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Full Length Research Paper

Comparative Study on Button Mushroom vs. Oyster Mushroom: Empirical Estimates of Costs, Returns and Marketing Perspective in Mid Hills of Himachal Pradesh, India

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Abstract

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This study examines the economic performance, cost structures and marketing dynamic of button and oyster mushrooms in Kangra valley of Himachal Pradesh. A simple random sample of 60 mushroom growers, categorized into small (40) and large (20) on the basis of number of compost bags they kept by using cumulative square root frequency method, were collected by survey method on a well structured and pre-tested schedule for the agricultural year 2023-24. The findings revealed that button mushroom generates a gross income of Rs.45, 149 per 100 bags whereas for oyster mushroom it was Rs. 21,960 per 100 bags. Button mushrooms incur higher input costs due to compost and labour requirements, yet yield greater net returns compared to oyster mushrooms. The fixed cost constitutes 27.31 per cent of the total cost which was half of that of oyster mushroom (51.59%). The share of variable cost in the total cost of producing both types of mushrooms was more in case of button mushroom (72.69%) than in oyster mushroom (48.41%). The net return over total cost and over variable cost was higher for button mushrooms than the oyster mushrooms. The breakeven output of button mushroom in terms of mushroom production in kg was 100 kg whereas the respective figure for oyster mushroom was 72 kg. Three marketing channels were followed in button mushroom in the research area but channel-2 (Mushroom grower---Retailer—Consumer) was the most widely used channel through which 48.16 per cent of the total quantity was marketed by 40.60 per cent of the mushroom growers. In case of oyster mushroom, only two marketing channels were followed i. e. channel-1 and channel-2.All the findings of the comparative analysis demonstrates the economic superiority of button mushrooms over oyster mushrooms in terms of profitability, driven primarily by consumer preferences and established market channels in the Kangra valley.

Keywords: Button mushrooms, Oyster mushrooms, cost, return, breakeven, marketing channel, fixed cost, variable cost.

Introduction

In the context of Himachal Pradesh, comparing button and oyster mushrooms is crucial because oyster mushrooms offer a more sustainable and potentially more profitable alternative for local cultivation, especially in rural areas, due to their simpler cultivation process and lower capital costs compared to button mushrooms. Oyster mushroom cultivation is known for its simplicity and lower capital requirements, making it a viable option for farmers in Himachal Pradesh, especially in rural areas where resources might be limited. Oyster mushrooms, also known as "Dhingri" in Hindi, are highly nutritious and have gained significant popularity. The cultivation of oyster mushrooms can be more profitable than button mushrooms due to lower capital costs and simpler prod-

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uction technology. While button mushrooms dominate the domestic market, oyster mushrooms have a growing demand, particularly in the export market, and are sought after as a functional food. Oyster mushrooms can be grown on a variety of substrates and thrive in both temperate and tropical regions, making them adaptable to the diverse climates of Himachal Pradesh. Oyster mushroom cultivation can be an environmentally friendly method of transforming waste materials into nutritious food, contributing to food security and sustainable agricultural practices. Button mushrooms dominate production at 95%, while Oyster mushrooms represent only 5% of the total output.

The study is different from the existing literature in the sense that some studies address the economic aspects of mushroom cultivation only, but a comparative study could focus on the social and economic impact of mushroom farming in the Kangra valley of Himachal Pradesh. It investigates the potential of mushroom cultivation to generate income, create employment, and improve food security in mid hills of Himachal Pradesh. This could help policymakers and stakeholders develop strategies to promote sustainable mushroom farming in the region.

When comparing button mushrooms and oyster mushrooms in terms of cost, returns and marketing, oyster mushroom generally have a lower production cost due to simpler cultivation requirements, while button mushrooms often command a higher market price due to greater consumer familiarity resulting in potentially higher returns per kilogram. However, factors like local market demand and production practices can significantly influence these dynamics.Higher production costs of button mushrooms are attributed to the need for specialized training in compost preparation, stricter environmental controls, and a longer cultivation cyclewhen compared with oyster mushrooms which has a lower costs because of the fact that its ability to grow on readily available substrate like straw or sawdust; it require less stringent environmental control and has faster growth cycle. Secondly, the returns from button mushrooms are potentially higher per kg which is due to higher market price because of wider consumer acceptance and market demand has already established. On the other hand, lower returns per kg of oyster mushrooms may be due to lower market price compared to button mushrooms and potentially has oversupply in certain market. As for its marketing aspects are concerned, button mushrooms are widely recognized by the consumers and are commonly used in traditional dishes and it require less marketing efforts to reach to consumers, while oyster mushrooms require more marketing to educate consumers on its taste and versatility and can be marketed as a sustainable option due to its ability to grow on waste materials.

