



# REVIEW OF RESEARCH

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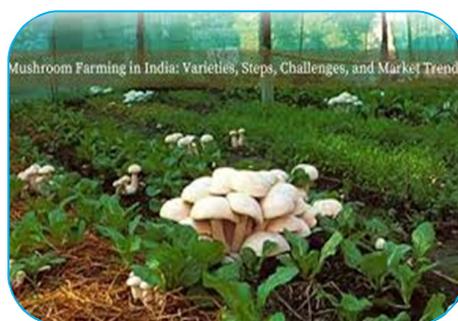
## MUSHROOM CULTIVATION IN INDIA: PRODUCTION TRENDS AND EMERGING OPPORTUNITIES

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### ABSTRACT:

*In India, growing mushrooms has become a high-value, low-space and short-duration agricultural activity that supports rural entrepreneurship, income production and nutritional security. In addition to analyzing regional production patterns across Northern and Southern states, this study looks at mushroom production trends in India from 2010–11 to 2019–20. CAGR and trend methodologies were used to examine data from sources like the National Horticulture Board, NABARD, and FAO. The results suggest that rising states like Bihar, Karnataka, Chhattisgarh, and Jharkhand experienced substantial increase, while established producers like Haryana, Himachal Pradesh, and Tamil Nadu maintained steady output. Additionally, government measures from 2010–11 to 2019–20 are reviewed in the study including support under the Mission for Integrated Development of Horticulture (MIDH), National Horticulture Mission (NHM) and Rashtriya Krishi Vikas Yojana (RKVY), alongside ICAR-led research and skill development programs. These involvements, united with infrastructure, nutritional promotion and market association have changed mushroom cultivation into an advantageous and sustainable agro-entrepreneurial venture in India.*



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**KEYWORDS:** Production, Cultivation, Growth, Profitable.

### INTRODUCTION

Agriculture is the main source of income and the bulk of the food for India's enormous population; hence it plays a significant role in the country's economy. It includes the transportation, processing and sale of agricultural goods and sustains the livelihoods of farmers and agricultural laborers. Bihar is the state that produces the most mushrooms in India, which is the subject of this study. Because they are regarded as high-value commodities, there is a sizable market demand for mushrooms, and mushroom farming has developed into a specialized agricultural endeavor to satisfy this expanding demand. Growing fungus for either personal or commercial use is known as mushroom farming. White button, oyster, shiitake, and Portobello mushrooms are common types that can be grown either indoors or outdoors. While small-scale farming serves individual needs, commercial farms are able to produce vast numbers to supply restaurants and stores. Traditional medicine also uses mushrooms. Mushroom farming, which calls for certain management and expertise, may be a lucrative endeavor for farmers and business owners.

Mushroom farming has a long and intriguing history that dates back to the prehistoric era. Farmers were already cultivating shiitake mushrooms in China by the 12<sup>th</sup> century, when the practice

was first recorded. Shiitake mushroom growing on oak planks was initially brought to Japan around 1700. European mushroom farming began in the late 17<sup>th</sup> century when champignon mushrooms were first cultivated in caverns in France. The champignon mushroom quickly became well-known and was cultivated in the US and Europe. Around the turn of the 20<sup>th</sup> century, commercial mushroom cultivation began in the United States. As the country's main mushroom-producing region, Pennsylvania has expanded dramatically since its founding as the first commercially successful mushroom farm in 1896. Millions of pounds of the edible plant are produced each year by the multimillion dollar industry that is Mushroom farming today.

### REVIEW OF LITERATURE

Kratika Sharma (2015) in his paper describes the several kinds of edible mushrooms that are consumed in India, as well as how they are grown and prepared. Fungi like mushrooms are prized for both their taste and nutritional content. They are cultivated with specifically propagated spawns on well prepared compost. Since mushrooms can be grown on any substrate made from clean agricultural waste. Cherian and Jose (2020) noted in their study that the minimal capital investment required is the reason why mushroom gardening is becoming popular in India. In regions with a shortage of land and a surplus of agricultural waste, the method may be profitable. Additionally, the technology used to cultivate mushrooms is environmentally benign. Because of their high nutritional content and ease of digestion, mushrooms are becoming more and more important in today's healthy diet. Aditya and Bhatia (2020) in their research article researched that that mushroom growing can be embraced as profitable agro entrepreneur by rural women successfully and it has been projected that due to the adoption of this venture. It is necessary to promote mushrooms as a nutrient-dense food. Women force will get another dimension of the entrepreneurial skill among effort in direction which would lead to a better human resource development.

