An Economic analysis of production of Button Mushroom in Solan district of Himachal Pradesh, India

ABSTRACT

The present study was carried out to find out the cost of cultivation, various cost concepts and benefit-cost ratio in Solan district of Himachal Pradesh. Here farmers of different categories were selected based on production of button mushroom by them that is small farmers with a production of 1 quintal of mushrooms, medium farmers with a production of 1-3 quintals of mushrooms and large farmers with a production of 3 quintals of mushrooms. The research was undertaken in Solan block of Solan district was selected purposively because it has maximum number of mushroom growers/respondents in the state. Solan district has maximum number of mushroom production in the state. 73 respondents were selected purposively from 4 panchayats of Solan block. The cost of cultivation of mushroom experienced per 100 square feet was maximum by small farmers Rs. 3179.20, then it was by medium farmers Rs. 2735.13 and less cost was experienced by large farmers Rs. 2666.02. The cost concepts for various farm lot per 100 square feet for Cost A1 was Rs. 2288.55 for small lot, Rs. 2046.37 for medium lot and Rs. 1985.69 for large lot. Cost A2 was similar to Cost A1 because farmers were not taking the land from the government for cultivation so, there was no rent paid to government land. Cost A2 was maximum in case of small category (Rs. 2359.2), followed by medium category (Rs. 2115.13) and large category (Rs. 2046.46). Cost

C was greater in case of small growers which was Rs. 3159.2, followed by medium growers Rs. 2715.13 and large growers were incurring minimum cost which was Rs. 2646.46.

The benefit cost ratio was paramount in large category 1:2.9 after that it was medium category 1:2.7 and merest was of small category 1:2.1. The total yield was maximum in large size of farm lots 71.01 kg, followed by medium farms 68.54 kg and minimum yield was in small size farm lots 62.65 kg.

Keywords: Button mushroom, Cost of cultivation, Benefit-Cost ratio, Yield per Kg.

1. Introduction

Button mushroom scientifically known as *Agaricus bisporus* comes under separate groups of organisms known as Fungi. They belong to *Agaricaceae* family. With the absence of chlorophyll, they continue their life on dead and decaying organic materials. Button mushroom has a fruiting body shaped like an umbrella. The cultivation of mushrooms was firstly started in France in 1650. China was the first country to do artificial cultivation of tropical and sub-tropical mushrooms. During the 16^{th} and 17^{th} century Europeans started its cultivation in caves and green houses. Mushrooms are an exemplary source of vitamins, minerals, protein, folic acid and carbohydrates. The white button mushroom is consumed as fresh mushroom or it can be canned and ready to eat as soups, sauces, pickles and other food products. It is the widely consumed variety in domestic and export markets. This variety ranks first in terms of production as well as consumption.

China is the leading producer of mushrooms in the world with total production of 41.127 million tonnes. India ranks sixth in terms of mushroom production with a total production of 0.243 million tonnes (FAOSTAT 2023).

In India, Bihar state produces maximum quantity of mushrooms with a total production of 28.00 tonnes. Himachal Pradesh ranks eight in mushroom production with 14.80 tonnes yearly production (ICAR-DMR).

2. Materials and Methods

In this research, multi stage sampling technique was used for the purposively selection of district, block, panchayats and growers/respondents. Among the 4 selected panchayats total 73 respondents were selected for the study from the Solan block of district Solan. They were selected by using random sampling technique. The respondents were divided into three categories based on the

production they did. 1st group was farmers with less than 1 quintal production, 2nd group was farmers between 1-3 quintal of production and the 3rd group was farmers with more than 3 quintal production. The primary information and the data were gathered by using well-structured questionnaires method. Different questions were framed and asked from each and every respondent like socio economic profile of mushroom growers and various activities involved in cultivation of mushroom. To know the approximate profitability of mushroom farmers benefit-cost ratio was applied. By doing summation of all the costs, the cost of cultivation was calculated like cost of spawn, cost of straw, cost of FYM, cost of fertilizer, cost of irrigation, cost of hired labour. The secondary data was taken from different books, journals and Directorate of Mushroom Research website.