The relative profitability of each of these two mushrooms type can vary greatly depending on local market demand and consumer preference. The large-scale production can often reduce costs per unit for both types of mushroom. Advancements in cultivation techniques can significantly impact production costs and market competitiveness for both button and oyster mushrooms. The mid-hills of Himachal Pradesh, with their unique climatic conditions, present a compelling case for comparing button and oyster mushroom cultivation to inform regional agricultural policy. Despite the growing interest in oyster mushroom cultivation as a cost-effective alternative, limited research has explored its comparative profitability and market dynamics against the well-established button mushroom industry. Keeping all these facts in mind, the present investigation was undertaken with the goal of comparing costs, returns, and marketing channels for the two mushroom types in Kangra valley.

II Method and Material

The present study was carried out in Kangra valley of Himachal Pradesh. This district was selected purposively because the Indo Dutch Mushroom Project Palampur, which is run by the State Directorate of Horticulture and located in the CSKHPKV Palampur, provides spawned compost to mushroom producers in several districts. Secondly, the centre for mushroom research and training (CMRT) CSKHPKV, Palampur also provides spawned compost bags and spawn of different kind of mushrooms i.e. button and Oyster mushrooms. Thirdly, training on many different aspects of mushroom farming is also provided by the directorate of extension education CSKHPKV Palampur. Large number of mushroom growers are also present in the district and no study was conducted in the recent years that is why the kangra district was selected purposively.The primary data for the study was collected from seven randomly selected blocks of the district namely, Nagrota, Sullah, Palampur, Bhawarna, Jaisinghpur, Panchrukhi and Baijnath as these blocks are located around Palampur which is a hub of trainings and technical know-how on mushroom cultivation and supplying of spawned compost bags and spawn of different kinds of mushrooms. Data were collected on various aspects of costs, returns and marketing of both button and oyster mushrooms. Simple Random Sampling design was employed for the selection of 60 mushroom growers which were selected randomly from the above mentioned seven blocks. The selected mushroom growers were categorized into two categories, small and large; on the basis of number of compost bags they placed by using cumulative square root frequency method. By following this method, those mushroom growers who kept less than 300 compost bags are called small and their number was 40 while, those mushroom growers who placed more than or equal to 300 compost bags are called large and their number was 20. The rationale behind mushroom farmers are categorized as small or large based on the number of compost bags they use, which is a proxy for the size of their operation and production capacity, impacting resource allocation and support programs. The number of

compost bags directly correlates with the volume of mushrooms a farmer can cultivate, and therefore, their potential output and income. Categorizing farmers allows for targeted support and resources. Small farmers may access to inputs (such as compost and spawn), technology and training, while large farmers might benefit from programs focused on market access and expansion. The classification helps policymakers understand the structure of mushroom farming sector and tailor interventions to meet the needs of different farmers groups. For instance, A farmer using a few hundred compost bags might be considered a small-scale producer, while someone using thousands could be classified as a large –scale farmer. The method to grow mushroom is same as described by Directorate of Mushroom Research (DMR), Solan, Himachal Pradesh.

A. Data Collection

In order to meet out the specific requirements of the study, primary data were collected from 60 mushroom growers. Survey schedule was prepared for collection of detailed primary data which was pre-tested in the two villages of the study area to examine the relevance of questions on different cost, production and marketing aspects of the mushroom cultivation. The primary data were collected through survey method. The data was collected on well designed and pre-tested schedules from the selected mushroom growers through personal interview method. The data were collected pertaining to the agricultural year 2023-24.

B. Analytical Framework

The collected data was compiled properly and analyzed by employing appropriate mathematical and statistical tools. In order to meet out the objective, tabular analysis using averages, ratios and percentages were used to study the capital expenditure ,input use, costs and returns, break-even output and pattern and disposal of mushroom through different channels.

1. Cost and Return analysis

The costs and net returns from mushroom production were calculated in order to determine the economic viability of the mushroom.

(a)Cash Variable expenses include the items:

i). Spawned Compost bags
ii). Packing material
iii). Crop protection material
iv). Electricity charges
v). Transportation charges
vi). Miscellaneous charges (crop washing material, other chemicals etc…..)
vii). Interest on variable capital for half of the growth period of crop i.e. 1.5 months at the rate of 12 per cent per annum

Total Variable Cost - Cash variable expenses+ Human labor

(b) Fixed Cost

1. Interest on fixed capital at the rate of 12 per cent per annum
2. Depreciation charges on mushroom unit at the rate of 2 per cent per annum
3. Depreciation charges on implements at the rate of 10 per cent per annum.

