

*Research Paper*

Spatio-temporal Pattern of Mushroom Production in Haryana: During Post-liberalization Period

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Abstract

The significance of horticulture has increased during recent period in Haryana. Increase in the production of mushroom crop has benefited farmers economically. Mushroom cultivation helps in increasing agricultural profitability; enhance food's nutritional value and recycling farm waste. The present study analyses the pattern of mushroom production in Haryana. The study also tries to find out the impact of National Horticulture Mission (NHM) on mushroom production in the state. It is a secondary databased study of mushroom production in Haryana. The study covers a period of 31 years i.e., from 1990-91 to 2020-21. The study has been bifurcated into three-time period i.e., 1990-91, the year just before initiation of economic liberalization; 2005-06, the year of initiation of National Horticulture Mission and 2020-21, the latest period for which secondary data is available. The study brings out that mushroom cultivation in Haryana is getting significance with respect to time. The state is witnessed with regard to growth of mushroom production. The annual compound growth rate (8.32 percent) from 1990-91 to 2020-21 reveals that since 1990-91 mushroom production in the state is increasing at exponential rate. However, annual compound growth rate (3.28 percent) from 2005-06 to 2020-21 indicates marginal impact of National Horticulture Mission on mushroom production. The spatial pattern of mushroom production depicts that its production is mainly centered around GT belt and National Capital Region (Delhi).

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Introduction:

Agriculture is the backbone of Haryana's economy. Haryana is one of the agricultural developed states in India. Positive and significant impact of green revolution can be traced from the agriculture sector of Haryana. The infusion of high yield variety seeds and modern technology package has increased the agricultural production in the state at exponential rate. However, such a progress resulted into crop concentration. The place of almost all crops has been captured by wheat and rice in the most of the districts of Haryana. Such a change in cropping pattern leads to many other issues like extensive use of modern technology package (mechanization etc.)

has declined the employment opportunities. The other problems like exhaustion of ground water resources, decline in bio-diversity and problem of pest and weeds are result of such an extensive agriculture. To overcome from the most of the above stated issues the government as well as progressive farmers in the state are focusing towards horticulture. The post liberalization period has witnessed in increase in the area and production of horticulture crops in Haryana (Singh and Jaglan, 2019). The present paper focus on mushroom cultivation. Mushroom cultivation has a vast socio-economic dynamic. Its cultivation provides ample job opportunities and

capable in money generation. Due to the high nutritional values mushroom generate a self-sufficient market (Sharma, 2015). Mushroom cultivation has a diversified impact on economy, ecology etc. Ecologically its cultivation has zero emission of natural gases. Besides it, mushroom cultivation helps in managing and recycling farm waste (Saha, 2021). Mushroom cultivation has an ability to gear up economic sustainability (Imtiaz, 20214). However, like other horticultural crops mushroom cultivation is also not free from constraints. Mushroom growers face many significant constraints like lack of marketing facilities, non-availability of proper marketing channels, non-availability

of quality spawns and lack of government support (Lama et al., 2022).

Study Area

The present study covers the Haryana state which lies in the north-western part of India (Fig. 1). The state came into existence on November 1, 1966, after carved out from Punjab state. The state covers an area of 44212 square km, which is 1.4 percent of total geographical area of country. Latitudinal and longitudinal dimensions of the state are 27° 39' to 30° 35'N and 74° 28' to 77° 36' E.