### OBJECTIVES OF THE STUDY

The main objectives of the study are:

- To study the production of mushroom in India.
- To examine the government initiatives to promote mushroom production in India

### RESEARCH METHODOLOGY

Compound Annual Growth Rate (CAGR) and Growth Index were used in the analysis. The goal of combining this methodology is to draw attention to the direction, volatility and stability of India's mushroom production. The data on mushroom production used in this study collected from the National Horticulture Board, NABARD, FAO and other secondary sources.

### DISCUSSION AND ANALYSIS

In India, states like Haryana, Punjab, Uttar Pradesh and Himachal Pradesh are the main producers of button mushrooms, which are followed by oyster and milky mushrooms. During the period from 2010-11 to 2019-20 was a notable geographic change and huge growth in India's mushroom production. In the past, the sector was dominated by temperate northern states like Himachal Pradesh, which continued to play a significant role because of its well-established infrastructure and the existence of the ICAR-Directorate of Mushroom Research. But as the decade went on, Haryana became a dominant force, frequently topping the national output records because to its extensive commercial facilities that focused on white button mushrooms. Maharashtra, Odisha, and Punjab, which profited from the use of contemporary climate-controlled farming methods, were other important contributors at this time. Due to vigorous state-level promotion and strong adoption rates among small-scale farmers, Bihar notably rose quickly in the second half of this decade, surpassing many traditional leaders to become a top producer by 2019-20.

**TABLE-1**  
**PRODUCTION OF MUSHROOM IN INDIA DURING THE PERIOD 2010-11 TO 2019-20**

(In Thousand Tonnes)

Year	Production	Growth Index
2010-11	40.7	100
2011-12	25.7	63.144963
2012-13	28.2	109.72763
2013-14	17.1	60.638298
2014-15	51.1	298.83041
2015-16	436	853.22896
2016-17	441	101.14679
2017-18	487	110.43084
2018-19	182	37.371663
2019-20	211	115.93407

**Source:** Indiastat

Table 1 displays India's mushroom production in thousand tonnes from 2010-11 to 2019-20, along with the growth index. In 2011-12, production fell precipitously to 25.7 thousand tonnes (growth index 63.14). Before dropping once more to 17.1 thousand tonnes in 2013-14, it made a minor recovery in 2012-13 (to 28.2 thousand tonnes). Production increased significantly in 2014-15, reaching 51.1 thousand tonnes, and then experienced an extraordinary spike in 2015-16, reaching 436 thousand tonnes (growth index 853.23). In 2016-17 and 2017-18, production increased moderately more, peaking at 487 thousand tonnes. Nonetheless, output experienced a significant drop in 2018-19 (182 thousand tonnes), followed by a little recovery to 211 thousand tonnes in 2019-20. The table shows notable variations overall, with notable rise following 2014-15 and a substantial peak in 2017-18 before to an abrupt decline and partial recovery.

**TABLE-2**  
**PRODUCTION OF MUSHROOM IN NORTHERN INDIA DURING THE PERIOD 2017-18 2020-21**

(In Thousand Tonnes)

States/UTs	2017-18	2018-19	2019-20	2020-21	CAGR
Arunachal Pradesh	0.06	0.06	0.06	0.08	9.013
Assam	0.22	0.22	1.2	1.4	106.436
Bihar	5.6	5.6	20.28	21.33	69.874
Chhattisgarh	0.54	7.6	1.05	13.9	117.382
Delhi	3.16	3.16	3.16	3.25	-200.846
Goa	4.47	4.47	6.4	6.5	15.976
Gujarat	12	12	14	14.5	7.485
Haryana	20.05	20.05	20.05	19.6	-0.678
Himachal Pradesh	14.51	14.51	15.6	14.8	1.326
Jammu & Kashmir	0.77	1.5	1.5	3.5	57.497
Jharkhand	1	1	3	7.5	104.282
Madhya Pradesh	0.5	0.5	0.5	1.5	39.038

