Original Research Article

Constraints in adoption of mushroom cultivation and impact of training programme to improve the adoption status of farmers of northern Gangetic plains of India.

Abstract

Mushroom Cultivation as an entrepreneur provides ample of opportunities for sustaining rural livelihood. Krishi Vigyan Kendra, ICAR-Indian Institute of Sugarcane research, Lucknow is actively involved to provide practical training programme on button mushroom cultivation in growing season. Main objective of training programmes on mushroom production is to promote mushroom production as a self-employment venture, which can ultimately improve the socioeconomic condition of farmers. It has been also observed that some of the people trained at KVK, ICAR-IISR, Lucknow have adopted mushroom cultivation while some have not. It was found worthwhile to study the major constraints in adoption of mushroom cultivation as an enterprise. With this objective, the present study on constraints in adoption and impact of training programme to improve the adoption status of farmers was carried out at KVK, ICAR-IISR, Lucknow from 2017 to 2021. A total of 250 trainees trained by KVK, ICAR-IISR, Lucknow were selected as respondents. The data revealed that issues related to lack of government support (96.5%) along with less remuneration being a seasonal activity (87.3%) and non-availability of quality spawn (85.5%) are the major constraints in adoption of this venture. In order to find out the relationship between ranks accorded by groups of respondents to different categories of constraints, rank order correlation was calculated.

Key Words: Mushroom Cultivation, Constraints, Adoption, Training Programme.

1. Introduction :

Mushrooms are a good source of soluble protein and fiber which plays an important role in human health. Mushroom protein being easily digestible (70-90%) is considered superior to vegetable proteins. Low protein intake by Indians leads to fatigue, sluggish metabolite, low synthesis of brain hormones and immunity. The prompt way to produce quality protein products will rescue the country from malnutrition. To finding the alternative way to produce cheat and quality food to overcome the malnutrition, microbes and the edible mushrooms are most important. In India, awareness about consumption and health benefits of mushrooms available for cultivation is limited, their demand is also less. The cultivation of *Pleurotus ostreatus* mushrooms tends first in followed by *Agaricus bisporus* mushroom in India in terms of popularity and consumption.

Sharma *et. al,*2017 revealed that mushroom industry has expanded very rapidly in the last two decades by the addition of newer types of mushrooms for commercial cultivation throughout world. However, mushroom as a vegetable is yet to find regular place among the Indian consumers. Despite of

favorable agro-climate, abundance of agro wastes, relatively low-cost labor and a rich fungal biodiversity, India has witnessed a lukewarm response in its growth. At present, the total mushroom production in India is approximately 0.13 million tons. From 2010-2017, the mushroom industry in India has registered an average growth rate of 4.3% per annum. Out of the total mushroom produced, white button mushroom share is 73% followed by oyster mushroom (16%), paddy straw mushroom (7%) and milky mushroom (3%). Compared to other vegetables; per capita consumption of mushrooms in India is meager and data indicates it is less than 100 grams per year. In the year 2016-2017, Indian mushroom industry generated revenue of Rs. 7282.26 lacs by exporting 1054 quintals of white button mushroom in canned and frozen form. By considering the production statistics, the spawn demand in India is estimated about 8000-10000 tons per annum. Majority of this commercial spawn to the growers is being supplied by the private units and the contribution of public sector organizations in spawn supply was limited to 10%.

