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Extent of adoption of biofertilizers by turmeric growers

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Abstract

Present study was conducted to know the adoption level of Biofertilizers by the turmeric growers. Study was conducted in Wasmat block of Hingoli district of Maharashtra. 120 turmeric growing farmers from 10 villages were randomly selected for study. An interview schedule with respect to socio economic characteristics of turmeric growers and their adoption level of biofertilizer use was designed for the study. Majority of turmeric growers were middle aged, educated up to higher secondary education, had medium land holding, income, social participation, extension contact and risk orientation. 87.50 percent of the turmeric grower had medium adoption level, whereas 12.50 percent and 0.00 percent of biofertilizer users were in the low and high adoption level categories, respectively.

Keywords: Adoption, biofertilizers, turmeric, growers

Introduction

Turmeric (*Curcuma longa* L) is used widely as a spice in South Asia and Middle Eastern Cooking. India is the world's largest producer, consumer and exporter of turmeric. India produces 80 percent of global turmeric production and exports 60 percent of worlds export. Telangana is largest producer of turmeric followed by Andhra Pradesh, Tamil Nadu, Karnataka, Orissa, West Bengal and Maharashtra (Anonymous 2020) [1]. Turmeric has greater importance in Indian dishes, Hindu religious functions and medicinal and cosmetic industries.

Chemical fertilizers have played an important role in increasing agricultural production. However, massive use of chemical fertilizers has adverse effect on soil fertility and soil structure. (Savic 2012) [5]. The use of chemical fertilizers should be reduced and replaced as by biofertilizers. Biofertilizers enhances soil fertility and crop productivity, maintain agro-ecosystem and sustainable agricultural production and is also cost effective as compared to use of inorganic chemical fertilizers. Biofertilizers contain microorganisms known to better germination and root expansion of crop (Chen 2006) [2]. They also consist of microbes useful for nitrogen fixation, phosphate mineralization and phytohormone production essential for plant growth. The biofertilizers production is also simple, requires less energy, capital and labour force as compared to chemical fertilizers (Raimi et al. 2017) [4]. Despite of these factors the use of biofertilizers is not satisfactory. Thus the study was undertaken with the specific objectives to study the socio-economic

characteristics of the turmeric growers and to know the extent of adoption of biofertilizers by them.

Materials and Methods

Hingoli is one of the leading turmeric producer district in Marathwada region of the Maharashtra State. Present study was purposively conducted in Wasmat block of Hingoli district having major area under turmeric cultivation. 120 farmers from 10 villages were selected randomly who have cultivated turmeric crop on more than 0.20 ha. An interview schedule including relevant questions for seeking information with respect socio economic characteristics of the turmeric growers and their adoption level about biofertilizers use was designed for the study. Data were collected by contacting the selected farmers at their homes or farm.

A level of adoption of biofertilizers was measured by computing adoption score. Based on total score of the respondents, they were classified into three categories low, medium and high by using mean and standard deviation. Statistical tools frequency, percentage, range, Karl Person's correlation coefficient, multiple linear regression have been used for data analysis.

Results and Discussion

Results of the table 1 with regards to profiles of the respondents revealed that 67.50 percent of the respondents were middle aged, where as 19.17 percent and 13.33 percent respondents belonged to old age group and young age group respectively.

Regarding education 27.50 percent of the respondents were educated up to higher secondary level education followed by 23.33 percent respondents had 5th to 7th standard primary education, 14.16 percent had secondary education, 10.83 percent were illiterate and equal respondents had up to 4th standard primary education. 8.33 percent respondents were graduates, 2.52 percent were post graduate and 2.50 percent could able to read and write.

The data from the Table-1 also revealed that 49.16 percent of the respondents had medium size of land holding followed by 20.00 percent had marginal land holding. 19.17 percent respondents were small land holder, 11.67 percent were semi medium land holder and none of the respondent had large land holding.

Majority (45.83%) of respondents were engaged in farming, whereas, 25.00 percent of respondents were engaged in farming with labour, 12.50 percent engaged in farming with subsidiary occupation, 11.67 percent were engaged in

farming with business and 5.00 percent were engaged in farming with service.

