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Analysis of constraints limiting the growth and sustainability of mushroom cultivation

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Abstract

Mushroom cultivation has emerged as a profitable agri-enterprise with significant potential for income generation, employment creation, and nutritional security. However, several production, marketing, and institutional constraints hinder its sustainable growth. This study was conducted to identify and prioritize the constraints perceived by mushroom growers in Haryana. The study was carried out in two major mushroom-producing districts of Haryana, namely Sonapat and Panipat. A total of 120 mushroom growers were selected through random sampling and interviewed using a structured interview schedule. The perceived constraints were categorized as very serious, serious, and not so serious, and ranked using the Weighted Mean Score (WMS) technique. The findings revealed that high maintenance costs (WMS = 2.98) were the most severe constraint, followed by the seasonal nature of mushroom cultivation (WMS = 2.98), low market prices during the peak season (WMS = 2.96), low profitability (WMS = 2.93), lack of marketing skills (WMS = 2.93), non-availability of skilled labor (WMS = 2.92), and pest and disease infestation (WMS = 2.90). Other important constraints included inadequate technical knowledge, risks associated with the perishable nature of mushrooms, composting problems, and unorganized marketing channels. Less severe constraints included lack of capital and credit facilities, inadequate infrastructure, non-availability of quality spawn & compost and limited awareness of government assistance. The study highlights the need to strengthen extension services, capacity-building programs, market infrastructure, storage facilities and institutional support mechanisms to enhance the profitability and sustainability of mushroom cultivation.

Keywords: Mushroom growers, constraints, mushroom cultivation, extension services, marketing challenges, sustainability

1. Introduction

Mushroom cultivation has emerged as a promising agro-industry with significant potential to transform agricultural livelihoods and accelerate rural entrepreneurship globally. Driven by an escalating demand for functional foods and robust market growth, the global mushroom industry has expanded remarkably in recent decades. Cultivation dynamics reveal that Asia overwhelmingly leads global mushroom production, accounting for 95.00 per cent of the worldwide output, followed by Europe (3.00%) and the Americas (1.00%). Aligning with this global momentum, India's mushroom sector has witnessed a monumental transition. The national production nearly doubled from 1.29 lakh tonnes in 2016-17 to 2.59 lakh tonnes in 2020-21, exhibiting a robust compound annual growth rate (CAGR) of 19.17 per cent. Currently, India ranks sixth globally in mushroom production with an annual output of approximately 0.31 million tons, spearheaded by major producing states such as Odisha, Bihar, Maharashtra, Haryana, Uttar Pradesh, Punjab and Himachal Pradesh (Sharma *et al.*, 2018) ^[1]. Notably, Haryana occupies a premier position, ranking fourth nationwide with a production of 21.50 thousand tonnes in 2021-22, thereby serving as a vital hub for the nation's commercial mushroom supply. The socio-economic and nutritional imperatives of mushroom farming make it an ideal enterprise for small-

scale agrarian systems. Rich in protein, dietary fibre, vitamins and minerals, fresh mushrooms contain 85.00 to 95.00 per cent moisture. At the same time, on a dry weight basis, they yield 35.00 to 70.00 per cent carbohydrates, 15.00 to 34.70 per cent protein, 6.00 to 10.90 per cent minerals, 10.00 per cent fat and 3.00 to 8.00 per cent nucleic acids. This exceptional biochemical profile positions the enterprise as a vital tool for mitigating nutritional insecurity. Economically, the net agricultural income from mushroom cultivation averages 2.48 lakh rupees per annum at the national level, which is significantly higher than returns from conventional cropping systems; furthermore, the enterprise generates an average of 532 man-days of rural employment per unit. For growers in Haryana, this enterprise offers substantial income-generating avenues with relatively low land and resource footprints. Despite these compelling economic opportunities and vertical growth, the commercial mushroom sector in India is bottlenecked by severe field-level vulnerabilities. The transition from a seasonal activity to a sustained commercial enterprise is restricted by a multitude of systemic challenges, primarily a lack of technical knowledge, inadequate cold-chain infrastructure, unorganized marketing channels and escalating input costs (Bijla & Sharma, 2023) ^[2]. At the grass-roots level, growers encounter acute operational barriers, including frequent pest and disease outbreaks,