(c) Total costs = Total variable cost + Total fixed cost

2. Returns

(a) Computation of Gross Returns

The gross returns were calculated as follows:
$GR=TP_M*P_M$

Where,

GR= Gross Returns from mushroom crop (Rs./100 bags)
TP_M= Total Production of the mushroom (kg)
P_M =Price of the mushroom per kilogram (Rs.)

(b) Computation of Net Returns

1. Net returns over variable cost= Gross Returns- Variable Cost
2. Net returns over total cost= Gross Returns- Total Cost

3. Computation of Benefit-Cost ratio

Benefit- cost ratio implies per rupee invested on inputs used in the production process.

$$\text{Benefit} - \text{Cost ratio} = \frac{\text{Gross returns}}{\text{Total costs}}$$

4. Break-even analyses

The amount of production needed to pay all the production cost is known as break-even output and the output below this level would led into net loss to the producer. In simple terms, break-even is the point in which the mushroom growers are neither in profit nor in loss. The break-even output is calculated by the formula:

$$\text{Break} - \text{even output} = \frac{\text{TFC}}{\text{Py} - \text{AVC}}$$

Where,

TFC = Total fixed cost in rupees
Py = per unit price of mushroom
AVC =Average Variable cost in rupees
AVC = TVC/TP_M
TVC = Total Variable Cost

TP_M = Total mushroom production in kilogram

5. Marketable surplus

The marketable surplus is the residual left with the producer after meeting their requirements for family consumption, kind payment to labour and gifts and marketable surplus of both mushroom types was estimated as follows:

$MS_i = TP_i - TRi$ (i =1, 2, 3…60 growers)

Where,

MS_i= Marketable surplus of mushroom with i^{th}grower

TP_i= Total production of the mushroom with i^{th}grower

TRi = Total requirements of the i^{th} mushroom grower

6. Marketed surplus

Marketed surplus was the actual quantity of mushroom that the producer sold in the market irrespective of its requirements and it was estimated as follows:

$MT_i = MS_i - LM_i$

Where,

MT_i= Marketed surplus by the i^{th}producer

MS_i=Marketable surplus of the i^{th}producer

LM_i= Losses incurred by the i^{th} producer

7. Marketing Channels

Marketing channels refers to various intermediaries which were involved for the transfer of mushroom produce from mushroom growers to consumers. The personal survey of various intermediaries involved in the marketing process was done to assess the different marketing channel that the mushroom growers in the research area used to market their mushrooms.

III Results and Discussions

Capital Investment: The investment on farm implements and machinery is very crucial as proper investment in implements and machinery reduces labour cost and enhances the productivity of the crop. The investment on farm implements is a significant source of capital formation. In this context, the investment on farm implements and machinery was studied and the results of the study were presented in table-1. It can be analyzed from the table that the highest percentage of investment was made on mushroom house which accounts for 76.74 per cent of the total investment which ranges from 78.63 per cent on small farms and 75.12 per cent on large farms. The second highest investment was made on iron racks (11.81%) followed by wooden racks (8.49%). Exhaust fans, thermometer, hygrometer, room heater, spray pump, and bucket etc. were the other implements on which the investment was made. The overall investment on equipment's accounts for 23.26 per cent of the total capital investment and it varies from 21.37 per cent on small farms to 24.88 per cent on large farms. The total capital investment was more in large farms (Rs. 3, 96,055) than the small farms (Rs. 1, 69,931). The overall investment on overall farms accounts for Rs. 2, 45,304.

Classification of mushroom growers according to crops taken in a year: The mushroom growers were divided on the basis of number of mushroom crops taken in a year. Table-2 revealed that the total sample of 60 mushroom growers were taken out of which fifty per cent of the growers had taken one crop of button mushroom in a year followed by two crops of button mushroom (25%). Only 8.33 per cent of the total population were growing one crop of button mushroom and one crop of oyster mushroom. When comparison was made between small and large farms, it was found that 75 per cent of the total population from small farms had grown one crop of button mushroom but in case of growing two crops of button mushroom, the percentage of large farms (70%) were more than the large farms (2.5 %).

