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Deepak H Ulemale
Associate Professor, HOD, Department of Agriculture Economics and Stat, Shri Shivaji Agriculture College, Amravati, Maharashtra, India

Vivek W Kukade
PG Student, Department of Agriculture Economics and Stat, Shri Shivaji Agriculture College, Amravati, Maharashtra, India

Sunil N Ingle
Assistant Professor, Department Agriculture Economics and Stat, Shri Shivaji Agriculture College, Amravati, Maharashtra, India

Corresponding Author:
Deepak H Ulemale
Associate Professor, HOD, Department of Agriculture Economics and Stat, Shri Shivaji Agriculture College, Amravati, Maharashtra, India

Economic analysis of value addition in chilli in Nagpur district of Maharashtra State

Deepak H Ulemale, Vivek W Kukade and Sunil N Ingle

Abstract
The present study was estimated the value addition in chilli and break-even point of chilli processing unit. The total sample 21 Chilli processing units out of sample of seven small sized units, seven medium sized units and seven large sized units having varied installed processing capacity were selected for the study. The data were collected with the help of specially prepared schedule by personal interview method. The average break-even point in physical quantity for chilli processing unit was 222.60 qtl., consisting of qtl. for small sized units was 82.67, for medium sized of chilli processing unit was 195.81 qtl. and 370.52 qtl. for large sized of chilli processing units. The average break-even point in monetary value for chilli processing unit was Rs. 5394823.93, consisting for small sized unit was Rs. 1961337.44, for medium sized units was Rs. 4745882.99 and Rs. 9167778.73 for large sized unit. The cost of raw material were Rs. 16857.17, Rs. 16971.45, Rs. 17128.60 in small, medium and large sized processing unit respectively. The processing cost were Rs. 1912.66, Rs. 1923.62, Rs. 1927.85 in small, medium and large sized processing unit respectively. The per quintal gross returns from chilli powder in small, medium and large sized units were Rs. 23725.57, Rs. 24237.09 and Rs. 24743.25 respectively. The value addition in chilli in small, medium and large sized units were Rs. 4955.74, Rs. 5342.01 and Rs. 5686.79 respectively.

Keywords: Chilli, break-even point, value addition

Introduction
The Processing and value addition of farm products has boosted agro- processing industry focusing in the rural area, which can generate large employment opportunities. Experiences have shown that, in rural areas where agro-industries came up in a big way, have set in a motion the forces that change the socio– economics structure of an area. Therefore, development of agro-processing industries implies development of agriculture simultaneously development of industries, at rural level cater the need of the masses in a decentralized fashion. Chilli is one of the most important commercial crops of India. It is grown almost throughout the country. India being the world's largest producer, consumer and exporter of chillies. Chillies are the most common spice cultivated in India. Chilli is a universal spice of India. There are more than 400 different varieties of chillies found all over the world. Different varieties are grown for vegetables, spices, condiments, sauces and pickles. Chilli occupies an important place in Indian diet. It is an indispensable item in the kitchen, as it is consumed daily as a condiment in one form or the other. Among the spices consumed per head, dried chilli fruits constitute a major share. Currently, chillies are used throughout the world as a spice and also in the making of beverages and medicines.

Materials and Methods
For the present study, Nagpur district was purposively selected. The chilli processing units in Nagpur has varied installed processing capacity considered for selection of 21 processing units. Total 21 processing units was selected, 7 are small, 7 are medium and 7 are large sized processing units for the present study.

Break- even point
The point at which the two curves i. e. total cost curve and total revenue curve intersect is called as break-even point (BEP), which indicates level of production at which neither losses money nor makes profit.

For physical quantity

$$BEP = \frac{F}{P-V}$$

For Monetary value

$$BEP = \frac{F}{\left(1-\frac{V}{P}\right)}$$

Where,
BEP = Break-even point
F = Fixed cost in Rs.
P = Price per quintals
V = Variable cost per quintal.

Value addition

It reflected the difference between price for which a firm sold its product and the cost incurred on the purchased inputs by it. This difference represented the value addition by the productive activities of the firm.
Value addition = Selling price of the product - Cost of the total inputs.