limited market intelligence, price volatility, and the untimely availability of quality inputs such as pure-culture spawn (Pipaliya & Ansari, 2023) [11]. Because agricultural extension planning requires a precise understanding of localized bottlenecks to formulate effective remedial strategies, isolating these field-level barriers is crucial. Keeping this in view, the present study was specifically conceptualized to identify, quantify and prioritize the production constraints perceived by mushroom growers in the progressive districts of Haryana, providing an empirical roadmap for targeted institutional interventions.

Objectives

To find out the constraints perceived by mushroom growers in mushroom production.

2. Materials and Methods

A list of mushroom growers of each selected block was collected from the District Horticulture Office of the respective districts. From that list, 30 mushroom growers of each block were selected randomly. A total of 60 mushroom growers from each district were selected randomly. Thus, a total of 120 mushroom growers were selected for the present study.

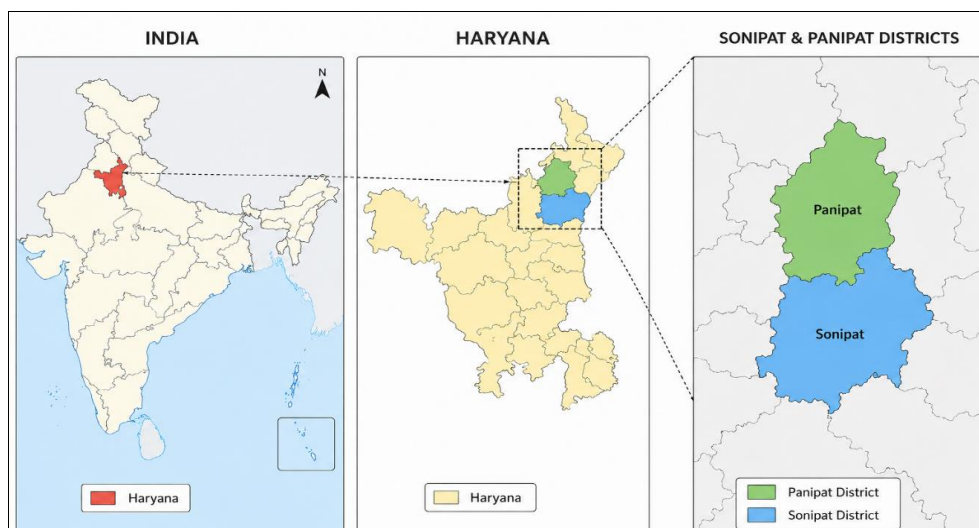


Fig 1: Locale of the study

They were interviewed using a well-structured interview schedule which consisted of questions related to their background information, knowledge index, including all technological aspects of MPT, perceived training need schedule and schedule related to preference of training facilities. As per the objectives of the study, training need was selected as the dependent variable, whereas, age, gender, education, land holding, social participation, socio-economic status, extension contact, innovativeness, use of information sources and economic motivation constituted the independent variables. The association of the important socio-economic variables with training need in respect to mushroom production technology was worked out. The results were presented in tables in order to exhibit the findings clearly and effectively. The following statistical tools were used in the study based on the nature of the data and objectives of the study:

• Rank Order

Rank order was given on the basis of mean score weighted mean score. The ranks were denoted by roman capitals as: I, II, III and so on.

• Arithmetic Mean

The mean is the arithmetic average and is the result obtained when the sum of the values of the individuals in the data is divided by the number of individuals in the data (Panse and Sukhatme, 1967). It is denoted by $\bar{X}$. the mean is computed by the formula,