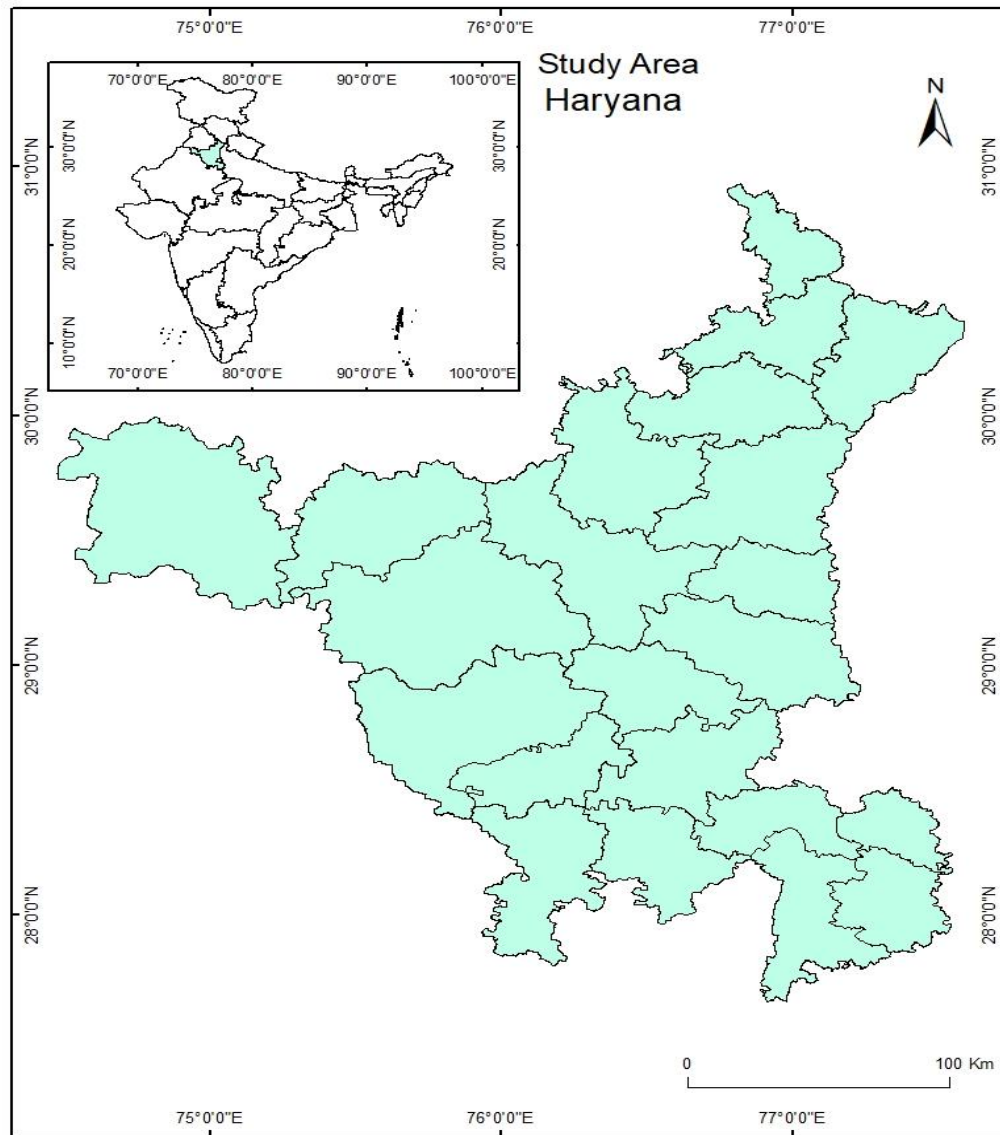


Figure 1: Study Area Haryana

Alluvial plain formed by deposits of Yamuna and Ghaggar rivers is the largest physiographic division of the state; however lower Shivalik hills lies in the north-eastern part and patches of Aravalli hills present in the south and south-western part of the state. The altitude from the mean sea level of the state varies from 200 to 1200 m. The annual rainfall

varying from 300 to 1000 mm, which declines from northeast to west and southwest (Singh, 1976). Most of the rainfall occurs during the monsoon season, however, due to the phenomena of western disturbance some rainfall occurs in winter season also. The temperature in the state reaches upto 45° C or more, while winters in the state remain mild. The

common vegetation of Haryana are deciduous forest and thorny shrubs.

Objectives of the Study

The study attempts to evaluate the following objectives based on geographical perspective.

1. To study the dynamics of mushroom production in Haryana during post liberalization period.
2. To examine the spatial pattern of mushroom production in the state.

Research Questions

The present study shall investigate following research questions.

1. What are the trends of mushroom production during post liberalization period in Haryana?
2. What is the Spatio-temporal pattern of mushroom production in the state since 1990s?