**Source:** National Horticulture Board, Ministry of Agriculture and Farmers Welfare, Government of India, New Delhi.

Table 2 shows the Compound Annual Growth Rate (CAGR) and the amount of mushrooms produced in a few Northern Indian States and Union Territories between 2017-18 and 2020-21 (in thousand tonnes). The data reveals significant differences in growth trends and production levels. Though, it displayed a little negative CAGR (-0.678), suggesting stagnation, Haryana continuously

reported one of the highest output levels among the states (about 20,000 tonnes). Along with minimal growth, Himachal Pradesh's production remained steady and comparatively high. Over the period, Goa and Gujarat displayed gradual and modest increases. Despite lower initial output levels, Chhattisgarh (CAGR 117.382), Assam (106.436), and Jharkhand (104.282) showed rapid increase. Bihar experienced impressive increase, rising from 5.6 to 21.33 thousand tonnes. Jammu & Kashmir also saw significant progress. Delhi, on the other hand, had a negative CAGR despite nearly constant production numbers. Overall, the table shows that throughout this time, mushroom production increased rapidly in a number of smaller or emerging states, even as historically powerful growers maintained steady output.

**TABLE-3**  
**PRODUCTION OF MUSHROOM IN SOUTHERN INDIA DURING THE PERIOD 2017-18 TO 2020-21**  
(In Thousand Tonnes)

States/UTs	2017-18	2018-19	2019-20	2020-21	CAGR
Tamil Nadu	11.48	11.48	11.48	11	-1.273
Karnataka	1.22	1.22	1.22	4.5	47.929
Kerala	0.91	0.91	0.91	1	2.869
Andhra Pradesh	3.65	3.65	3.65	3	-5.713

**Source:** National Horticulture Board, Ministry of Agriculture and Farmers Welfare, Government of India, New Delhi

The output of mushrooms in Southern India from 2017–18 to 2020–21 is shown in Table 3 for each of the four main states. A negative Compound Annual Growth Rate (CAGR) of -1.273 percent was achieved by Tamil Nadu, which continuously maintained the highest production at 11.48 units from 2017–18 to 2019–20 before slightly decreasing to 11 units in 2020–21. With the greatest CAGR of 47.929 percent among the states, Karnataka's production increased dramatically, from a stable 1.22 units during the first three years to 4.5 units in 2020–21. Kerala showed modest increase, with production rising to 1 unit in 2020–21 after being steady at 0.91 units for three years, indicating a positive CAGR of 2.869 percent. On the other hand, Andhra Pradesh's output remained steady at 3.65 units from 2017–18 to 2019–20, but it fell to 3 units in 2020–21, resulting in a negative CAGR of -5.713 percent. Overall, the table shows that Karnataka had the most notable rise during the time, even though Tamil Nadu continued to be the top producer.

### GOVERNMENT INITIATIVES AND PRODUCTION OF MUSHROOM IN INDIA

In an effort to diversify horticulture, boost farmers' incomes and advance nutritional security, the Indian government launched a number of strategic programs to boost mushroom output between 2010–11 and 2019–20. It was acknowledged that growing mushrooms was a short-term, low-land, high-value business that would be ideal for women, young people living in rural areas and tiny and marginal farmers. Strengthening horticulture development programs under the National Horticulture Mission (NHM), which offered funding for the establishment of training centers, compost preparation facilities, spawn production labs and mushroom production units, was one of the main initiatives undertaken during this time. In order to build mushroom sheds, buy equipment, and use better cultivation techniques, subsidies were offered. This assistance fostered broader adoption across states and greatly decreased the initial investment burden.

