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Cost benefit analysis of paddy straw mushroom in Bilaspur district of Chhattisgarh

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Abstract
The study was conducted in Bilaspur district of Chhattisgarh during the year 2022-23 to 2023-24, had analysed the cost, return and break-even analysis of paddy straw mushroom on different categories of farmers. Bilaspur district was selected purposively. The primary data was collected from the mushroom producers through personal interviews by survey method with the help of a well-prepared schedule and questionnaire for the mushroom production The overall total cost incurred in cultivating paddy straw mushroom was Rs. 83.52 per kg which was sold at Rs. 300 per kg which gave gross income of 300 per kg and 199.94 Rs per kg of net return. The overall break-even point for oyster mushroom production was 0.18 kg.

Keywords: Cost, return and break-even point

1. Introduction
In numerous states, including Haryana, Uttar Pradesh, Punjab, Uttarakhand, Himachal Pradesh, and Tamil Nadu, growing mushrooms is currently one of the main sources of revenue for farmers. Punjab leads the Indian mushroom output with 14%, followed by Uttarakhand, Maharashtra, Haryana, and Tamil Nadu. Currently, India produces about 0.13 million tons of mushrooms annually. Between 2010 and 2017, the Indian mushroom industry experienced an average annual growth rate of 4.3%. Out of the total mushroom produced, white button mushroom share is 73% followed by oyster mushroom (16%), paddy straw mushroom (7%) and milky mushroom (3%). Compared to other vegetables; per capita consumption of mushrooms in India is meagre and data indicates it is less than 100 grams per year. Major mushroom growing regions were in the state of Chhattisgarh. In the plain zone of the state, there were many mushroom retailers and wholesalers in the districts of Bilaspur and Raipur, and particularly skilful and productive mushroom growers in the Mahasamund district. Several mushroom species were found in the Baster Plateau zone, and yields were high. The present study was conducted in the district of Bilaspur the following objective:

- To analyse the cost, return and break-even point of paddy straw mushroom on different categories of farmers

2. Methodology
The study was carried out in Bilaspur district of Chhattisgarh. Primary data were collected from the farmers particularly engaged in mushroom cultivation in the area. The study incorporated questionnaires as a tool to engage with the farmers.

2.1 Cost, return and break-even analysis
Standard cost of production calculation was followed items of different cost incurred:

Variable Cost

- Labour cost
- Spawn cost
- Paddy straw (Bhusha) cost

- Poly bags cost
- Chemicals (Bavistin, formalin, etc.)
- Irrigation charge
- Manure/FYM
- Electricity charge
- Transporting charge
- Interest on working capital

Fixed Cost

- Structure prepared (mushroom growing house)
- Equipment's
- Depreciation on fixed capital
- Interest on fixed capital

Break-even point (BEP) of output was calculated by using the following formula:

BEP = TFC/ (ASP – AVC)

Were,
TFC = Total fixed cost
ASP = Average sale price of mushroom (Rs/kg)
AVC = Average variable cost (Rs/kg

3. Results and Discussion

3.1 Cost of cultivation of paddy straw mushroom

The cost analysis of paddy straw mushroom cultivation shows significant differences between small, medium, and large farmers. Small farmers incurred the lowest material cost for straw preparation at Rs. 17.09/kg, while large farmers had the highest at Rs. 21.00/kg. Medium farmers fell in between at Rs. 18.59/kg. The overall material cost is Rs. 18.52/kg, constituting approximately 18.50 per cent of the total cost. Labour charges for straw preparation increase with the scale of farming, ranging from Rs. 1.67/kg for small farmers to Rs. 2.50/kg for large farmers, with an overall of Rs. 2.00/kg.

The cost for chemicals such as formaline, bavistin and calcium carbonate was Rs. 4.59/kg for small farmers and Rs. 6.25/kg for large farmers, with an overall of Rs. 5.25/kg. Labour charges for substrate treatment are relatively consistent, overall Rs. 0.99/kg.

The cost of spawn was lowest for small farmers at Rs. 8.51/kg and highest for large farmers at Rs. 10.67/kg, with an overall of Rs. 9.37/kg. Labour charges for spawn mixing also increase with scale, from Rs. 1.67/kg for small farmers to Rs. 2.50/kg for large farmers, overall Rs. 2.00/kg.

Labour Charges for Irrigation, these charges ranged from Rs. 1.01/kg for small farmers to Rs. 1.67/kg for large farmers, with an overall of Rs. 1.25/kg. Labour charges for protection were consistent, overall Rs. 0.99/kg across all scales.

Labour charges for picking were significantly higher for large farmers Rs. 4.17/kg compared to small farmers Rs. 1.75/kg, with an overall of Rs. 2.63/kg. This indicated a higher labour intensity in large farmers.