By adding up total fixed cost and total variable cost total cost of cultivation was calculated.The Gross Return was determined by multiplying yield and selling price. Net Return of mushroom farmers was revealed by subtracting cost of cultivation and gross return.

Benefit-cost ratio was determined by dividing gross return by total cost of cultivation. It was 1:2.1 in small size farms which means that by investing one rupee small farmers earned a profit of rupees 2.1.

3. Result and Discussion

Table 1 Complete description of the cultivated land holdings on different size of farm categories

Particulars	Size of farm Group			Sample Average
	Small	Medium	Large	
Size of farm group (in no.)	28	32	13	24.33
Average land holdings (ha)	0.85	2	3.5	2.11

(Total number of respondents = 73)

From table 1 it was estimated that number of mushroom farmers were grouped into various categories like small (28), medium (32) and large (13) respondents respectively. The entirely 73 respondents were selected for the analysis. Out of the total available land with the growers the total cultivated land of small farmers was 0.85hectare, medium farmers cultivated land was 2 hectare

and large farmers were cultivating in 3.5 hectare of land. The total sample average of land cultivated was of about 2.11 hectare.

Table 2 Family members age composition

S. No.	Age Categories	Small	Medium	Large	Sample Average
1	Below 15 years	1 (17.85)	2 (33.33)	2.3 (31.50)	5.3 (28.05)
2	15 – 60 years	2.8 (50)	2.5 (41.66)	4 (54.79)	9.3 (49.20)
3	Above 60 years	1.8 (32.14)	1.5 (25)	1 (13.69)	4.3 (22.75)
Total		**5.6 (100)**	**6 (100)**	**7.3 (100)**	**18.9 (100)**

In table 2 the composition based on their age is shown. Maximum number of members were lying between the age group of 15-60 years, they were 49.20%. The second category was below 15 years (28.05%) and very few number of family members were at the age group of above 60 years (22.75%).

Table 3. Various costs incurred in mushroom cultivation per 100 square feet in different farm groups

S. No.	Particulars of farm operation	Size of farms groups			Sample average
		Small	Medium	Large	
1	Hired Labor	500 (15.72)	400 (14.62)	400 (15.00)	**433.33 (15.15)**
2	Cost of Spawn	120.25 (3.78)	95.5 (3.49)	90.56 (3.39)	**102.10 93.56)**
3	Cost of Straw	435.12 (13.68)	422.25 (15.43)	415.16 (15.57)	**424.18 (14.83)**
4	Cost of Fertilizer	105.05 (3.30)	101.5 (3.71)	95.6 (3.58)	**100.72 (3.52)**
5	Cost of FYM	150.6 (4.73)	145.75 (5.32)	140.6 (5.27)	**145.65 (5.09)**
6	Cost of Bavistin	110.05 (3.46)	105.05 (3.84)	94.6 (3.54)	**103.23 (3.60)**

7	Cost of Irrigation	80.63 (2.53)	65.66 (2.40)	61.11 (2.29)	**69.13** **(2.41)**
8	Cost of Plant Protection	50.11 (1.57)	40.33 (1.47)	40.33 (1.51)	**43.59** **(1.52)**
9	Interest on Working Capital @ 8%	124.14 (3.90)	110.08 (4.02)	107.04 (4.01)	**113.75** **(3.97)**
10	Depreciation on Fixed Capital @ 10%	612.6 (19.26)	560.25 (20.48)	540.25 (20.26)	**571.03** **(19.96)**
11	Rental Value of Owned Land	20 (0.62)	20 (0.73)	20 (0.75)	**20.00** **(0.69)**
12	Land Revenue paid to Govt.	0 (0)	0 (0)	0 (0)	**0.00** **(0)**
13	Interest on Fixed Capital	70.65 (2.22)	68.76 (2.51)	60.77 (2.27)	**66.73** **(2.33)**
14	Imputed Value of family Labor	800 (25.16)	600 (21.93)	600 (22.50)	**666.67** **(23.30)**
Total Cost of Cultivation		**3179.20** **(100)**	**2735.13** **(100)**	**2666.02** **(100)**	**2860.12** **(100)**

Table 3 studied that the maximum cultivation cost was incurred by small farms which was Rs. 3179.20 per 100 square feet and then it was for medium farms which was Rs. 2735.13 per 100 square feet and less cost was incurred by large farms which was Rs. 2666.06 per 100 square feet.