Input use pattern: The various inputs which were used in the mushroom production have been presented in Table-3. Spawn is an additional input which is used in oyster mushroom only and was used to the extent of 10 kg per hundred bags in the study area. It can be viewed from the table that 100 compost bags of each weighing 20 kg were used for both type of mushroom in the study area. The packing material used for 100 bags of button mushroom was 2.43 kg while, it was only 1.30 kg in case of oyster mushroom because the production of oyster mushroom was less than the button mushroom so packing material required was less for oyster mushroom. Plant protection is one of the vital steps in both types of mushroom as they were used to control the different diseases and to enhance the yield of mushrooms. Formalin was mainly used for sterilizing the room before putting the bags in the room. The quantity of bavistin and formalin used was more in case of button mushroom than in oyster mushroom because both the chemicals were added during the process of compost preparation i.e. during boiling of straw. The transportation cost was also incurred during the process of marketing which was Rs. 488 for button mushroom as against nil in oyster mushroom on sampled farms. The human labour plays an essential role in mushroom production and for button mushroom, labour used for 100 bags was 19 man days which was much more than the oyster mushroom which stood at 4.74 man days only.

Labor Utilization:

Mushroom cultivation is a labor intensive work as it requires labour from cultivation to harvesting for various purposes like putting bags into the racks, watering, maintenance, harvesting, washing and packing, etc. Efficient management by the labour will directly impact the production and profitability of mushrooms. The labour

Table 1: Capital Investment on Farm implements, tools and asset on sampled farm (Per farm).

Sr.No.	Particulars	Small		Large		Overall	
		Number	Value (Rs)	Number	Value (Rs)	Number	Value (Rs)
1	Mushroom House	0.78 (5.16)	1,33625 (78.63)	1 (2.54)	2,97,500 (75.12)	0.86 (3.71)	1,88,250 (76.74)
2	Iron Racks	3.03 (20.03)	21,100 (12.42)	7.45 (18.93)	44,700 (11.29)	4.5 (19.50)	28,967 (11.81)
3	wooden Racks	3.95 (26.11)	9,875 (5.81)	17.10 (43.46)	24,750 (10.79)	8.33 (35.94)	20,833 (8.49)
4	Thermometer	0.40 (2.64)	120 (0.07)	0.60 (1.52)	180 (0.05)	0.47 (2.03)	140 (0.06)
5	Tank for boiling Dhingri straw	0.23 (1.52)	113 (0.07)	0.60 (1.52)	300 (0.08)	0.35 (1.51)	175 (0.07)
6	Bucket	2.03 (13.42)	203 (0.12)	3.50 (8.89)	350 (0.09)	2.52 (10.87)	252 (0.10)
7	Hygrometer	0.38 (2.51)	188 (0.11)	0.75 (1.91)	375 (0.09)	0.50 (2.16)	250 (0.10)
8	Room Heater	0.15 (0.99)	150 (0.09)	0.55 (1.40)	550 (0.14)	0.28 (1.21)	283 (0.12)
9	Exhaust Fan	1.08 (7.14)	1,075 (0.63)	2.25 (5.72)	2,250 (0.57)	1.47 (6.34)	1,467 (0.60)
10	Cooler	0.08 (0.53)	338 (0.20)	0.25 (0.64)	1,125 (0.28)	0.13 (0.56)	600 (0.24)
11	Blower	0.53 (3.50)	788 (0.46)	1.05 (2.67)	1,575 (0.40)	0.7 (3.02)	1,050 (0.43)
12	Foot Spray Pump	0.33 (2.18)	488 (0.29)	1 (2.54)	1,500 (0.38)	0.55 (2.37)	825 (0.34)
13	Hand spray Pump	0.7 (4.63)	490 (0.29)	0.9 (2.29)	630 (0.16)	0.77 (3.32)	537 (0.22)
14	weighing Machine	0.73 (4.82)	508 (0.30)	1.1 (2.80)	770 (0.19)	0.85 (3.67)	595 (0.24)
15	Packing Machine	0.73 (4.82)	870 (0.51)	1.25 (3.18)	1,500 (0.38)	0.9 (3.88)	1,080 (0.44)
	Total cost of equipments	14.35 (94.84)	36,306 (21.37)	38.35 (97.46)	98,555 (24.88)	22.32 (96.29)	57,054 (23.26)
	Total capital investment	15.13 (100.00)	1,69,931 (100.00)	39.35 (100.00)	3,96,055 (100.00)	23.18 (100.00)	2,45,304 (100.00)

Note: Figures in the parentheses indicate percentages to the total in each category.

duration engaged in different operation in mushroom production has been converted into man days in order to calculate the labour employment. In this context Table 4 provides the information on the labour utilization pattern of button mushroom.

It can be seen from the table that the total labour required for performing various operations in button mushroom production varied from 18 man days on small farms to 19

Table 2: Classification of number of mushroom growers according to crops taken in a year in the study area (Number/annum).