In miscellaneous costs gunny bags costs ranged from Rs. 0.42/kg for small farmers to Rs. 0.84/kg for large farmers, overall Rs. 0.58/kg. Broom costs increase from Rs. 0.17/kg for small farmers to Rs. 0.42/kg for large farmers, overall Rs. 0.26/kg. Electricity costs ranged from Rs. 0.67/kg for small farmers to Rs. 1.09/kg for large farmers, overall Rs. 0.85/kg. Transportation costs range from Rs. 1.26/kg for small farmers to Rs. 2.50/kg for large farmers, overall Rs. 1.69/kg. Labour charges for miscellaneous cost ranged from Rs. 1.00/kg for small farmers to Rs. 1.84/kg for large farmers, with an overall of Rs. 1.29/kg.

The total variable cost ranged from Rs. 43.14/kg for small farmers to Rs. 60.28/kg for large farmers, with an overall of Rs. 49.58/kg. Large farmer face higher variable costs, primarily due to increased labour and material expenses.

For fixed cost in preparing structure costs ranged from Rs. 25.00/kg for small farmers to Rs. 41.67/kg for large farmers, overall Rs. 31.67/kg. For purchasing equipment's costs ranged from Rs. 10.42/kg for small farmers to Rs. 16.67/kg for large farmers, overall Rs. 12.61/kg.

Depreciation and interest costs also increase with the scale of farming, from Rs. 3.54/kg and Rs. 1.42/kg for small farmers to Rs. 5.83/kg and Rs. 2.33/kg for large farmers, respectively. The total fixed cost ranged from Rs. 40.38/kg for small farmers to Rs. 66.51/kg for large farmers, with an overall of Rs. 50.47/kg.

The total cost of cultivation, which includes both variable and fixed costs, ranged from Rs. 83.52/kg for small farmers to Rs. 126.79/kg for large farmers, with an overall of Rs. 100.06/kg.

The analysis revealed that both variable and fixed costs increased with the scale of operation. Large farmers incurred higher costs due to increased labour, material, and fixed costs. While large farmers may benefit from higher production volumes, their cost efficiency did not necessarily improve because of the proportional increase in various cost components.

Table 1: Cost of cultivation of Paddy straw mushroom (Rs./Kg.)

S. No.	Particulars	Small	Medium	Large	Overall
A	**Variable Cost**				
1	**Straw preparation**				
	a) Material cost	17.09 (20.46)	18.59 (18.12)	21.00 (16.57)	18.52 (18.50)
	b) Labour charges	1.67 (2.00)	2.09 (2.03)	2.50 (1.97)	2.00 (2.00)
2	**Substrate treatment**				
	a) Chemical (Formaline, Bavistin, Calcium carbonate)	4.59 (5.49)	5.42 (5.28)	6.25 (4.93)	5.25 (5.25)
	b) Labour charges	0.84 (1.00)	1.01 (0.98)	1.25 (0.99)	0.99 (0.99)
3	**Spawn mixing**				
	a) Spawn	8.51 (10.18)	9.59 (9.35)	10.67 (8.42)	9.37 (9.37)
	b) Labour charges	1.67 (2.00)	2.09 (2.03)	2.50 (1.97)	2.00 (2.00)
4	**Irrigation**				
	a) Labour charges	1.01 (1.21)	1.26 (1.22)	1.67 (1.32)	1.25 (1.25)
5	**Protection**				
	a) Labour charges	0.84 (1.00)	1.01 (0.98)	1.26 (0.99)	0.99 (0.99)
6	**Picking**				
	a) Labour charges	1.75 (2.10)	2.67 (2.60)	4.17 (3.29)	2.63 (2.63)
7	**Miscellaneous**				
	a) Gunny bags	0.42 (0.51)	0.59 (0.58)	0.84 (0.66)	0.58 (0.58)