The global mushroom industry has grown rapidly in recent years in terms of beneficial effects, market value, and demand. India has a wide range of agro-climatic conditions and is largely an agricultural country with a cultivated area of about4.37 %, generating about 620 million tons of agro waste annually. Mushroom cultivation not only helps recycle agro wastes, but also fills the nutritional gap prevalent among a large population of India. Recently, government industrial policy and creative innovation has promoted research and other endeavors aiming towards the cultivation of mushrooms (Raman *et al*.,2018).India has great potential for production of mushroom from abundantly available recyclable agro-waste like cereals straws, enormous domestic market, cheapman power, congenial climate, strong technical base and government support (Kaul, 1999). In this context, there is a widespread agreement among agricultural scientists to the importance of adoption of subsidiary occupations in rural area. Among these, mushroom cultivation constitutes an important and crucial segment for increasing food production, which provides extra income to the farmers other than their field crops during winter in Punjab. Sangrur has location specific advantage being nearer to big cities as Ludhiana, Patiala and Chandigarh and therefore, potential market is available for marketing of mushroom. Therefore, there is urgent need to provide the facilities for setting up to viable units for increase in quality of mushroom production. In the era of science and technology, Krishi Vigyan Kendra (KVKs) are functional in various districts of our country having the objectives to solve the problem of un-employment in the rural areas of their respective district by providing vocational training and advisory services to strengthen the allied enterprises other than crop production in the area as a source of subsidiary business or main source of income for diversification of agriculture and increase of farmers income per unit area. The training programmes of KVK are multipurpose one to cover not only the various needs of a farmers but also the entire needs of village and community (Choudhary,1999 and Sharma *et al.,* 2013).

After training, follow up extension programmes are undertaken (Singh *et al.*, 2013). In the present study, an attempt have been made to analyze the impact of vocational training programmes on “Mushroom producion” with the objective to motivate the establishment of maximum number of mushroom units in district Lucknow so as to increase adoption percentage of this occupation by trainees. Keeping in view

the increasing demand of mushroom, the study is based on the primary data collected from the mushroom trainees and the study was carried out during 2018-21. The main objective our study is to encourage the farmers' to take up mushroom cultivation as an enterprise through adoption of scientific mushroom cultivation technology.

2. Material and Methods:

Krishi Vigyan Kendra, ICAR- Indian Institute of sugarcane Research, Lucknow, U.P. was conducted fifteen days vocational training programme on "Button Mushroom Cultivation" for employment generation of youths of Lucknow district. The present study was conducted to impact analysis of button mushroom cultivation training programme of last five year (2017-18 to 2021-22). Training programme imparted to skill development in button mushroom cultivation. In this fifteen days vocational training programme cover all the aspects of button mushroom production along with processing and marketing also. Training programme was based on 'learning by doing' and 'seeing by believing' principal. Farmers, youths continuous visited to KVK, ICAR-IISR, Lucknow to solve their quires. Among them mushroom production training seekers came to knew about training programme also. During this period they also filled a performa to participate in button mushroom training programme. Other than this google form also sent in different whattsapp groups of farmers. All interested youths or farmers called to KVK for their primary evaluation. This was conducted through questioner and viva-voce. Durining training programme a low cost button mushroom production unit established at KVK farm. In this processes i.e. compost preparation, hut preparation, spawing casing preparation and their use irrigation, harvesting, washing and packaging, all steps were carried out by trainees under training programme. Day to day, these steps also followed by trainees at their home in newly established button mushroom unit. So, they grew button mushroom, at KVK as well as his home. The trainees were interacted personally for the feedback or study purpose. A total of 250 farmers were exclusively imparted button mushroom training during the above said period.

3. Results and Discussion:

This study was conducted by KVK, ICAR-IISR, Lucknow from 2017-18 to 2021-22.During this period total 250 trainees were trained in mushroom production training programme. Data regarding reasons for participation in mushroom production training programme as depicted in table 1were collected from participants through questioners and interviews in pre evaluation test before started to training programme. In this study five reasons for participation in training programme were evaluated and found that out of 250 trainees maximum 84% participants want to established a mushroom unit as an enterprise while 6.8% want to mushroom production for self-consumption and 5.2% interested to aware about mushroom cultivation. Rest of 4% half want to improved their knowledge and half were done for