Results and Discussion

Classification of chilli processing units on the basis of their installed processing capacity

The selected chilli processing units were classified on the basis of their installed processing capacity and presented in Table 1.

Table 1: Classification of chilli processing units on the basis of installed processing capacity

Sr. No.	Size Wise Group of unit	No. of Sample	Installed Capacity (Qt/day)	Actual processing Capacity (Qt/day)	Capacity Utilization (%)
1	Small	7	10	8	86.76
2	Medium	7	25	22	89.02
3	Large	7	47	43	91.46

As per the Table 1, it is observed that, the actual processing capacity utilized by small, medium and large sized chilli processing units were 86.76 percent 89.02 percent and 91.46 percent respectively by comparing the installed processing capacity per day. Installed capacity was not fully utilized by chilli processing units because of their storage facility, unavailability of credit facilities, raw material and inadequate supply of skilled labour and a common factor of irregular power supply, applicable to all size of processing units.

Annual Recovery of dry chilli powder by processing unit

The details of recovery of dry powder by processing units are presented in Table 2.

Table 2: Annual Recovery of dry chilli powder by processing unit (Qtl./Unit)

Particulars	Small Units	Medium Units	Large Units	Overall Units
Plant Operated (Days/Yr.)	280	274	289	281
Raw Material Processed (chilli)	2356.43	6034.14	12372.14	6920.90
Chilli Powder	1987.14 (84.33)	5227.86 (86.64)	10789.29 (87.21)	6001.43 (86.06)
Moisture Losses	132.14 (5.61)	282.14 (4.68)	540.86 (4.37)	318.38 (4.88)
Pedicel and Stalk Losses	174.29 (7.40)	429.27 (7.11)	872.14 (7.05)	491.90 (7.19)
Loss in Grinding and Handling the Chilli powder	62.86 (2.67)	94.88 (1.57)	169.86 (1.37)	109.19 (1.87)
Total Wastage	369.29 (15.67)	806.29 (13.36)	1582.86 (12.79)	919.48 (13.94)

(Figure in Parentheses indicate percentage to annual quantity chilli processed)

The details of recovery from processing of dry chilli by processing units are presented in Table 2. The Table indicated that large processing units recovered 87.21 percent from their total dry chilli processed, which is marginally higher compared to medium (86.64 percent) and small (84.33 percent) units. The loss in grinding and handling the chilli powder was more in small (2.67 percent) units followed by medium (1.57 percent) and large (1.37 percent) units. Losses of chilli due to moisture in small (5.61 percent), medium (4.68 percent) and large (4.37 percent) sized processing unit and the losses of chilli by pedicel and stalk was marginally more in small (7.40 percent) compared to medium (7.11 percent) and large (7.05 percent) dry chilli processing units.
The total wastage of chilli was considerably high in small (15.67 percent), followed by medium (13.36 percent) and large (12.79 percent) dry chilli processing units.

Annual average fixed cost of chilli processing unit

As revealed from table 3, the total annual average fixed cost for small, medium and large processing units were Rs. 424984.88, Rs. 1081227.12 and Rs. 2172582.94 respectively. It is observed from small group that, interest rate on fixed capital accounted a larger proportion i.e. 55.45 percent (235671.43) of the total fixed cost followed by permanent labour charges with 20.51 percent (87157.14), depreciation on building with 8.80 percent (37394.41), opportunity cost of land with 5.72 percent (24301.24) and lowest depreciation on furniture 0.92 percent (3918.75).
In medium sized units, interest rate on fixed capitals was main item of fixed cost which accounted 50.42 percent of the total fixed cost followed by permanent labour wages accounting 22.29 percent, depreciation on building accounting 9.25 percent, lowest cost was found in depreciation on furniture i.e. 0.78 percent.
In large group units, interest rate on fixed capital accounted a larger proportion i.e. 47.97 percent (1042251.43) of the total fixed cost followed by permanent labour charges with 24.97 percent (542532.86), depreciation on building with 9.84 percent (213772.68), opportunity cost of land with 6.50 percent (141227.68) and lowest depreciation on furniture 0.83 percent.
The details of the annual fixed cost for small, medium and large chilli processing units are presented in Table 3.