Sr. No.	Particulars	Farm Size		
		Small	**Large**	**Overall**
1.	One crop of button mushroom	30	-	30
		(75.00)	-	(50.00)
2.	Two crop of button mushroom	1	14	15
		(2.50)	(70.00)	(25.00)
3.	One crop of button and one crop of oyster mushroom	5	-	5
		(12.50)	-	(8.33)
4.	Two crop of button and one crop of oyster mushroom	4	6	10
		(10.00)	(30.00)	(16.67)
	Total	40	20	60
		(100.00)	(100.00)	(100.00)

Note: Figure in parentheses indicates the percentage to the total in each category.

Table 3: Input use pattern of Button and Oyster mushroom on sampled farms. (Per 100 bags).

Sr. No.	Particulars	Units	Type of Mushroom	
			Button Mushroom	**Oyster Mushroom**
1.	Spawn	Kg	**-**	10
2.	Compost Bags (20 kg)	Number	100	100
3.	Packing Material	Kg	2.43	1.39
4.	Plant Protection			

Table 3 Cont.

i)	Formalin	Millilitre	173.45	161
ii)	Bavistin	Grams	101.29	18
5.	Electricity charges	Rs.	312	253
6.	Transportation charges	Rs.	488	-
7.	Human Labour(man days)	Man days	19	4.74
8.	Miscellaneous	Rs.	380	231

Table 4: Combined Labour utilization pattern of Button and Oyster mushrooms on sampled farms (Man days/100bags).z

Sr. No.	**Particulars**	**Farm Size**		
		Small	**Large**	**Overall**
1.	Putting bags in rack	0.64	0.47	0.52
		(3.53)	(2.44)	(2.75)
2.	Watering	3.67	5.14	4.70
		(20.23)	(26.66)	(24.83)
3.	Medicine spray	1.78	1.67	1.70
		(9.81)	(8.66)	(8.98)
4.	Harvesting	7.40	6.29	6.62
		(40.79)	(32.62)	(34.97)
5.	Washing and packing	4.65	5.71	5.39

Table 4 Cont.

		(25.63)	(29.62)	(28.47)
	Total Labour	18.14	19.28	18.93
		(100)	(100)	(100)
i)	Hired Labour	0.95	4.5	3.43
ii)	Family Labour	17.19	14.78	15.50

Note: Figures in parentheses indicate the percentage to the total in each category.

man days on large farms per 100 bags. It can also be viewed from the table that labour used in the overall farm per 100 bags was highest for harvesting operations followed by washing and packaging which accounted for 34.97 per cent and 28.47 per cent respectively. The next highest labour usage was found in watering and medicine spray accounting for 24.83 per cent and 8.98 per cent. When comparison was made between small and large farms, it was found that more percentage of labour in large farms was used only in case of watering (26.66%) and washing and packaging (29.62%) than the small farms. The overall family labour used was approximately 16 man days with small farms having more man days (17 man days) than large farms (15 man days). Very less hired labour was used on overall farm for mushroom production with large farms using more hired labour than the small farms.

Cost of production: The cost required for 100 compost bags of both button and oyster mushrooms have been presented in table-5. The total cost components were divided into fixed and variable cost components. The fixed cost components include the factors such as depreciation charges on mushroom building and implements, interest on fixed capital whereas the variable cost include the factors like outlays on compost bags, packing material, cost protection material, electricity, transportation and labour charges and miscellaneous charges. It can be seen from the table that total cost of production on oyster mushroom was to the tune of Rs. 14,290 per 100 bags which was less than that of button mushroom (Rs. 26,966 per 100 bags). This was due to the fact that oyster mushroom usually grown in March-April so it doesn't require much temperature maintenance so there is less use of electricity than that of button mushroom. Second the cost of production of oyster mushroom compost bags was also less than the button mushroom. The table also does reflect that fixed cost of button mushroom constitutes 27.31 per cent of the total cost which was half of that of oyster mushroom (51.59 %). The share of variable cost in the total cost of producing both types of mushrooms was more in case of button mushroom which was to the extent of 72.69 per cent than in oyster mushroom which stood at 48.41 per cent. The investment on the compost bags was the major component of variable cost amounting to Rs. 10,100 per 100 bags i.e. 37.41 per cent of the total cost in case of button mushroom while, for oyster mushroom it was just Rs. 1,482 per hundred bags which was 10.37 per cent of the total cost. The next highest investment in button mushroom was made on human labour followed by transportation charges with a percentage of 28.05 per cent and 1.81 per cent of the total cost respectively. On the contrary in case of oyster mushroom, the investment on labour followed by spawn was to the extent of 15.03 per cent and 9.80 per cent of the total cost respectively. On one hand the investment made on crop protection material in button mushroom was just 0.77 per cent of the total cost but on the other hand in case of oyster mushroom, it was 7.17 per cent of the total investment. This indicates that the quantity of chemical used in oyster mushroom was much more than that of button mushrooms because the chemical were added during the boiling of straw. It is also important to mention here that there were only fifteen oyster mushroom growers in the research area because of less demand and less awareness of oyster mushroom.