The highest cost was found to be invested on depreciation on fixed capital, hired labour and cost of straw with a sample average of Rs. 571.03, Rs. 433.33 and Rs. 424.18 respectively.

The land revenue paid to the government was zero for all the farm categories because no land was taken on rent for the cultivation of mushroom. Rental value of owned was Rs. 20 per 100 square feet for all the three farm groups.

Table 4 Cost concepts for different farm lots

S. No.	Cost Concepts	Size of Farm groups			Sample Average
		Small	Medium	Large	
1	Cost A1	2288.55	2046.37	1985.69	2106.87
2	Cost A2	2288.55	2046.37	1985.69	2106.87
3	Cost B	2359.2	2115.13	2046.46	2173.59
4	Cost C	3159.2	2715.13	2646.46	2840.26

Table 4 signifies the cost concepts of different categories of farm per 100 square feet. Cost A1 and Cost A2 were same because land revenue paid to the government was zero. So, the Cost and Cost A2 was maximum in small category (Rs. 2288.55 pee 100 sq. ft.), followed by medium farms (Rs. 2046.37 per 100 sq. ft.) and minimum was in case of large farms (Rs. 1985.69 per 100 sq. ft.). Cost B was found to be maximum in small farms (Rs. 2359.2 per 100 sq. ft.), followed by medium farms (Rs. 2115.13 per 100 sq. ft.) and lesser cost was found in large farms (Rs. 2046.46 per 100 sq. ft.). Cost C was recognized highest in small farms (Rs. 3159.2 per 100 sq. ft.), followed by medium farms (Rs. 2715.13 per 100 sq. ft.) and minimum cost was in large sized farms (Rs. 2646.46 per 100 sq. ft.).

Table 5. Cost and Return in Mushroom per 100 Sq. feet in different size of farm groups

S. No.	Particulars				Sample Average
		Small	Medium	Large	
1	Total cost of Cultivation (Rs. /100 Sq. feet)	3179.2	2735.13	2666.02	2860.12
2	Yield (Kg)	62.65	68.54	71.01	67.40
3	Cost of Production (Rs. / Sq. feet)	50.74	39.9	37.54	42.73
4	Selling Price (per Kg)	110	110	110	110
5	Gross Return per 100 sq. feet	6891.5	7539.4	7811.1	7414
6	Net Return Per 100 Sq. feet	3712.3	4804.27	5145.08	4553.88
7	Family Labor Income	4532.3	5424.27	5764.64	5240.40
8	Family Business Income	4602.95	5493.03	5825.41	5307.13
9	Farm Investment Income	3802.95	4893.03	5225.41	4640.46
10	Benefit Cost Ratio	1:2.1	1:2.7	1:2.9	1:2.5

Table 5 display that total cost of cultivation was greater in case of small farm lots (Rs. 3179.2 per 100 sq. ft.). Small farmers purchased the inputs in less quantity so the cost of inputs was incurred maximum by them. Cost incurred by medium farmers was (Rs. 2735.13 per 100 sq. ft.) and lesser cost was incurred by large farmers (Rs. 2666.02 per 100 sq. ft.). The maximum yield

was obtained by large respondents 71.01 Kg, followed by medium respondents 68.54 Kg and small farmers mushroom yield was 62.65 Kg. Benefit-cost ratio was 1:2.1 in small size farms which means that by investing one-rupee small farmers earned a profit of rupees 2.1. In medium farms it was 1:2.7 and in large farms it was 1:2.9. Maximum profit was earned by large category of farmers.

4. Conclusion

The field survey was conducted 4 panchayats of Solan block of Solan district of Himachal Pradesh. The majority of mushroom farmers were found to in small category. Age was found to be an important socio-economic factor which affects the decision-making ability of an individual. The study in the Solan block also justified that maximum profit was earned by large growers. By using minimum cost of cultivation large farmers earned maximum profit.

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