Material and Methodology:

The present study covers a period of 31 years i.e., from 1990-91 to 2020-21. The study has been bifurcated into three time periods i.e., 1990-91, the year just before initiation of economic liberalization period; 2005-06, the year of initiation of National Horticulture Mission; 2020-21, the latest period for which secondary data is available. The study is based on secondary sources of data, which has been taken from Horticulture Department of Haryana. The study uses time-series district level data, the temporal changes in the production has been shown by bar diagrams whereas, and spatial variation have been depicted through choropleth maps. The compound growth rate of mushroom production has been computed with the help of following formula.

$$R = [\{ \text{Anti log} (\log X_2 - \log X_1) / i \} - 1] \times 100$$

Here

R = Annual Compound Growth Rate

X₁ = Production during Initial Phase of Study

X₂ = Production during Final Phase of Study

Results and Discussion:

Trends of Mushroom Production

Importance of mushroom cultivation is very high despite a marginal share of its production among all horticultural crops in Haryana. Along with health benefits (high nutritional values) mushroom cultivation also provides ample source of employment, which helps in improving socio-economic status of farmers. It is evident that mushroom production in the state is increasing consistently over the period 1990-91 to 2020-21 (Fig. 2(a)). From 1990-91 to 2020-21 overall mushroom production in Haryana increased from 850 to 10139 tones. There is about twelve-fold increase in the production from 1990-91 to 2020-21 in the state. The overall annual compound growth rate during this period is 8.32 percent (Table 1), which is remarkably high. However, for the period 1990-91 to 2005-06 (Initiation of National Horticultural Mission) mushroom production in the state was very high. The overall production during this period increased from 850 to 6044 tons from 1990-91 to 2005-06 (Fig. 2(b)). It shows about seven-fold increase in the mushroom production during this period. The annual compound growth rate during this period was 13.97 percent (Table1). The effect of National Horticultural Mission on mushroom production in Haryana can be traced with the help of Fig. 2(c). The finding from the study reveals that from 2005-06 to 2020-21 there was only 1.67 times increase in the overall production i.e., from 6044 to 10139 tones. The annual compound growth rate during this period was 3.28 percent (Table 1). The above finding shows a marginal effect of National Horticultural Mission on mushroom production in Haryana.

