Economic Analysis of Production and Marketing of Button Mushroom in Central Kashmir

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Abstract

Button mushroom (Agaricus bisporus) is the most popular mushroom variety grown and consumed in Jammu and Kashmir. The present investigation was conducted in Central Kashmir, examining the economics of button mushroom production and marketing. The three categories of farmers were studied based on production volume, with large-scale growers being the most profitable. The analysis highlighted operational costs, cultivation expenses per kilogram, and the favourable returns to scale as significant contributors to success. Regarding marketing, Channel-C emerged as the predominant choice among farmers. The Challenges identified the complexities which includes maintaining the ideal growth conditions, spawn availability, and market uncertainties. This research offers crucial insights for the Central Kashmir mushroom farming sector, aiding policymakers and practitioners alike.

Keywords: Button Mushroom, Simple random technique, Cobb-Douglas production function, Benefit-cost ratio, Marketing, Constraints

Introduction

Mushroom is a form of plant life known as fungus. Fungi produce fruit bodies that are large enough to be considered as mushroom. They occur in a wide variety of habitats ranging from polar to tropics and above soil to below soils (Chang and Hayes, 1978). Cancer, cholesterol reduction, stress, insomnia, asthma, allergies and diabetes have been found to benefit from mushrooms (Bahl, 1983). The polysaccharide content of mushroom is used as an anticancer drug; moreover, they have even been proven to be effective in the fight against HIV (Nanba et al., 1993).

Global mushroom production was estimated to be 11, 898, 399 tonnes in 2019 (FAO, 2020). Mushroom cultivation and production increased most dramatically in China, the United States, Netherlands, India and Vietnam. In India, five mushroom species are widely cultivated commercially: white button mushroom (*Agaricus bisporus*), oyster (*Pleurotus spp.*), paddy straw mushroom (*Volvariella volvacea*), milky (*Calocybe indica*) and shiitake (*Lentinula edodes*). Button mushrooms account for about 75 per cent of total mushroom production, followed by oyster mushrooms (16%) and paddy straw mushrooms (7%). White button mushrooms in canned and frozen form are being exported from India in quantities of 1054 quintals (Sharma et al., 2017). In the fiscal year 2016-2017, the mushroom industry earned Rs 7282.26 lacs from exports. Despite the fact that many exotic cultivation technologies have been

standardised, White button mushroom, oyster and paddy straw continue to dominate the commercial markets. These three mushrooms account for nearly 96 per cent of all mushrooms produced in India.

The Union Territory of Jammu and Kashmir (J&K) has diverse climatic and topographic conditions, is a rich repository of unexplored macrofungal wealth, providing a conducive environment for the abundant growth of this diverse group of fungi (Kumar et al., 2011). White button mushroom (Agaricus *bisporus*) is most commonly grown in Kashmir valley. In the year 2018-2019 total button mushroom production in entire Kashmir valley was recorded 1501 quintals. However, South Kashmir contributes a major portion of button mushroom production with 41 per cent share followed by North Kashmir (39%) and Central Kashmir contributes about (21%) of the total mushroom production (Directorate of Agriculture, Srinagar, J&K, 2020). The present study was therefore, undertaken to estimate and explore profit, benefit cost ratio (BCR), marketing channels and problems and constraints of button mushroom production in Central Kashmir, and to provide suggestions and recommendations to generate policy implications for the further development of button mushroom production in Central Kashmir.