Costs and returns analysis: Table-6 depicts the comparative costs and return of both button and oyster mushrooms on sampled farms. It can be seen from the table that the total production of mushrooms per 100 compost bags was more on button mushroom (347.30 kg) than the oyster mushroom (180 kg). The gross returns of button mushroom were found to be Rs. 45,149 where as for oyster mushroom it was Rs. 21,960. The net return over total cost and over variable cost per hundred bags of button mushroom accounts for Rs. 18,153 and Rs. 25,525 respectively whereas for oyster mushroom the respective amount was Rs. 7,670 and Rs. 15,042 respectively. The

Table 5: Cost of production of button mushroom and oyster mushrooms on sampled farms (Rupees/100 bags).

Sr. No.	Particulars	Type of Mushroom	
		Button Mushroom	**Oyster Mushroom**
A.	**Non-Recurring Expenditure (Fixed Cost)**		
i)	Interest on fixed capital @12%	2,845	2,845
		(10.54)	(19.91)
ii)	Depreciation Charges		
a)	Buildings (@2% p.a.)	1,564	1,564
		(5.79)	(10.94)
b)	Depreciation on implements (@10%)	2,963	2,963
		(10.98)	(20.73)
	Total Fixed cost	7,372	7,372
		(27.31)	(51.59)
B.	**Recurring Expenditure (Variable Cost)**		
i)	Spawn	-	1,400
			(9.80)
ii)	Compost Bags	10,100	1,482
		(37.41)	(10.37)
iii)	Packing material	274	277
		(1.01)	(1.94)
iv)	Plant protection	208	1,025

Table 5 Cont.

		(0.77)	(7.17)
v)	Electricity charges	312	253
		(1.16)	(1.77)
vi)	Transportation charges	488	-
		(1.81)	-
vii)	Labour charges	7,572	2,148
		(28.05)	(15.03)
viii)	Miscellaneous	380	231
		(1.41	(1.62)
ix)	Total (i to vii)	19,334	6,816
		(71.62)	(47.70)
x)	Interest on Recurring Expenditure (variable cost) (@12 % for 1.5 months)	290	102
		(1.07)	(0.71)
	Total Recurring Expenditure (Total Variable Cost)	19,624	6,918
		(72.69)	(48.41)
C.	**Total cost (A+B)**	26,996	14,290
		(100.00)	(100.00)

Note: Figure in parentheses indicates the percentage to the total in each category.

net return per kg over total cost and over variable cost were Rs.52.27/kg and Rs. 73.50/kg respectively for button mushroom while the respective statistics in case of oyster mushroom were Rs. 41.91/kg and Rs. 82.20/kg respectively. This suggests that net return per kg over variable cost was higher in oyster mushroom than in button mushroom. This is because of low variable cost required for the cultivation of oyster mushroom on the sampled farms of the study area. The benefit cost ratio of button mushroom was 1.67 as against 1.54 in case of oyster mushroom. All the above facts indicate that cultivation of button mushroom is a profitable venture than oyster mushroom in the research area.

Breakeven analysis: Breakeven output is the level of output at which mushroom grower will neither face profit nor loss. In other words, in economic terms, it is that output level where the total revenue and the total cost curve intersects and the profit is zero at this level. The comparative breakeven analysis of button and oyster mushroom has been presented in table-7. Breakeven output for button mushroom in the table reveals that if the

Table 6: Return and benefit cost analysis of button mushroom and oyster mushroom on sampled farms.

Sr. No.	Particulars	Units	Type of Mushroom	
			Button Mushroom	Oyster Mushroom
1.	Total cost	Rupees/100 bags	26,996	14.290
i)	Fixed cost	Rupees/100 bags	7,372	7,372
ii)	Variable cost	Rupees/100bags	19,624	6,918
2.	Total Production	Kilograms/100bags	347.3	183
3.	Gross Returns	Rupees/100bags	45,149	21,960
4.	Net Returns over Total cost	Rupees/100bags	18,153	7,670
5.	Net Return over Total cost	Rs/kg	52.27	41.91
6.	Net Returns over Variable cost	Rupees/100bags	25,525	15,042
7.	Net Return over Variable cost	Rs/kg	73.50	82.20
8.	Net returns per rupee of investment	Rupees	0.67	0.54
9.	Benefit-Cost Ratio	Ratio	1.67	1.54