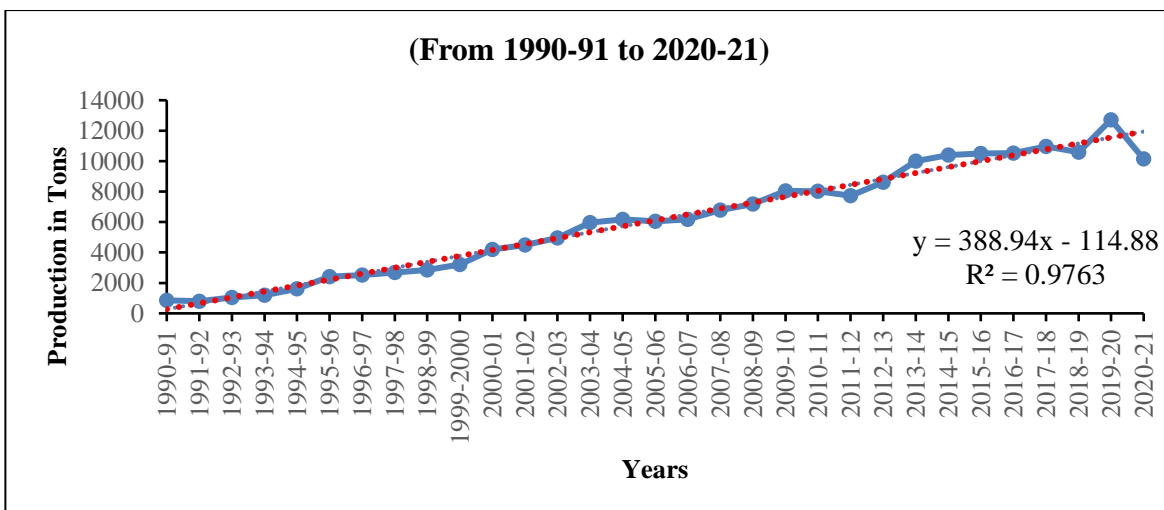


Fig. 2(a): Trends of Mushroom Production in Haryana

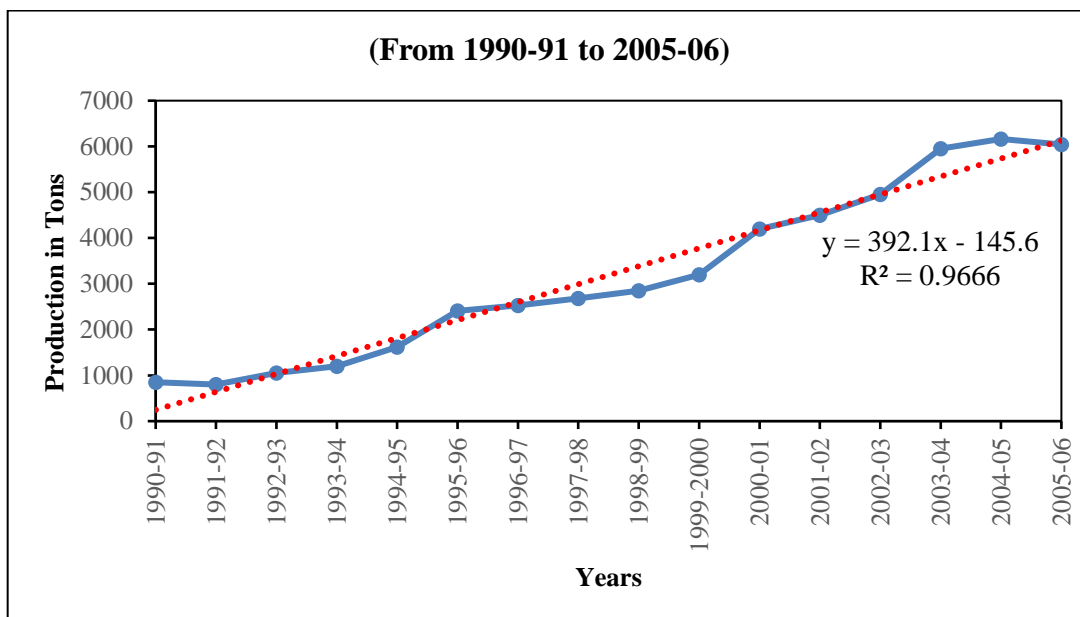


Fig. 2(b): Trends of Mushroom Production in Haryana

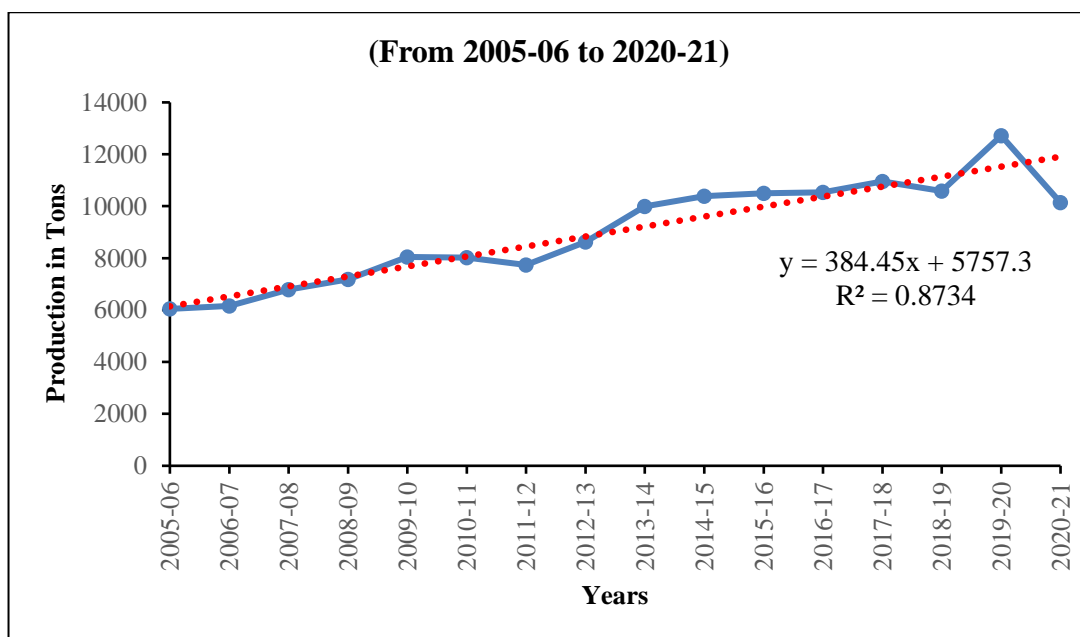


Fig. 2(c): Trends of Mushroom Production in Haryana

Period	Annual Compound Growth Rate (Percent)
2005-06 over 1990-91	13.97
2020-21 over 2005-06	3.28
2020-21 over 1990-91	8.32