certificate only. Result of Kaur (2019) was same. The data resulted in table 2 noted that issues related to lack of government support (96.5%), less remunerative being a seasonal activity(87.3%), Non-availability of skilled labors(81.3%), experienced workers leave the unit after sufficient exposure(75.4%) and Lack of sufficient space (63.5%) are most serious bottlenecks in adoption of this venture. Among input constraints non-availability of quality spawn in local area (85.5%), inadequate supply of spawn at appropriate time, procurement of raw material is time consuming and unavailability of chemicals in nearby market were major constraints. Non-availability of proper agency to purchase mushroom (81.6%), no control over price fixation (78.9%), perishable commodity results in losses and erratic local demand for mushroom were part of marketing constraints. Part of socio economic constraints i.e. preparation amongst people that they don't have enough, lack of awareness about nutritional value of mushrooms and less taste for mushroom were 68.9%, 63.5% and 45.9%.Crop management in mushroom cultivation is an important part of mushroom cultivation. Maintenance of humidity, temperature and irrigation is very important part because these factors have direct correlation with production. This climatic factors effect to production but in some cases proper composting, casing, spawning and method of irrigation etc. are also major factor of crop management. The above mentioned factors and sanitation or contamination is very important issue of crop management. This is directly correlated with disease and insects occurrence in mushroom crop. In this study results revealed that unfavorable climatic conditions (65.8%) were major factor of crop production and it was followed by poor and irregular production and frequent occurrence of diseases. Technological issues play a very important role in mushroom production because without technological knowledge mushroom production will be an uphill task. So, a proper training may certainly rectify to technological constraints. In this pre-evaluation participants realized that compost preparation is a lengthy and cumbersome task (56.6%) followed by lack of literature in simple language (51.3%) and limited post-harvest processing options (43.8%).In order to find out the relationship between ranks accorded by groups of respondents to different categories of constraints, rank order correlation was calculated Table 3.It was found that category general constraints(80.8%) was top ranked category as perceived by growers engaged in mushroom production. This was followed by input constraints (69.73%), marketing constraints (68.3%), socio-cultural constraints (59.4%), constraints related to crop management (54.6%) and technological constraints (50.6%). The above said results are similar to *Khurana and Sharma* (1995) and *Singh and Singh* (2017) studies.

KVK, ICAR-IISR, Lucknow is providing practical training on mushroom cultivation during growing season. Mushroom cultivation can help to reduce poverty among the youth and also beneficial as it is good source of nutrition. The present study was conducted at KVK, ICAR-IISR, Lucknow from 2017-18 to 2021-22.The total 250 trainees got training from KVK during this period. In Table 4 results revealed that in first year adoption was 100% because as per KVK,ICAR-IISR, Lucknow norm that all participants must continue mushroom cultivation with training programme in same year. Preparation of compost on own site is not less than 10q. Next year i.e. 2^{nd}year, after training programme, trainees have own decision to continue to mushroom cultivation. In this study adoption percentage was 30.2%.It means 69.8% farmers

has not opted this profession. The adoption level was elaborated into three categories; small (less than 20 q compost), medium (compost between 20-100q) and large (more than 100 q), In this context Table 4 resulted that in consecutive five years from 2017 to 2021,out of total 250 trainees 76 trainees established their entrepreneur i.e. 30.2% of total participants. In the year 2017, out of 25 trainees seven trainees were established their entrepreneur, in which five trainees were comes under medium adoption level prepared compost more than 50 q annually and 2 trainees were under large adoption level means prepared compost up to 300q.In year 2018,30 percent trainees were established their entrepreneur, large scale(4 trainees), medium scale (5 trainees), and small scale (3trainees).In year 2019 out of 55 trainees 17 trainees established their entrepreneur in ratio of small: medium: large adoption level:: 3: 6: 8.In year 2020 more number of trainees had medium adoption level and In year 2021 maximum 32.7% trainees established their entrepreneur. Overall result revealed that maximum number of trainees adopted medium level of compost preparation. A pattern has been observed in mentioned years that more farmers have given preference to establish mushroom unit as medium and large scale enterprises. In these trainees maximum youths established their entrepreneur in large scale adoption level. Same trend were also seen in *Sharma et.al*,2013 and Kaur,2019 study.