Methodology

Description of study area

The study was conducted during the year 2021. Based on the objectives of the study, primary data were used in the present study. Central Kashmir was chosen purposively for this study on the basis of preliminary information obtained from the Department of Horticulture, Govt. of J&K which included: less exploited for Button mushroom cultivation and a lack of socioeconomic studies relevant to the problem observed in Central Kashmir. Twenty- seven (27) sample households were randomly selected and information was collected on inputs and outputs, problems and constraints of button mushroom production and marketing through a comprehensive pre-scheduled questionnaire. Data were analysed following both tabular and statistical methods.
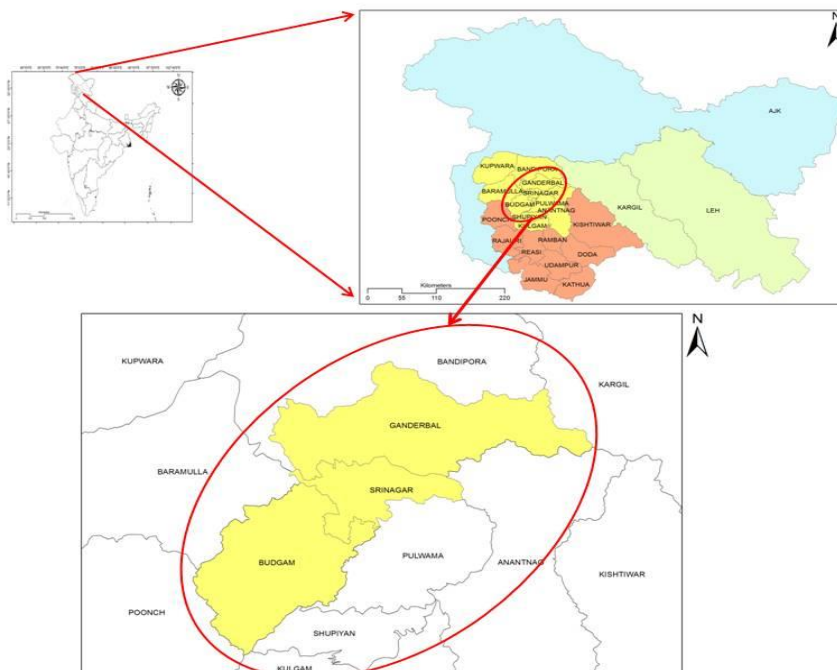
Map: Location of Study Area

Objectives

1. To study the production and marketing pattern of button mushroom growers in central Kashmir.
2. To carry out the feasibility analysis of button mushroom growers.
3. To identify constraints in production and marketing of button mushroom and to suggest appropriate policy measures.

Sampling design

Commensurate with the objectives of the study, the sampling design adopted in the study was simple random technique.

Stratification of sample households

For the construction of strata, cumulative square root frequency method was used (Singh and Mangat, 1995). For the analysis of data all the mushroom growers were classified into three categories on the basis of number of bags, viz., Small Category (≤ 100), Medium Category (101- 200) and Large Category (>200).

Table 1: Farm category wise distribution of sampled households in study Area

Category of farmers	No. of Mushroom Bags	No of farmers	Percentage of farmers	Average No of bags
Small	≤100	13	48.1	93
Medium	101-200	9	33.33	178
Large	>200	5	18.5	560
Total		27	100.00	208

Results and Discussion

Per Unit Cost and returns, Break-even point and B:C ratio of Button mushroom production in study area

The cost of cultivation per unit varied from Rs. 28361 in small category, to 116860 in large category resulting to increase with increase in size of mushroom unit.

The total yield was found to be 186 kg from 93 bags in case of small category growers, for medium 400 kg from 178 bags and in case of large category 1400 kg from 560 bags with returns to the tune of Rs. 37200, Rs. 80000 and 280000 in small, medium and large category respectively.

The B:C ratio in the small, medium and large categories was 1.3, 1.7 and 2.4, respectively, indicating that each rupee invested in a mushroom enterprise generates Rs. 1.3, Rs. 1.7 and Rs. 2.4 in the small, medium and large categories. Thus, it could be concluded that investment in mushroom production was economically feasible and financially viable.

Table 2: Per Unit Cost and returns, Break-even point and B:C ratio of Button mushroom production in study area

Particulars	Small	Medium	Large
Average number of bags	93	178	560
Cost of cultivation (Rs. /unit)	28361	46845	116860

Total yield in (Kg)	186	400	1400
Per Kg cost of mushroom production	152	117	83
Gross returns	37200	80000	280000
Net returns	8094	32381	163107
Break even output (Kg)	390	428	1379
B:C ratio	1.3	1.7	2.4

Source: Field survey, 2021

Production function analysis

Regression analysis was utilised to assess the factors that influence mushroom growing revenue. In the production analysis, the resource variables explained 86 per cent of the variation in total mushroom yield. The different variables used were; fixed cost, working capital, labour and education. Working capital and labour were found to be statistically significant at the 1% level of significance, whereas fixed costs were determined to be significant at the 5% level of significance, according to regression function estimates from Table 3. Education was positively related with the output but not found statistically significant. The sum of elasticity coefficients ($\sum bi = 1.29$) is greater than unity, indicating that overall farms under this crop have growing returns to scale.