Source: Computed by Authors (Based on Secondary Sources of Data)

Table 1: Annual Compound Growth Rate of Mushroom Production in Haryana

Spatial Pattern of Mushroom Production

Table 2 and fig. 3 shows the spatial distribution of mushroom production in Haryana. The findings of the study reveal that during 1990-91 i.e., just before the economic liberalization period total mushroom production in the state was 850 tons only. Among the districts, Sonipat district with more than half of the total production was the leading producer, followed by Gurugram district (about one-third production).

It is important to note that during this period, mushroom production was centered towards these two districts in the state and both these districts produced about 90 percent of the total mushroom production of the state. However, with the passes of time mushroom production became popular among farmers in Haryana. During 2005-06, total mushroom production in the state became 6044 tons with a seven-fold increase. Among the districts with one-third production

Sonipat district was the leading mushroom producer followed by Panipat district (about 20 percent), and Gurugram district (about 13 percent). The findings of the study also reveal that from 1990-91 to 2005-06 infusion of mushroom cultivation spread among the all districts of Haryana. However, during 2020-21 (latest period of study) total mushroom production in the state became 10139 tons. Among the districts, Panipat district (22.51 percent) was the leading mushroom producer, followed by Sonipat district (19.92 percent),

Yamuna Nagar district (12.33 percent), and Kurukshetra district (12.31 percent). It is interesting to note that before 2020-21 districts of northern Haryana had a marginal share in mushroom production but during 2020-21 period of study, these districts show a remarkable growth in the mushroom production in the state. The study also reveals that except Gurugram, Jhajjar, Panchkula, and Rohtak districts all other districts of Haryana are showing a significance growth in mushroom production.

District/Year	1990-91	2005-06	2020-21
Ambala	0(0.00)	172(2.85)	382(3.78)
Bhiwani	0(0.00)	1(0.01)	7(0.06)
Charkhi Dadri	DNA	DNA	DNA
Faridabad	13(1.54)	28(0.47)	102(1.00)
Fatehabad	DNA	45(0.74)	382(3.77)
Gurugram	288(33.88)	775(12.82)	10(1.00)
Hisar	2(0.23)	165(2.73)	546(5.39)
Jhajjar	DNA	12(0.20)	5.5(0.05)
Jind	7(0.82)	165(2.72)	462(4.56)
Kaithal	0(0.00)	145(2.40)	390(3.86)
Karnal	37(4.35)	385(6.39)	762(7.51)
Kurukshetra	10(1.17)	197(3.26)	1249(12.31)
Mahendragarh	0(0.00)	3(0.04)	35(0.34)
Nuh	DNA	DNA	0(0.00)
Palwal	DNA	DNA	28(0.27)
Panchkula	DNA	80(1.32)	68(0.68)
Panipat	0(0.00)	1222(20.22)	2283(22.51)
Rewari	0(0.00)	1(0.01)	28(0.28)
Rohtak	13(1.54)	270(4.47)	16.8(0.17)
Sirsa	0(0.00)	22(0.37)	112.7(1.11)
Sonipat	480(56.47)	2020(33.42)	2020(19.92)
Yamuna Nagar	0(0.00)	336(5.56)	1250(12.33)
Haryana	850(100.00)	6044(100.00)	10139(100.00)
Source: Directorate of Horticulture Department, Haryana			
DNA: Data Not Available			

Table 2: District-wise Mushroom Production in Haryana (Tones)