$$\bar{X} = \frac{\sum x_i}{N} \quad (i = 1, 2, 3 \dots \dots n)$$

Where,

$\bar{X}$ = Mean of the scores

$\sum x_i$ = Summation of individual scores

N = Number of observations

3. Results

3.1 Constraints faced by the mushroom growers

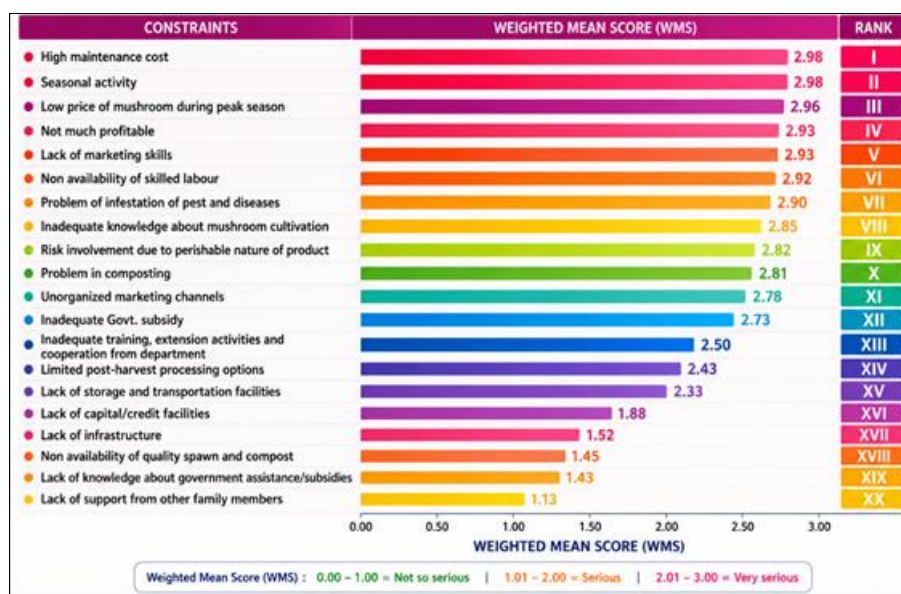
Constraints or impediments perceived by the mushroom growers as 'very serious', 'serious' and 'not so serious' in the mushroom production were assessed and a rank order was worked out based on weighted mean score to find out the severity of constraints. The results so obtained have been presented in Table 3.1.

Table 3.1: Constraints faced by the mushroom growers (n=120)

Sr. No.	Constraints	Very serious (3)	Serious (2)	Not so Serious (1)	Total Weighted score	Weighted Mean score	Rank
1.	High maintenance cost	118(98.30)	02(1.60)	-	358	2.98	I
2.	Inadequate Govt. subsidy	93(77.50)	22(18.30)	05(4.10)	328	2.73	XII
3.	Inadequate knowledge about mushroom cultivation	03(2.50)	46(38.50)	71(59.10)	342	2.85	VIII
4.	Inadequate training, extension activities and cooperation from department	60(50.00)	60(50.00)	-	300	2.50	XIII
5.	Lack of capital/credit facilities	09(07.50)	88(73.30)	23(19.10)	226	1.88	XVI
6.	Lack of infrastructure	06(05.00)	50(41.60)	64(53.30)	182	1.52	XVII
7.	Lack of knowledge about government assistance/subsidies	105(87.50)	12(10.00)	03(02.50)	172	1.43	XIX
8.	Lack of marketing skills	111(92.50)	09(07.50)	-	351	2.93	V
9.	Lack of storage and transportation facilities	44(36.60)	71(59.10)	05(04.10)	279	2.33	XV
10.	Lack of support from other family members	05(04.10)	06(5.00)	109(90.80)	136	1.13	XX
11.	Limited post-harvest processing options	59(49.10)	54(45.00)	07(05.80)	292	2.43	XIV
12.	Low price of mushroom during peak season	115(95.80)	05(04.10)	-	355	2.96	III
13.	Non availability of quality spawn and compost	15(12.50)	24(20.00)	81(67.50)	174	1.45	XVIII
14.	Non availability of skilled labour	112(93.30)	06(05.00)	02(01.60)	350	2.92	VI
15.	Not much profitable	112(93.30)	08(06.60)	-	352	2.93	IV
16.	Problem in composting	101(84.10)	15(12.50)	4(3.30)	337	2.81	X
17.	Problem of infestation of pest and diseases	112(93.30)	04(03.30)	04(03.30)	348	2.90	VII
18.	Risk involvement due to perishable nature of product	101(84.10)	16(13.30)	03(02.50)	338	2.82	IX
19.	Seasonal activity	117(97.50)	03(02.50)	-	357	2.98	II
20.	Unorganized marketing channels	96(80)	21(17.50)	3(2.50)	333	2.78	XI