mushroom grower receives 100 kg of production valued at Rs.1300 then the button mushroom grower will be at no profit and no loss situation under the given input and output regime. Likewise, oyster mushroom growers will be at no loss and no profit situation when they produce 72 kg of oyster mushroom valued at Rs. 10,080. The oyster mushroom growers had less breakeven output because of low average variable cost of production of Rs. 37.8 per kg. The breakeven output in physical terms or in terms of number of compost bags placed reveals that growers of button mushroom and oyster mushroom will be at no loss and no profit situation if they placed at least 33 and 39 compost bags respectively.

Production and disposal pattern: Table-8 highlights the production and disposal pattern of button and oyster mushroom simultaneously on sampled farms. The production of button mushroom in the sample farms was found to be 8.36 quintal per farm. On the contrary, the respective figure for oyster mushroom was found to be 101.3 kg per farm. Out of the total production of button mushroom, 1.91 per cent of the production was consumed at home; the respective figure for oyster mushroom was 8.16 per cent. The proportion of production given in the form of gift was 0.60 per cent in case of button mushroom and 2.87 per cent in case of oyster mushroom. As for as marketed surplus is concerned, it was 94.26 per cent for button mushroom while it was 82.83 per cent in case of oyster mushroom. Thus, it can be concluded from the table

Table 7: Break-even analysis of button and oyster mushroom (Rupees per 100 bags)

Sr. No.	Particulars	Type of Mushroom	
		Button Mushroom	**Oyster Mushroom**
1.	Cost of Production		
i)	Fixed Cost	7,372	7,372
ii)	Variable Cost	19,624	6,918
iii)	Total Cost	26,996	14,290
2.	Average Variable cost	56.50	37.80
3.	Total Production (kg)	347.3	183
4.	Selling Price of Mushroom (Rs/Kg)	130	140
5.	Break-even output(mushrooms in kg)	100	72
6.	Break -even point (No. of compost bags)	33	39

that out of the total production of button mushroom, about 94 per cent was available for sale and remaining 3 per cent was used for other purposes like home consumption, gifts to relatives, friends and neighbour and kind payments and a loss of nearly 3 per cent; the respective figures for oyster mushroom were 83 per cent and 13 per cent and there was a loss of approximately 4 per cent respectively.

Marketing of Mushroom: The final objective of every commercial activity is to guarantee an efficient market for its product. The marketing of mushrooms include all the processes, agencies and channels which are involved to transfer the produce from mushroom growers to consumers. Marketing plays an indispensable role in production of both types of mushrooms since it has the power to influence remunerative prices, which in turn influences production incentives. If the marketing system is not effective and efficient, the production cannot fetch remunerative prices. In view of this head, an attempt has been made to describe the existing marketing system for the button and oyster mushroom cultivation in the study area.

Marketing channels: The route or the path through which the commodity passes from producer to ultimate consumer is known as marketing channel. Market functionaries serve as a link between producer and consumer throughout the entire marketing process. Marketing channels significantly impact the disposal and sale of the produce. There were two different intermediaries that were involved between producer and consumer i.e. retailers and wholesalers. Effective utilization of marketing channels can help mushroom growers to increase profitability from the produce. The marketing channels that were involved in the marketing of button and oyster mushrooms were as follow:

Table 8: Production and disposal pattern of button mushroom and oyster mushroom on sampled farms.

Sr. No.	Particulars	Type of Mushroom	
		Button Mushroom (Quintal/farm)	**Oyster Mushroom (Kg/farm)**
1.	Production	8.36	101.33
		100	(100.00)
2.	Self- Consumption	0.16	8.27
		(1.91)	(8.16)
3.	Payment in kinds	0.02	1.73
		(0.24)	(1.71)
4.	Gifts	0.05	2.87
		(0.6)	(2.83)
5.	Marketable Surplus	8.13	88.46
		(97.25)	(87.30)
6.	Losses	0.25	4.53
		(2.99)	(4.47)
7.	Marketed Surplus	7.88	83.93
		(94.26)	(82.83)

Note: Figures in parentheses indicate the percentage to the total in each category.

