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Cost -Return Analysis of Mushroom Enterprise in Punjab and Haryana

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ABSTRACT

The farmers of Punjab and Haryana have undertaken mushroom as a subsidiary occupation for enhancing their income. Therefore, the present study was undertaken with the objective of estimating the cost and returns associated with mushroom as a subsidiary agricultural enterprise under the integrated farming system (IFS) model of crop + dairy + mushroom. The fixed cost, variable cost, gross returns and net returns were estimated using the primary data collected by the 60 farmers from Punjab and Haryana i.e., 30 respondents from each state practising crop + dairy + mushroom IFS model. The study has indicated that the mushroom enterprises were providing a net return of Rs. 30.50/kg and Rs. 29.76/kg in Punjab and Haryana, deeming it to be a highly profitable venture across the farm sizes. However, mushroom enterprise requires heavy initial investment therefore proper credit and marketing facilities should be made available to mushroom growers to promote mushroom cultivation in the study areas.

Keywords: Mushroom Production, Punjab, Haryana, Total Cost, Net Return

JEL Classification: C81, D24, Q10

Introduction

Mushroom offers several health benefits hence, it is considered as next generation healthy food as it acts as a natural bioactive ingredient and has the potential for taking the food processing industry by storm. It possesses all the attributes that is required in a low-caloric functional food i.e., low fat content, high quality proteins, dietary fibres and nutraceuticals. Raising animals for meat purposes has severe detrimental effect on environment hence, incorporation of mushroom in muscle foods can serve fruitful as its fibrous texture mimics the texture of meat and offers unique umami flavour and taste (Badalyan, 2012; Wasser, 2014; Guinard *et al*, 2016; Kumar *et al*, 2017; Summers *et al*, 2017; Spencer and Guinard, 2018; and He *et al*, 2020). Since ancient times, mushrooms have been consumed for extending life expectancy and promoting health benefits in Asian countries and in India, they are extensively used in ayurveda and folk medicine (Adhikari, 1981; Jitendra and Vaidya, 2000; Halpern and Miller, 2002; Veljović and Krstić, 2020). In India, mushroom production is mainly dominated by button mushroom (73%) followed by oyster mushroom with a share of 16 per cent (Sharma *et al*, 2017). The per capita consumption of mushroom in India (30 g/annum) is on the lower end in comparison to that of the western countries (4000 g/annum) (Wakchaure, 2011). Hence, awareness about the health and dietary benefits of mushroom needs to be imparted through focused extension research and services on mushroom (Shirur and Shivalingegowda, 2015). The consumers in India have lately developed an extra liking for mushroom as vegetable thereby enhancing its mushroom demand and supply. Therefore, government and cultivators are promoting mushroom cultivation, keeping in view of the increasing demand of mushroom due to globalization and are helping in opening avenues for export as it has huge demand in international markets (Raman *et al*, 2018). During the COVID-19 lockdown period, people developed interest in mushroom which lead to an increase in its consumption further promoting its production and processing (Singh *et al*, 2022). In 2020-21, India's mushroom production stood at 243,000 metric tonne (MT) and was estimated to increase upto 2.59 lakh MT during 2021-22. Haryana and Punjab were estimated to be the 4th and 5th highest producing states in India during 2021-22 with respective production of 21.20 MT and 19.15 MT (Agricoop.nic.in). Mushroom enterprise is truly beneficial as it provides additional income. The previous studies have confirmed that mushroom production is definitely a profitable enterprise as in the state of Haryana, mushroom was providing a net income of Rs. 14.15/kg and

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in Bihar, mushroom growers received an yearly net income of Rs. 422.90/sq. m. thereby yielding a benefit-cost ratio of 1.31 (Singh *et al*, 2010; Kumari *et al*, 2022). The present study was undertaken with the objective of estimating the cost and returns associated with mushroom as a secondary agricultural enterprise under the integrated farming system (IFS) model of crop + dairy + mushroom.

Data Sources and Methodology

The study area was purposively selected as Patiala district from Punjab and Sonepat and Panipat districts from Haryana as these districts are the forerunners in mushroom production in their respective states. A list of Integrated Farming System practising farmers with mushroom as sub-enterprise was received from Punjab Agricultural University,

Table 1: Socio-economic profile of the sample farmers

Particulars	Categories	Respondents from Punjab	Respondents from Haryana
Age- group (in years)	20 to 30	4	7
	30 to 40	6	8
	40 to 50	13	10
	More than 50	7	5
	Total	30	30
Educational status	Illiterate	2	8
	Primary school	7	8
	Middle school	9	6
	Matriculation	7	6
	10+2 and above	5	2
	Total	30	30
Occupational status	IFS	23	26
	IFS + Service	5	3
	IFS + Business	2	1
	Total	30	30
Family composition (members)	Less than 4	3	2
	4 to 6	9	6
	6 to 8	12	12
	More than 8	6	10
	Total	30	30
Farming experience (in years)	Less than 10	2	3
	10 to 20	16	19
	20 to 30	7	5
	30 to 40	5	3
	Total	30	30
Operational area under cultivation	Marginal (<1 ha)	2	—
	Small (1 to 2 ha)	12	14
	Semi-medium (2 to 4 ha)	7	8
	Medium (4 to 10 ha)	7	8
	Large (>10 ha)	2	—
	Total	30	30
Major sources of finance for farmers	Financial Institutions	27	24
	Non-financial sources	3	6
	Total	30	30