An examination of Table 3.1 indicates that high maintenance costs were the most severe constraint in mushroom production, with a mean score of 2.98, followed closely by seasonality of mushroom cultivation (2.98) and low market prices during peak season (2.96). These factors notably affect the operations and profitability of mushroom growers. Other significant constraints included low profitability of mushroom cultivation (2.93), lack of marketing skills (2.93), non-availability of skilled labor (2.92), pest and disease infestations (2.90), risk due to the perishable nature of mushrooms (2.82), and composting problems (2.81). Further challenges identified were

unorganized marketing channels (2.78), insufficient government subsidy (2.73), limited training and extension support (2.50), restricted post-harvest and processing options (2.43), and lack of storage and transportation facilities (2.33). Less severe constraints included lack of capital/credit facilities (1.88), inadequate infrastructure (1.52), non-availability of quality spawn and compost (1.45), and limited awareness of government assistance (1.43). The least impactful constraint was lack of support from family members (1.13), indicating that this factor had a minimal effect compared to other challenges faced by mushroom growers.

**Fig 1:** Constraints faced by the mushroom growers

4. Discussion

The findings revealed that mushroom growers face several economic, technical, and marketing constraints that significantly affect the profitability and sustainability of mushroom cultivation. Among the identified constraints, high maintenance cost (WMS = 2.98) emerged as the most severe, indicating the substantial financial burden associated with maintaining mushroom production units. Similarly, the seasonal nature of mushroom cultivation (WMS = 2.98) and low market prices during peak production periods (WMS = 2.96) were perceived as major constraints, reflecting market instability and reduced profitability due to seasonal oversupply. The constraints of low profitability (WMS = 2.93) and lack of marketing skills (WMS = 2.93) suggest that growers face difficulties in securing remunerative returns and effectively marketing their produce. Furthermore, non-availability of skilled labour (WMS = 2.92) and pest and disease infestation (WMS = 2.90) were reported as important production-related challenges affecting yield and quality. Respondents also identified inadequate knowledge about mushroom cultivation (WMS = 2.85), risk associated with the perishable nature of mushrooms (WMS = 2.82), problems in compost preparation (WMS = 2.81), and unorganized marketing channels (WMS = 2.78) as significant constraints. These findings highlight the need for strengthened extension services, technical training, improved storage facilities and better market linkages. Moderate constraints included inadequate government subsidy (WMS = 2.73), limited training, extension activities and departmental cooperation (WMS = 2.50), limited post-harvest processing facilities (WMS = 2.43) and lack of storage and transportation facilities (WMS = 2.33). Comparatively lower-ranked constraints were lack of capital and credit facilities (WMS = 1.88), inadequate infrastructure (WMS = 1.52), non-availability of quality spawn and compost (WMS = 1.45) and a lack of awareness regarding government assistance and subsidies (WMS = 1.43).

The least severe constraint was lack of support from family members (WMS = 1.13), indicating that family support is generally available to mushroom growers. This finding is in line with the observations of Karthick and Hamsalakshmi (2016) ^[6]. Overall, the results suggest that reducing production costs, strengthening extension support, enhancing technical and marketing skills and improving market infrastructure are essential for promoting sustainable mushroom cultivation.

5. Conclusion

On the basis of results, it can be concluded that mushroom growers face several production, marketing and institutional constraints that affect the profitability and sustainability of mushroom cultivation. High maintenance costs, the seasonal nature of production and low market prices during the peak season emerged as the most severe constraints. Lack of marketing skills, low profitability, a lack of skilled labor, pest & disease infestations and inadequate technical knowledge were also reported as major challenges. The study highlights the need for strengthened extension support, capacity-building programs, improved market infrastructure and enhanced institutional assistance to promote the sustainable growth of mushroom cultivation.

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