	b) Broom	0.17 (0.20)	0.25 (0.25)	0.42 (0.33)	0.26 (0.26)
	c) Electricity	0.67 (0.80)	0.92 (0.90)	1.09 (0.86)	0.85 (0.85)
	d) Transportation	1.26 (1.50)	1.67 (1.63)	2.50 (1.97)	1.69 (1.69)
	e) Labour charges	1.00 (1.20)	1.26 (1.22)	1.84 (1.45)	1.29 (1.29)
	Total material cost	32.70 (39.15)	37.03 (36.10)	42.77 (33.74)	36.52 (36.50)
	Total labour cost	8.78 (10.51)	11.37 (11.08)	15.19 (11.98)	11.16 (11.15)
	Sub total	41.48 (49.66)	48.39 (47.18)	57.96 (45.72)	47.68 (47.65)
8	Interest on working capital @ 4%	1.66 (1.99)	1.94 (1.89)	2.32 (1.83)	1.91 (1.91)
	Total variable cost	43.14 (51.65)	50.33 (49.06)	60.28 (47.55)	49.58 (49.55)
B.	**Fixed Cost**				
1	Structure prepared (mushroom growing house)	25.00 (29.94)	33.34 (32.50)	41.67 (32.87)	31.67 (31.65)
2	Equipment's	10.42 (12.47)	12.50 (12.19)	16.67 (13.15)	12.61 (12.60)
	Sub total	35.42 (42.41)	45.84 (44.68)	58.34 (46.01)	44.28 (44.25)
3	Depreciation on fixed capital@10%	3.54 (4.24)	4.58 (4.47)	5.83 (4.60)	4.43 (4.43)
4	Interest on fixed capital @4%	1.42 (1.70)	1.83 (1.79)	2.33 (1.84)	1.77 (1.77)
	Total fixed cost	40.38 (48.35)	52.25 (50.94)	66.51 (52.45)	50.47 (50.45)
C	Total cost (A+B)	83.52 (100.00)	102.58 (100.00)	126.79 (100.00)	100.06 (100.00)

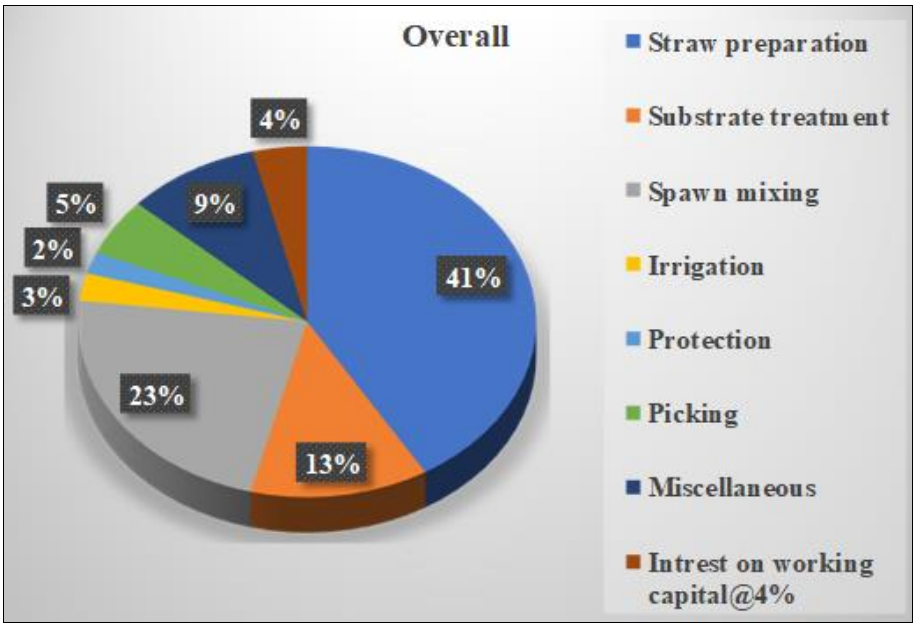

Fig 1: Cost of cultivation of paddy straw mushroom

3.2 Cost and return of paddy straw mushroom

Total cost incurred in cultivating paddy straw mushroom was Rs. 83.52 per kg., Rs. 102.58 per kg. and Rs. 126.79 per kg. For small, medium and large-scale farmers respectively. Further, small, medium and large-scale farmers sold paddy straw mushroom at Rs. 300 per kg. from each category of farmer.

The farmer received gross income of 300 Rs. Per kg. The net return for small, medium and large-scale farmers was Rs. 216.48 per kg., Rs. 197.42 per kg. and Rs. 173.21 per kg. Respectively. Input to output ratio was calculated as 3.59, 2.92 and 2.37 unit per unit of input.

The overall total cost incurred in cultivating paddy straw mushroom was Rs. 83.52 per kg which was sold at Rs. 300 per kg which gave gross income of 300 per kg and 199.94 Rs per kg of net return. Input-output ratio was found to be 3.09 unit per unit of input.

Table 2: Cost and return of paddy straw mushroom on the sample households (Rs./kg.)

Particulars	Small	Medium	Large	Overall
Total Cost	83.52	102.58	126.79	100.06
Selling price	300.00	300.00	300.00	300.00
Gross income	300.00	300.00	300.00	300.00
Net return	216.48	197.42	173.21	199.94
Input - Output ratio	1:3.59	1:2.92	1:2.37	1:3.09