Table 3: Annual average fixed cost of chilli processing unit (Rs./unit)

Sr. No.	Particulars	Small sized processing units	Medium sized processing units	Large sized processing units	Overall sized processing units
1	Depreciation on Building @5%	37394.41 (8.80)	100048.56 (9.25)	213772.68 (9.84)	117071.88 (9.30)
2	Opportunity cost of Land	24301.24 (5.72)	77318.88 (7.15)	141227.68 (6.50)	80949.27 (6.46)
3	Depreciation on Furniture @10%	3918.75 (0.92)	8432.54 (0.78)	18073.81 (0.83)	10141.70 (0.84)
4	Depreciation on Machineries @10%	19284.76 (4.54)	44142.86 (4.08)	85867.35 (3.95)	49764.99 (4.19)
5	Permanent Labour Wages	87157.14 (20.51)	240998.57 (22.29)	542532.86 (24.97)	290229.52 (22.59)
6	Taxes, licence fee and insurance premium	17257.14 (4.06)	65142.86 (6.02)	128857.14 (5.93)	70419.05 (5.34)
7	Interest on fixed capital @12%	235671.43 (55.45)	545142.86 (50.42)	1042251.43 (47.97)	607688.57 (51.28)
8	Total fixed cost	424984.88 (100)	1081227.12 (100)	2172582.94 (100)	1226264.98 (100)
9	Qty. of raw material Processed (chilli) (Qtl/Yr)	2356.43	6034.14	12372.14	6920.90
10	Fixed cost per Quintal	185.14	179.78	176.87	180.60

(Figures in parentheses indicate percentage to average fixed cost of chilli processing unit)

Annual average variable cost of chilli processing unit

As evident from the Table 4, that annual average variable cost incurred for small, medium and large units w4 Rs. 43831612.95, Rs. 112623615.03, and Rs. 233440525.41 respectively. For overall annual average variable cost incurred in chilli processing was Rs. 129965251.13.

The total variable cost per quintal incurred for chilli was Rs. 18584.69, Rs.18715.29, and Rs. 18879.58 for small, medium, large sized units respectively. At overall was Rs. 18726.52.

Table 4: Annual average variable cost of chilli processing unit (Rs./Unit)

Sr. No.	Particulars	Small sized processing units	Medium sized processing units	Large sized processing units	Overall sized processing units
1	Raw material cost (Dry Chilli)	39759692.23 (90.71)	102130033.07 (90.68)	211793502.19 (90.73)	117894409.16 (90.71)
2	Casual labour charges	14357.14 (0.03)	41142.86 (0.04)	77571.46 (0.03)	44357.15 (0.03)
3	Electricity charges	27285.71 (0.06)	79571.43 (0.07)	123714.31 (0.03)	76857.15 (0.06)
4	Repair and maintenance	12714.29 (0.03)	37557.14 (0.03)	59642.87 (0.03)	36638.10 (0.03)
5	Edible oil cost & lubricant	14142.91 (0.03)	43714.29 (0.04)	73071.45 (0.03)	43642.88 (0.03)
6	Water charges	6071.43 (0.01)	24571.44 (0.02)	43128.59 (0.02)	24590.49 (0.02)
7	Telephone & Telegraph charges	3614.29 (0.01)	9871.49 (0.01)	14142.89 (0.01)	9209.52 (0.01)
8	Other miscellaneous charges as gunny bag, labelling & stitching	9042.87 (0.02)	18642.86 (0.02)	33885.71 (0.01)	20523.81 (0.02)
9	Interest on Working Capital @10%	3984692.09 (9.09)	10238510.46 (9.09)	21221865.95 (9.09)	11815022.83 (9.09)
10	Total variable cost (Rs.)	43831612.95 (100)	112623615.03 (100)	233440525.41 (100)	129965251.13 (100)
11	Total raw material processed (Chilli) (Qtl.)	2356.43	6034.14	12372.14	6920.90
12	Total variable cost (Rs./Qtl.)	18584.69	18715.29	18879.58	18726.52

(Figures in parentheses indicate percentage to total variable cost of chilli processing unit)

The average variable cost for chilli products as states above of small, medium and large processing units increase with increase sized of units because the total of chilli processed was higher in large sized units as compare small and medium sized units as raw material required every year its cost changed according to level of production so it is consider as variable cost.