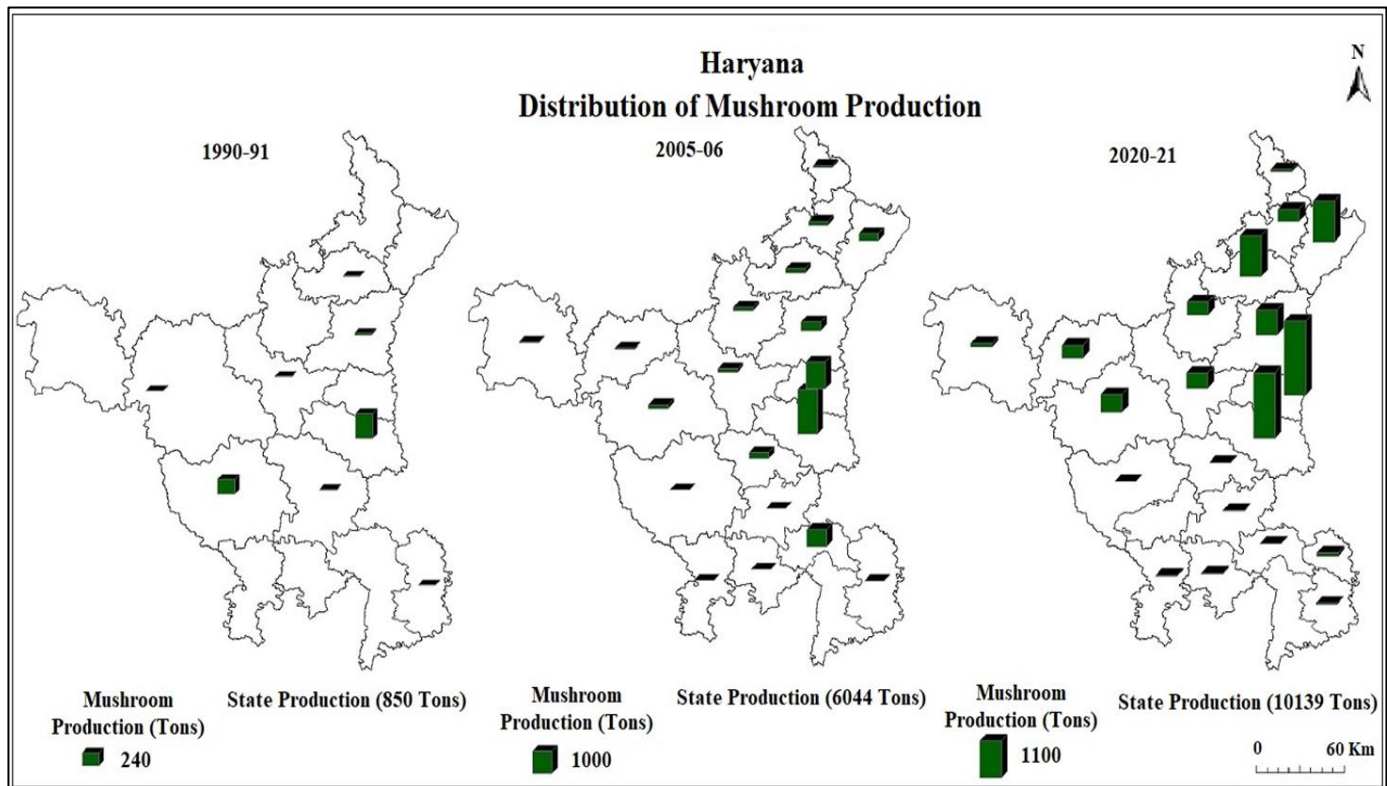


Figure 3: Distribution of Mushroom Production in Haryana (2005-06)

Conclusion and Suggestions:

Mushroom cultivation in Haryana is getting significance with respect to time. The production in the state has increased consistently over the period 1990-91 to 2020-21. The state is witnessed with regard to growth of mushroom production. The annual compound growth rate (8.32 percent) reveals that since 1990-91 mushroom production in Haryana is increasing with a remarkable scale. The annual compound growth rate during 2005-06 and 2020-21 was 3.28 percent which indicates that the impact of National Horticulture Mission (NHM) on mushroom production in Haryana is marginal. However, there is significant difference in mushroom production among the districts during the initial phase of study period (1990-91). During this time period mushroom cultivation was limited to two districts i.e., Sonipat and Gurugram. One of the probable reasons behind such a concentration may be traced with the market demand in national capital region (NCR). Infusion of mushroom cultivation in other districts of Haryana entered later on. During the final phase of study (2020-21) mushroom production can be traced in all districts of Haryana. However, there is a high variation in their production. The findings of the study depicts that the districts which has direct access to grand trunk road (GT belt) produce more mushroom than other districts of Haryana. Better transportation facilities in this region along with well-established market may be the significant cause behind such a geo-spatial concentration. To increase the mushroom production in Haryana government should focus on regional variations. There should be more focus on the districts of south-west and western Haryana.

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