Button Mushroom **Oyster Mushroom**

Channel-1: MG—Consumer **M G---Consumer**
Channel-2: M.G.---R.----C. **M.G. ------R. --------C.**
Channel-3: MG—WS----R---C **Missing**

Table-9 indicates the pattern and disposal of button and oyster mushrooms in the study area. It is evident from the table that in case of button mushroom, 40.60 per cent of the mushroom growers followed channel-2. The total quantity of mushroom that was marketed through this channel was 48.16 per cent of the total production. The second important channel for button mushroom was channel -3 through which 41.30 per cent of the produce was marketed by 24.06 per cent of the mushroom growers. Only 10.55 per cent of the total produce was disposed through channel-1 and this channel was used by 35.34 per cent of the total mushroom growers.

In comparison in case of oyster mushroom only two channel were used in the disposal of the produce i.e. Channel-1 and channel-2. Channel-2 was the widely used channel by 88.65 per cent of the total produce was marketed

Table 9: Pattern and utilization of button mushroom and oyster mushroom on sampled farms.

Sr. No.	Particulars	Type of Mushroom			
		Button Mushroom		Oyster Mushroom	
	Channel	No.	Qty.(q/farm)	No.	Qty.(kg/farm)
1.	Mushroom Grower →Consumer	47	0.83	11	9.53
		(35.34)	(10.55)	(42.31)	(11.35)
2.	Mushroom Grower →Retailer---Consumer	54	3.79	15	74.4
		(40.60)	(48.16)	(57.69)	(88.65)
3.	Mushroom Grower →Wholesale---Retailer---Consumer	32	3.25	-	-
		(24.06)	(41.30)	-	-
	Total	133	7.87	26	83.93
		(100.00)	(100.00)	(100.00)	(100.00)

Note: Figures in parentheses indicate the percentages to the total in each category.

by 57.69 per cent of the total growers. Only 11.35 per cent of the total produce was disposed of by channel-1. Channel -3 was missing because there were very less numbers of oyster mushroom growers. Very less number of oyster mushroom bags were kept by the mushroom growers as the demand of oyster mushroom is not much because the people are not much aware of this species of mushroom

IV Conclusion and Policy implications

To sum up, following point are emerged out from this research study: First, the capital investment on farm building, implements and machinery revealed that the highest percentage of investment was made on mushroom house which accounts for 76.74 per cent of the total capital investment which ranges from 78.63 per cent on small farms and 75.12 per cent on large farms. Second, out of the 60 mushroom growers , 50 per cent of the mushroom growers were taking one crop of mushroom in a year followed by two crop of button mushroom i.e.25 per cent. Third, the total combined labour required for button and oyster mushrooms for performing various operations varied from 18 man days on small farms to 19 man days on large farms per 100 bags. Fourth, the total cost of production per 100 bags varied from Rs. 26,996 for button mushroom to Rs. 14,290 for oyster mushroom. The fixed cost constitutes 27.31 per cent of the total cost which was half of that of oyster mushroom (51.59%). The share of variable cost in the total cost of producing both types of mushrooms was more in case of button mushroom (72.69%) than in oyster mushroom (48.41%). Fifth, the net return over total cost and over variable cost was higher for button mushroom than the oyster mushroom.

The breakeven output of button mushroom in terms of mushroom production in kg was 100 kg whereas the respective figure for oyster mushroom was 72 kg. Sixth, the marketed surplus of button mushroom was 94.26 per cent of the total production which was higher than that of oyster mushroom which stood at 82.83 per cent. Seventh, three marketing channels were followed in button mushroom in the research area but channel-2 was the most widely used channel through which 48.16 per cent of the total quantity was marketed by 40.60 per cent of the mushroom growers. In case of oyster mushroom, only two marketing channels were followed i. e. channel-1 and channel-2. Channel-3 was not used in case of oyster mushroom because there were very less number of oyster mushroom grower who cultivates this crop in the study area. Thus, the higher profitability of button mushrooms underscores the importance of established market channels and consumer preferences. However, the cost-effectiveness of oyster mushroom cultivation suggests significant potential for growth with targeted marketing and education initiatives. While button mushrooms currently dominate the market in the Kangra Valley, the cost-effectiveness of oyster mushrooms presents a significant opportunity for diversification. Future efforts should focus on increasing consumer awareness and improving market access for oyster mushrooms to unlock their potential as a sustainable and profitable crop.

As every research study has its own limitations, so was for this study. The findings of this study are specific to the Kangra valley and may not be generalizable to other regions. However, scientific approach was used to conduct this investigation. But, like with every socio-economic survey, there are bound to be some limitations that can't be ignored. The study was based on only 60 mushroom growers selected randomly from the list of mushroom growers, due to limited time and other constraints. Since, sample mushroom growers didn't maintain any records, the information was only collected through personal interview method and they provided the information based on memory and prior experiences the possibility of few slips from the memory of the respondents can't, however, be ruled-out.

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