The government sustained and increased support for mushroom farming in 2014–15 when it combined many horticulture programs under the Mission for Integrated Development of Horticulture (MIDH). Credit-linked back-ended capital subsidies were made available under MIDH for the construction of spawn production facilities, controlled environment mushroom units, and post-harvest infrastructure such pack houses and cold storage. In order to help farmers' access better markets and lower post-harvest losses, the program also sponsored the creation of value addition units for drying, processing and packaging mushrooms. MIDH was instrumental in increasing mushroom output in the second half of the decade through coordinated efforts between the federal and state governments. The

Rashtriya Krishi Vikas Yojana (RKVY) was another significant initiative that gave states the freedom to plan horticultural and agricultural projects in accordance with regional objectives. Several states established training-cum-production centers, distributed high-quality spawn, organized awareness campaigns, and carried out demonstration projects using RKVY funds to encourage mushroom farming. RKVY's decentralized structure made it possible to implement region-specific marketing plans, particularly in places with climate conditions that are ideal for growing mushrooms. During this time, the Indian Council of Agricultural Research (ICAR) provided direction for the strengthening of research and development processes. Research organizations attempted to standardize production technologies for various agro-climatic zones, improve composting methods, and create disease-resistant and high-yielding mushroom species.

Through training initiatives and partnerships with State Agricultural Universities and Krishi Vigyan Kendras (KVKs), the ICAR-Directorate of Mushroom Research at Solan was instrumental in advancing improved cultivation techniques, generating breeding spawn and coordinating nationwide research activities. These programs increased the nation's mushroom production's sustainability, quality and productivity. Additionally, the government placed a strong emphasis on skill development and capacity building. To provide farmers, self-help organizations and rural youth with hands-on experience in spawn production, compost preparation pest and disease management, and post-harvest handling, training programs were arranged through KVKs, Agricultural Technology Management Agencies (ATMA) and state horticulture departments. The production of mushrooms was marketed as a feasible microbusiness that required little funding and space, making it particularly appropriate for female entrepreneurs and homes without land. A variety of entrepreneurship development programs and access to institutional credit further supported new competitors into the sector.

Another crucial area of engagement was infrastructure development. Mushrooms are perishable; the government encouraged the construction of refrigerated transportation, cold chain facilities and contemporary marketing infrastructure through MIDH and other programs. Product quality and shelf life were enhanced with the use of pack houses and grading equipment. By encouraging participation in agricultural fairs and exhibitions, promoting branding and packaging, and putting producers in touch with organized retail chains and exporters, efforts were also made to improve market ties.

Furthermore, in a number of states, mushroom farming was incorporated into livelihood and nutrition initiatives. Backyard farming programs and dietary diversity campaigns promoted mushrooms because of their high protein and vitamin content. Targeted measures with greater subsidy assistance were implemented to promote adoption in hilly and northeastern regions, where the climate is ideal. To improve accessibility for small farmers, low-cost production models utilizing locally accessible materials were created. In order to boost mushroom production, the Indian government developed a comprehensive approach between 2010–11 and 2019–20, combining financial incentives, research support, talent development, infrastructure creation and market promotion. With the help of programs like NHM, MIDH and RKVY, as well as robust research funding from ICAR universities, mushroom growing became a significant part of India's horticulture diversification and rural entrepreneurship.

## CONCLUSION

Thus, it can be concluded that the mushroom industry is essential to rural development because it generates revenue and fights poverty. In India, mushroom cultivation has developed into a specialized agriculture sector, despite notable geographical differences. While southern states have slower development rates, northern states like Bihar, Maharashtra, and Odisha have demonstrated remarkable growth. Mushrooms are still in scarce supply despite increased output. In order to remedy this, the government ought to provide further subsidies to the mushroom producers in the form of equipment, spawn, straws, and cash. Over the past ten years, India's mushroom production has grown and diversified significantly thanks to both market demand and calculated government assistance. While new regions showed tremendous increase, indicating the possibility for universal adoption, traditional

mushroom-producing states maintained consistent production. Financial aid, skill development, infrastructure, and market access were all made possible by government programs like NHM, MIDH, and RKVY, which were backed by ICAR research and extension services. In addition to being a lucrative business for small and marginal farmers, mushroom growing now supports entrepreneurship, rural employment, and nutritional security. Sustaining growth will depend on ongoing assistance and the spread of technology.

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