It was observed from the table that, the expenditure incurred on the purchase of raw material was the main item of variable cost which constituted 90.71 percent, 90.68 percent and 90.73 percent in small, medium and large sized units of processing respectively.

Per quintal total cost and returns of processing of chilli

It is revealed from Table 5 that, the total cost processing of chilli is highest in large sized units was Rs. 19176.15 followed by medium and small sized unit accounted as Rs. 19012.65 and Rs. 18883.98 respectively. The overall units cost for processing of chilli was Rs. 19024.26. Among the total cost in overall units, the variable cost contribution (98.43 percent), because of highest prices of raw material paid by entrepreneur in the market. In small, medium and large sized units the variable cost contributes 98.42 percent, 98.44 percent and 98.45 percent respectively.

It is evident from Table 5 that, the per quintal gross returns from chilli powder in small, medium and large sized was Rs. 23725.57, Rs. 24237.09 and Rs. 24743.25 respectively. The overall gross returns for all sized unit was Rs. 24235.30.

The net returns obtained Rs. 4841.59, Rs. 5224.44 Rs. 5567.09 for small, medium and large sized chilli processing units respectively. The average net returns Rs. 5211.04 from chilli processing unit. The cost-benefit ratio for small, medium and large chilli processing units were 1:1.26, 1:1.28 and 1:1.29 respectively.

The total cost of processing of chilli (including per quintal marketing cost) incurred by chilli processing owner is presented in table 5.

Table 5: Per quintal total cost and returns of processing of chilli (Rs./Qtl.)

Sr. No.	Particulars	Small sized processing units	Medium sized processing units	Large sized processing units	Overall sized processing units
A	**Chilli Powder (Per quintal of dry chilli) Costs**				
	1) Fixed Cost	185.14 (0.98)	179.78 (0.95)	176.87 (0.92)	180.60 (0.95)
	2) Variable Cost	18584.69 (98.42)	18715.29 (98.44)	18879.58 (98.45)	18726.52 (98.43)
	3) Marketing Cost	114.15 (0.60)	117.57 (0.62)	119.70 (0.63)	117.14 (0.62)
	4) Total Cost	18883.98 (100)	19012.65 (100)	19176.15 (100)	19024.26 (100)
B	**Chilli Powder (Per quintal of dry chilli) returns**				
	1) Chilli Powder recovery (kg)	84.33	86.64	87.21	86.06
	2) Price (Rs/Kg)	281.43	279.71	283.76	281.63
	3) Gross returns	23725.57	24237.09	24743.25	24235.30
C	Net return (B-C)	4841.59	5224.44	5567.09	5211.04
D	Benefit-cost ratio (B-C ratio)	1.26	1.28	1.29	1.27

(Figures in parentheses indicate percentage to total cost and returns of chilli processing unit)

Break- even analysis for chilli processing unit

The break-even analysis in physical quantity for chilli processing units is presented in Table 6.

Table 6: Break- even analysis in physical quantity for chilli (Qt./unit)

Sr. No.	Particulars	Total fixed cost in Rs.	Price per quintal (Rs.)	Variable cost per quintal (Rs.)	Break even quantity
1	Small	424984.88	23725.57	18584.69	82.67
2	Medium	1081227.12	24237.09	18715.29	195.81
3	Large	2172582.94	24743.25	18879.58	370.52
4	Overall	1226264.98	24235.30	18726.52	222.60

The average break-even point for chilli processing unit was 222.60 qtl., consisting of qtl. for small sized units was 82.67, for medium sized of chilli processing unit was 195.81 qtl. and 370.52 qtl. for large sized of chilli processing units.