Ludhiana and ICAR-National Dairy Research Institute, Karnal. Out of which, thirty farmers were randomly selected from both the states, totalling the overall respondents as sixty. The respondents were interviewed from both the states and data were collected during 2020-21 on several cost aspects of mushroom production to estimate the cost and returns associated with the cultivation of mushroom in the states of Punjab and Haryana. The concepts computed in the current study were capital investments, recurring expenditure (variable cost), non-recurring expenditure (fixed cost), total cost, gross returns, returns to fixed farm responses and net returns.

Total cost= variable cost + fixed cost

Gross returns = Total mushroom produced * average price received

Returns to fixed farm responses= Gross returns - variable cost

Net returns = Gross returns - total cost

Results and Discussion

The collected data on mushroom cultivation was subjected to socio-economic and various cost and returns analysis. It was found that the majority of the respondents from Punjab and Haryana belonged to the age-group of 40-50 years and more than 50 years, respectively. The average age of farmers was found to be 50.1 years throughout the country (Agriculture census, 2015-16). Most rural youth were not inclined to opt agriculture as their occupation and rampant migration to cities is threatening the future of agriculture and food security. This is leading to an alarming situation that who will manage farming in the future, as only 1.2 per cent of the working youth aspire to become farmers (Annual Status of Education Report, 2018).

Around 40 per cent of respondents from Punjab had a degree higher than secondary school while for Haryana, it was 26.67 per cent only. It was also observed that majority of the farmers were dependent only on agriculture for their earnings from both the states. Both the states majorly had family composition of 6 to 8 members and possessed farming experience of 10 to 20 years. However, maximum farmers with IFS model of crop + dairy + mushroom belonged to the category of small farmers with 1 to 2 ha area under farming of which average area under mushroom production was found to be 853.18 sq. m. for Punjab and 872.88 sq. m. for Haryana. Since, mushroom production required heavy investments hence, all the respondents were observed to be availing loans and maximum of them were done from institutional sources in both the states.

The capital invested on the sample mushroom farms for Punjab was estimated to be Rs. 2.95 lakhs, the major component of which was directed towards the construction of shed made exclusively for mushroom cultivation. Since, mushroom cultivation was carried out inside a well-built, ventilated shed with lots of shelves, the construction of which required adequate investment. For Haryana, capital investment was found to be around Rs. 1.86 lakhs. The

Table 2: Capital investment on sample mushroom farms of Punjab and Haryana

(per farm)

Particulars	Punjab		Haryana	
	No.	Present value (Rs.)	No.	Present value (Rs.)
Shed for mushroom cultivation		258097		160651
Polythene sheet (kg)	102.47	12297	209.86	25183
Subtotal (A)		265550		185834
Equipment				
Spray pump	2.39	1194	3.03	1514
Motor pump	1.09	2714	1.07	2667
Submersible pump	1.44	18920	2.70	94500
Pipe (feet)	200.36	3635	630.09	13399
Drum	1.69	1585	1.83	1711
Weighing machine	1.80	1080	2.06	1235
Other expenses*	32.15	8084	34.44	8584
Sub-total (B)		29097		123610
Grand total (A+B)		294647		309444

**Other expenses include cost of buckets, crates, picking baskets, tub, fork, punja, augour, and sealer.*

Table 3: Non-recurring expenditure incurred on mushroom farms of Punjab and Haryana

(per farm)

Particulars	Punjab	Haryana
Interest on capital investment @ 9 per cent	26518	27850
Depreciation on shed @ 7.5 per cent	19357	12049
Depreciation on polythene sheet @ 20 per cent	2459	5037
Depreciation on equipment @ 10 per cent	2910	12361
Imputed rental value for mushroom cultivation	42659	42659
Total	93904	99955

Table 4: Recurring expenditure (variable costs) incurred on sample mushroom farms of Punjab and Haryana

(per farm)

Particulars	**Punjab**		**Haryana**	
	Qty./ No	**Value**	**Qty./ No**	**Value**
Wheat straw (q)	230	57417 (19.37)	211	52691 (16.90)
Fertilizers (kq)	1023	8696 (2.93)	864	7342 (2.36)
Wheat bran (kg)	703	13343 (4.50)	699	13262 (4.25)
Molasses (kg)	132	1804 (0.61)	132	1804 (0.58)
Gypsum (kg)	1165	2319 (0.78)	1150	2289 (0.73)
Pesticides (kg/lt.)	18	4019 (1.36)	18	3975 (1.28)
Spawn (kg)	276	22107 (7.46)	275	21967 (7.05)
Paper (kg)	102	1521 (0.51)	91	1358 (0.44)
Casing soil	159	10048 (3.39)	140	8672 (2.78)
Pesticides for disinfecting casing soil	89	3573 (1.21)	96	3834 (1.23)
Electricity charges	—	1411 (0.48)		2357 (0.76)
Diesel charges	—	593 (0.20)		1018 (0.33)
Expenditure on labour	—	127696 (43.08)		137255 (44.03)
Misc. charges	—	35323 (11.92)		47050 (15.09)
Interest on variable cost @ 9 per cent p.a. for half period	—	6537 (2.20)		6860 (2.20)
Total	—	296391 (100.00)		311733 (100.00)