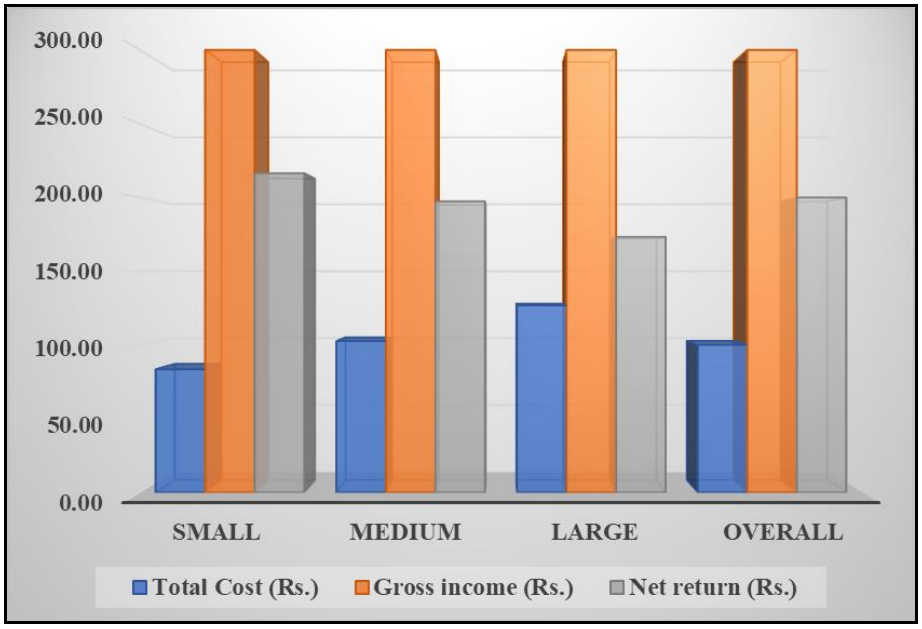

Fig 2: Cost and return of paddy straw mushroom

3.3 Break-even analysis for paddy straw mushroom

The results of break-even analysis had been presented in Table 3. The overall break-even point for paddy straw mushroom production was 0.20 kg. The break-even point of paddy straw mushroom was obtained at 0.16 kg., 0.21 kg. and 0.28 kg. for small, medium and large farmers respectively. The farmers were at no profit no loss situation under given inputs cost and output price structure.

Table 3: Break-even analysis for paddy straw mushroom (Rs./kg.)

Particulars	Small	Medium	Large	Overall
Total fixed cost	40.38	52.25	66.51	50.47
Total variable cost	43.14	50.33	60.28	49.58
Selling price	300.00	300.00	300.00	300.00
Break-even point	0.16	0.21	0.28	0.20

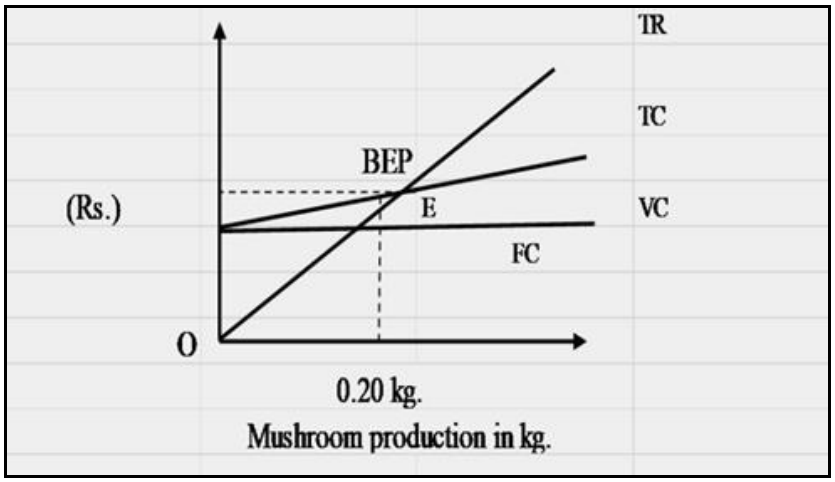

Fig 3: Break-even analysis for overall farmers

4. Conclusions

The total variable cost ranged from Rs. 43.14/kg for small farmers to Rs. 60.28/kg for large farmers, with an overall of Rs. 49.58/kg. Large farmer face higher variable costs, primarily due to increased labour and material expenses. The total fixed cost ranged from Rs. 40.38/kg for small farmers to Rs. 66.51/kg for large farmers, with an overall of Rs. 50.47/kg. The total cost of cultivation, which includes both variable and fixed costs, ranged from Rs. 83.52/kg for small farmers to Rs. 126.79/kg for large farmers, with an overall of Rs. 100.06/kg. The overall total cost incurred in cultivating paddy straw mushroom was Rs. 83.52 per kg which was sold at Rs. 300 per kg which gave gross income of 300 per kg and 199.94 Rs per kg of net return. The overall break-even point for paddy straw mushroom production was 0.20 kg. The break-even point of paddy straw mushroom was obtained at 0.16 kg., 0.21 kg. and 0.28 kg. for small, medium and large farmers respectively. The farmers were at no profit no loss situation under given inputs cost and output price structure.

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