This may be due to proper training, timely technical guidance skill development in compost preparation, and quality spawn and unit management in Lucknow district. KVK,ICAR-IISR, Lucknow always visit to established mushroom units of Lucknow district and motivated them for large scale adoption for good remuneration. The mushroom farming enterprises have a significant impact on mushroom growers to raise the income of the farming community, creating additional employment opportunities, providing sustainability to the existing cropping system. Mushroom farming is transforming farmers into full scale entrepreneurs with diversifying towards mushroom processing and mushroom trade, improving farming health and uplift socioeconomic condition of farmers. Further, an assessment was carried out on the trainees from 2017-2021, who adopted this occupation at different scale. It has been observed tha majority of adopted farmers have shifted in this profession towards small to medium and medium to large scale.

4. Conclusion:

On the basis of this study, it can be concluded that lack of government support in the form of loan and subsidy, less remunerative being a seasonal activities, non availability of quality spawn in local market and non-availability of proper agency to purchase mushroom was major constraints, which hamper the adoption of mushroom cultivation. So, government officials, researchers as well as policy makers may make a plan to help the reduce vulnerability to poverty, strengthens livelihoods, nutritious source of food and good source of income for mushroom growers.

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Table 1: Reason for participation in training programme:

Sl. No.	Reason for participation in training	Number	Percentage
1	Establishment of mushroom cultivation as a enterprises	210	84.0
2	To get certificate	5	2.0
3	Mushroom cultivation for self-consumption	17	6.8
4	Knowledge about mushroom cultivation	5	2.0
5	Awareness about mushroom cultivation among farmers	13	5.2

Table 2: Pre-received constraints in adoption of mushroom growing technology:

Sl. No.	Particulars	Percentage	Rank
Technological constraints			
1	Compost preparation is a lengthy and cumbersome task	56.6	I
2	Limited post-harvest processing options	43.8	III
3	Lack of literature in simple language	51.3	II
	Overall	**50.6**	
Input constraints			
1	Non-availability of quality spawn in local area	85.5	I
2	Inadequate supply of spawn at appropriate time	76.3	II
3	Unavailability of chemicals in nearby market	50.3	IV
4	Procurement of raw material is time consuming	66.8	III
	Overall	**69.73**	
Marketing constraints			
1	No control over price fixation	78.9	II
2	Non-availability of proper agency to purchase mushroom	81.6	I

3	Perishable commodity results in losses	61.4	III
4	Erratic local demand for mushroom	51.2	IV
	Overall	**68.3**	
Constraints related to crop management			
1	Frequent occurrence of diseases	43.6	III
2	Poor and irregular production	54.3	II
3	Unfavorable climatic conditions	65.8	I
	Overall	**54.6**	
Socio-cultural constraints			
1	Lack of awareness about nutritional value of mushrooms	63.5	II
2	Less taste for mushroom	45.9	III
3	Preparation amongst people that they don't have enough	68.9	I
	Overall	**59.4**	
General constraints			
1	Lack of Government support in the form of loan and subsidy	96.5	I
2	Less remunerative being a seasonal activity	87.3	II
3	Lack of sufficient space	63.5	V
4	Experienced workers leave the unit after sufficient exposure	75.4	IV
5	Non-availability of skilled laboures	81.3	III
	Overall	**80.8**	

Table 3: Rank order correlation of constraints in adoption of mushroom cultivation:

Sl. No.	Particulars	Percentage	Rank
1	General constraints	80.8	I
2	Input constraints	69.73	II
3	Marketing constraints	68.3	III
4	Socio-cultural constraints	59.4	IV
5	Constraints related to crop management	54.6	V
6	Technological constraints	50.6	VI

Table 4: After training adoption level of mushroom cultivation:

Year	Total no. of trainees	Adaptation (%)		Entrepreneur established	Adaptation level*		
		Ist Year	IInd Year onwards		Small <20q	Medium 20-100q	Large >100q
2017	25	100.0	28.0	7		5	2
2018	40	100.0	30.0	12	4	5	3
2019	55	100.0	31.0	17	3	6	8
2020	75	100.0	29.3	22	4	10	8
2021	55	100.0	32.7	18	8	8	2
Total	**250**	**100%**	**30.2%**	**76**	**20**	**34**	**23**

*compost preparation