### References

1. Anonymous. Status paper on rice in Maharashtra, 2011. <http://www.rkmp.co.in>
2. Bagde NT, Shende NV, Ingle RK, Shende PV. Value addition and processing of paddy in the vicinity of Chandrapur district of Maharashtra. Indian J. of Agril. Mktg. 2002; 16(3):50-51.
3. Goel RC, Gangwar AC. Economic analysis of paraboiled Vs. raw rice processing. Financing Agriculture. 1980; 11(3&4):75-78.
4. Goel RC, Gangwar AC. An economic analysis of paddy processing in Haryana. Agricultural Situation in India. 1984; 38:195-197.
5. Goutam DS, Singh PN, Nahatkar SB. Cost: benefit analysis of paddy processing plants in the rice bowl of India. Agril. Mktg. 1988; 31(3):24-26.
6. Jindal VK, Saini SS. Method of husking and milling rice and their economics in Kangra hills. Agriculture and Agro -Industries J. 1972; 5(9):32.S
7. Rai A, Singh R. Comparative economics and capacity utilization of various techniques of paddy processing in Nainital district of Uttar Pradesh. Indian J Agril. Econ. 1989; 44(3):337-338.
8. Rajagopal. Foodgrains processing technology in changing perspective. Agril. Situation in India. 1988; 43:587-590.

9. Sahu LK, Ayub MA. An economic analysis of value addition of paddy into flakes rice in Balodabazar-Bhatapara district of Chandigarh. Indian Journal of Economics and Development. 2017; 13(2A):540-542.
10. Singh K, Rangil PS. Economic of paddy processing in Punjab. J Agril. Dev. and Policy. 1997; 8(1):88-93.