Table 3: Production function analysis

	Coefficients	Standard Error	t- Statistics	*P*-value
Intercept	3.266	0.98	3.31	0.003
Fixed cost (X1)	0.208*	0.92	2.25	0.034
Working capital (X2)	0.429**	0.14	2.88	0.008
Labour (X3)	0.612**	0.10	4.48	0.004
Education (X4)	0.100	0.07	1.35	0.187
∑bi	1.32			
R²	0.86			

**Significant at 1% level of significance
*Significant at 5% level of significance
Source: Field survey, 2021

3.3   Marketing Channels

Table 4: Prevailing marketing channels of mushroom in the study area

Marketing Channels	Marketing intermediaries
Channel-A	Grower → Consumer
Channel-B	Grower → Retailer → Consumer
Channel-C	Grower → Wholesaler →Retailer→ Consumer

Source: Field and market survey, 2021

3.4 Marketing cost and Marketing margin

The results in Table 5 revealed that Producer's net selling price varied from Rs. 126.5/kg to Rs. 177/kg, while Consumer's purchasing price varied between Rs. 180/kg to Rs. 200/kg. Net marketing cost was estimated to be Rs. 3/kg, Rs. 28.5/kg and Rs.43.7/kg in Channel- A, Channel-B and Channel-C respectively. In case of Channel-A gross marketing margin was estimated as Rs. 2/kg, Rs. 50/kg and Rs. 70/kg in case of Channel-B and Channel-C respectively. Producer's share was found to be highest in Channel-A (98%), followed by Channel-B (73%) and Channel-C (63%).

Table 5: Price spread of Mushroom among the different marketing channels in the study area

Particulars	Channel A	Channel B	Channel C
Producer price (Rs. /Kg)	180	150	130
Consumer's price (Rs. /Kg)	180	200	200
Gross marketing margin (GMM) (Rs. /Kg)	2	50	70
Net marketing cost (Rs. /Kg)	3	28.5	43.7
Net marketing margin (Rs. /Kg)	-	25.5	29.8
Producer's Share (%)	98	73	63

3.5 Marketing efficiency

The results regarding marketing efficiency of different marketing channels depicted in Table 6 revealed that efficiency of Channel-A is highest (89%) followed by Channel-B (3%) and Channel-C (1.85%). Marketing efficiency and Price spread was found to be highest in case of Channel-A in comparison to other prevailing market channels in the study area but the volume of produce traded through this channel was lowest.

Table 6: Marketing efficiency in different marketing channels

Particulars	Channel A	Channel B	Channel C
Net marketing cost (Rs. /Kg)	2	25.5	43.7
Consumer's price (Rs. /Kg)	180	200	200
Net marketing margin (Rs. /Kg)	-	25.5	29.8
Marketing efficiency (%)	89	3	1.85

Source: Field and market survey, 2021

3.6 Constraints in Button mushroom production and marketing

In this section, an attempt has been made with the help of factor analysis, to identify the factors which act as constraints in the mushroom cultivation and its marketing. Mushroom growers in the valley face problems in the field of mushroom cultivation as well as marketing of mushroom. Major constraints in production and marketing of mushroom growers of the study are explained under the following sections:

3.6.1 Problems in production

Most of the mushroom growers in study area expressed the problems of maintaining temperature and humidity required for its growth, non-availability of quality spawn, lack of proper knowledge of

compost preparation, lack of skilled labourer. The major problem faced by the growers was maintenance of temperature and humidity in mushroom house which is the most important factor responsible for the growth of button mushroom. Almost 77.77 per cent of the growers were facing this problem as shown in Table (7).