The annual fixed cost of small sized units was Rs. 424984.88, for medium sized units was Rs. 1081227.12 and large sized units was Rs. 2172582.94. At overall, the average annual fixed cost was Rs 1226264.98. The price per quintal of small sized units was Rs.23725.57, for medium sized was Rs. 24237.09 and large sized unit was 24743.25. The per quintal variable cost was 18584.69 for small sized units, Rs.18715.29 for medium sized units and large sized units was Rs. 18879.58.

Break-even analysis in monetary value for chilli

The break-even analysis in monetary value for chilli is presented in Table 7. The average break-even point for chilli processing unit was Rs. 5394823.93, consisting for small sized unit was 1961337.44, for medium sized units was Rs. 4745882.99 and Rs. 9167778.73 for large sized unit.

The annual fixed cost of small sized units was Rs. 424984.88, medium sized units was Rs. 1081227.12 and large sized units was Rs. 2172582.94. At overall, the average annual fixed cost was Rs 1226264.98. The price per quintal of small sized units was Rs. 23725.57, for medium sized was Rs. 24237,09 and large sized unit was Rs. 24743.25. The per quintal variable cost was Rs. 18584.69 for small sized units, Rs.18715.29, for medium and large sized units was Rs. 18879.58.

Table 7: Break-even point in monetary value for chilli (Rs. /unit)

Sr. No.	Particulars	Total fixed cost in Rs.	Price per quintal (Rs.)	Variable cost per quintal	Break even
1	Small	424984.88	23725.57	18584.69	1961337.44
2	Medium	1081227.12	24237.09	18715.29	4745882.99
3	Large	2172582.94	24743.25	18879.58	9167778.73
4	Overall	1226264.98	24235.30	18726.52	5394823.93

Value addition in chilli

The value added due to processing of chilli value addition over the raw material was calculated and presented in Table 8.

Table 8: Value addition in chilli (Rs./Qtl.)

Sr. No.	Particulars	Small sized processing units	Medium sized processing units	Large sized processing units	Overall sized processing units
1	Cost of raw material (Dry Chilli)	16857.17	16971.45	17128.60	16985.74
2	Processing cost	1912.66	1923.62	1927.85	1921.38
3	Gross return	23725.57	24237.09	24743.25	24235.30
4	Value addition	4955.74	5342.01	5686.79	5328.18

It is revealed from Table 8 that, the cost of raw material were Rs. 16857.17, Rs. 16971.45, Rs. 17128.60 in small, medium and large sized processing unit respectively. The processing cost were Rs. 1912.66, Rs. 1923.62, Rs. 1927.85 in small, medium and large sized processing unit respectively. The per quintal gross returns from chilli powder in small, medium and large sized was Rs. 23725.57, Rs. 24237.09 and Rs. 24743.25 respectively. The value addition in chilli in small, medium and large sized units were Rs. 4955.74, Rs. 5342.01 and Rs. 5686.79 respectively.

Conclusions

The break-even point in physical quantity for chilli processing at overall level was 222.60 qtl. The break-even point in monetary value for chilli processing at overall level was Rs. 5394823.93. The per quintal value addition in chilli was more in large chilli processing unit (Rs. 5686.79) followed by medium (Rs. 5342.01) and small processing unit (Rs. 4955.74).

References

1. Bhagwat KD, Shelke RD. Value addition by agro processing industries in various pulse crops of dal mill in Marathwada region of Maharashtra state. International J of Commerce and Business Management. 2013;5(2):200-202.
2. Navadkar Kamble DSBT, Kalhapure SP. Value addition in pulses in western Maharashtra. Guj. J Ext. Edu. special issue of national seminar; c2017. p. 127-132.
3. Panigrah AK, Mishra S, Mohapatra U. Economics of small-scale rice mill in Ganjam district of Odisha. 2019;8(2):1579-1589.
4. Vennila M, Murthy C. Economics of production and processing of Pigeon pea in Karnataka. The Pharma Innovation Journal. 2021;SP-10(10):1056-1060.