Note: Figures in the parentheses indicate percentage of the total

Table 5: Returns from mushroom cultivated on sample mushroom farms of Punjab and Haryana

(Rs. per farm)

S. No.	Particulars	Punjab	Haryana
1.	Total mushroom production (kg)	5635	6045
2.	Average price received (Rs./kg)	98.24	98.13
3.	Gross returns (1*2)	554229	594238
4.	Variable cost	296391	311733
5.	Returns to fixed farm responses (RFFR) (3-4)	257838	282505
6.	Fixed cost	85372	99955
7.	Total cost (4+6)	381763	411688
8.	Net returns (3-7)	172466	182550

respective total expenditure on equipment for mushroom cultivation was worked out to be Rs. 29 thousand and Rs. 1.24 lakhs for mushroom farms in Punjab and Haryana (Table 2). The vast difference in the cost of equipment for the farmers of Punjab and Haryana was observed due to the difference in cost of submersible pumps as the farmers in Haryana were installing pumps with higher horsepower for multipurpose usage.

As per the perusal of Table 3, the fixed cost corresponding to mushroom cultivation in Punjab and Haryana was estimated at Rs. 94 thousand and Rs. 1 lakh, respectively. The major contributor to recurring expenditure was found to be imputed rental value for mushroom cultivation followed by interest on capital investment in both the states.

The recurring expenditure for mushroom cultivation was also estimated for the sample farms of Punjab and Haryana, wherein it was observed that expenditure on labour (43.08% and 44.03%) had the highest share out of the total variable cost followed by wheat straw (19.37% and 16.90%) which is necessary for compost preparation. The total variable expenditure in Punjab was worked out to be Rs. 2.96 lakhs while for Haryana it was estimated as Rs. 3.12 lakhs (Table 4).

The data given in table 5 depicts the total production, average price received, and gross and net returns obtained by selling mushrooms in Punjab and Haryana. In Punjab the gross return was calculated to be Rs. 5.54 lakhs against the average mushroom production of 5,635 kg and the net returns were found to be Rs, 1.72 lakhs after deducting the total cost of Rs. 3.82 lakhs. The mushroom growers of Haryana (Rs. 98.48/kg) were fetching a gross return of Rs. 5.94 lakhs against the average mushroom production of 6,045 kg. The net return was estimated as Rs. 1.83 lakhs after subtracting the total cost of Rs. 4.12 lakhs incurred in mushroom enterprise.

Table 6: Gross and net returns per square meter of mushroom farms in Punjab and Haryana

(Rs. per sq metre)

S. No.	Particulars	Punjab	Haryana
1.	Mushroom Yield (kg per sq. m.)	6.61	6.89
2.	Average price received (Rs. per kg)	98.24	98.13
3.	Gross returns from mushroom	648.88	676.15
4.	Variable cost	347.40	365.89
5.	Fixed cost	100.06	104.97
6.	Total Cost	447.46	470.86
7.	Net returns	201.43	205.29
8.	RFFR	301.49	310.26
9.	Cost of production per kg	67.74	68.37
10.	Variable cost per kg	52.60	53.12
11.	Net Returns per kg	30.50	29.76

While calculating gross and net returns for per sq. m. of bed area spawned for Punjab and Haryana (Table 6), it was found that average mushroom yield was 6.61 kgs, and the average variable cost of mushroom production (kg $^{-1}$) was found to be 52.60 for the mushroom enterprise. The per kg return from mushroom production was observed to be Rs. 30.50. For Haryana, the average mushroom yield was found to be 6.89 kgs with the average total cost of mushroom production (kg $^{-1}$) as Rs. 68.37. The average per kg returns thus generated was Rs. 29.76.

The results of the cost and return analysis for the current study of mushroom cultivation in Punjab and Haryana were in consonance with the research findings of Singh (2010), Singh *et al* (2010) and Kumari *et al* (2022).

Conclusion and Policy Implications

The present study concluded that the cost of mushroom production was Rs. 447.46/sq. m. for Punjab and Rs. 470.86/ sq.m. for Haryana while the respective gross returns from selling mushroom @ Rs.98.24/kg and Rs. 98.13/kg was observed to be Rs. 648.88/sq. m. and Rs. 676.15/sq. m. The respective high net returns of Rs. 201.43 and Rs. 205.29 for sq.m.$^{-1}$ and Rs. 30. 50 and Rs. 29.76 for kg.$^{-1}$ of mushroom in Punjab and Haryana suggests towards profitability of the mushroom enterprise when taken up as primary or subsidiary agricultural operation. However, mushroom enterprise requires heavy initial investment therefore government should give importance for inducing mushroom production in the states along with providing credit and market facilities to mushroom growers.

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