Table 7: Constraints faced by the selected mushroom growers in cultivation of mushroom

S.no	Problem	Small	Medium	Large	Total	Percentage
1.	Difficulty in maintenance of humidity and temperature	10	8	3	21	77.77
2.	Non-availability of quality spawn	9	6	3	18	66.66
3.	Lack of proper knowledge of compost preparation	8	5	2	15	55.55
4.	Lack of skilled laborer	6	4	1	11	40.1

Source: Field survey, 2021

3.6.2 Problems in marketing

The Problems faced by the growers in marketing of mushroom were presented in Table (8) have been briefly discussed below:

About 81 per cent grower perceived problem regarding the lack of assured market. Lack of storage facilities, Lack of guidance on post-harvest management, delay in payment, lack of advertisement was also regarded as some of the important factors in the marketing of mushroom. Because of no adequate storage facility grower has to sell the produce as soon as possible before it gets spoiled. Due to this reason the grower some times are forced to sell the produce at lower price.

Table 8: Constraints faced by the selected mushroom growers in marketing of mushroom:

S. No.	Problem	Small	Medium	Large	Total	Percentage
1	Lack of assured market	11	7	4	22	81.4
2	Lack of storage facilities	9	7	2	18	66.66
3	Lack of guidance on post-harvest management	10	5	2	17	62.12
4	Delay in payment	7	5	2	14	51.81
5	Lack of advertisement	6	4	2	12	44.44

6.1 Policy suggestions

Major policy suggestions/recommendation based on findings of the study, the necessary steps to be taken up in the areas of production, marketing and strategies to increase productivity and profitability of Button mushroom are drawn and are presented as under:

- The Department of Agriculture should develop an effective spawn testing method to ensure timely delivery of quality spawned compost bags to growers' doorsteps.
- The produce has a relatively limited shelf life, efforts must be made to create the storage facilities and value-added support for the growth of mushroom industry.
- Post-harvest value addition should be emphasised and mushroom growers should be given access to the package of best practises for mushroom production.

- The greatest hurdle in the downward distribution of technological know-how and the adoption of improved processes in the production process was a lack of awareness. As a result, a focus should be placed on increasing farmers awareness through a concentrated extension education effort that includes demonstration trials.

- Newly developed species should be promoted in the area by the Mushroom Research Centers which will give a good choice to consumers. This step will be ideal for increasing mushroom demand from the consumer side.

- The share of producer in the consumer's rupee was relatively higher when they sold their produce directly to consumer. Hence, producers may be educated to sell their produce directly to consumers in order to achieve a better price.

- To increase mushroom consumption and hence production, it is vital to raise awareness of the mushroom's nutritional worth among the general public by advertising in print and electronic media. This will allow for a wider acceptance of the mushroom in both rural and urban households' diets.

Conclusion

The results obtained during the present investigation, revealed that the cost of cultivation per unit was varied from Rs. 28361 in small category, to 116860 in large category which was due to increase with increase in size of mushroom unit. The total yield was found to be 186 kg from 93 bags in case of small category growers, for medium 400 kg from 178 bags and in case of large category 1400 kg from 560 bags with returns to the tune of Rs. 37200, Rs. 80000 and 280000 in small, medium and large category respectively. The four resource variables included in the production analysis have explained jointly 86 per cent variation in the total output of the button mushroom. The fixed cost (X_1), working capital (X_2), labor (X_3) turned out to be positive and significant but education (X_4) was positive but insignificant. The sum of elasticity coefficients ($\sum b_i = 1.29$) is greater than unity, which shows increasing returns to scale on overall farms under this crop. The output-input i.e., B:C ratio which indicates the profitability of investment estimated for sample button mushroom growers was found to be 1.3, 1.7 and 2.4 in small, medium and large category respectively which indicated that the cultivation of the button mushroom was profitable in the year 2021.Channel-B i.e., Grower → Retailer → Consumer was the popular channel among the growers. Net price received by Grower was found to be more in Channel-A i.e., Grower → Consumer, followed by channel-B and Channel-C. The producer's share in consumer's rupee was maximum in Channel-A (98%) followed by Channel-B (73%) and Channel-C (63%). Marketing efficiency also followed the same trend.

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