In case of annual income 62.50 percent of respondents had medium income level followed by 24.17 percent and 13.33 percent respondents had high and low annual income respectively.

Majority (58.33%) of the respondents were having medium social participation followed by 30.83 percent and 10.84 percent had low social participation and high social participation, respectively.

Nearly fifty percent (52.50%) respondents were having medium level of extension contact. Whereas, 30.83 percent were having low extension contact and only 16.67 percent had high level of extension contact.

More than half (66.67%) respondents had medium level risk orientation, whereas, 26.67 and 6.66 percent of them had low and high level risk orientation, respectively.

Table 1: Distribution of the respondents according to their characteristics

N = 120

Sr. No.	Characteristics	Respondents	
		Number	Percent
Age			
1.	Young (up to 29 years)	16	13.33
2.	Middle age (30 to 50 years)	81	67.50
3.	Old (51 and above)	23	19.17
	Mean = 39.45	SD = 10.25	
Education			
1.	Illiterate	13	10.83
2.	Literate (can only read and write)	03	2.50
3.	Primary education (up to 4th std)	13	10.83
4.	Primary education (5th - 7th std)	28	23.33
5.	Secondary education (8th - 10th std)	17	14.16
6.	Higher secondary education (11th & 12th)	33	27.50
7.	Graduate (above 12th)	10	8.33
8.	Post Graduate	03	2.52
Land holding			
1.	Marginal (Up to 1 ha.)	24	20.00
2.	Small (1.01 to 2.00 ha.)	23	19.17
3.	Semi medium (2.01 to 4.00 ha.)	14	11.67
4.	Medium (4.01 to 10.00 ha)	59	49.16
5.	Large (10.01 and above)	00	0.00
Occupation			
1.	Farming	55	45.83
2.	Farming + Labour	30	25.00
3.	Farming + Subsidiary Occupation	15	12.50
4.	Farming + Business	14	11.67
5.	Farming + Service	06	05.00
Annual Income			
1.	Low (Up to Rs.85729)	29	24.17
2.	Medium (Rs.85730 to 255520)	75	62.50
3.	High (Rs. 255521 and above)	16	13.33
	Mean = 1,70,625	SD = 84896	
Social Participation			
1.	Low (Up to 5)	37	30.83
2.	Medium (6 to 13)	70	58.33
3.	High (14 and above)	13	10.84
	Mean = 8.91	SD = 4.07	
Extension Contact			
1.	Low (up to 13)	37	30.83
2.	Medium (14 to 21)	63	52.50
3.	High (22 and above)	20	16.67
	Mean = 17.21	SD = 4.78	

Risk Orientation			
1.	Low (up to 12)	32	26.67
2.	Medium (13 to 23)	80	66.67
3.	High (24 and above)	08	6.66
Mean = 17.51		SD = 6.00	

Adoption of biofertilizers by turmeric growers

Results of Table-2 revealed that 65.00 percent respondents used *Rhizobium* followed by *Azotobacter* (52.50%), Phosphobacteria (30.00%), *Azospirillum* (19.16%), and other biofertilizers like potash solublizer bacteria and/or zinc solublizer bacteria (17.50%). Majority of the respondents (52.50%) used biofertilizers during turmeric cultivation. 49.16 percent respondents used biofertilizers for seed treatment in turmeric, 46.66 percent respondents

drenched at root zone of turmeric with the help of sprayer. 22.50 percent and 17.50 percent respondents applied biofertilizers through drip irrigation and spreading on soil respectively. Meager number of respondents (14.16%) also applied biofertilizer at the time of sowing by mixing with fine cow dung /compost. Results indicated that there was considerable variation in the extent of adoption of specific biofertilizer practices by the farmers.

Table 2: Adoption of biofertilizers by respondents

Sr. No.	Particulars	Respondents	
		Frequency	Percent
N=120			
1.	Used biofertilizers		
	1) <i>Azospirillum</i>	23	19.16
	2) Phosphobacteria	36	30.00
	3) <i>Azotobacter</i>	63	52.50
	4) <i>Rhizobium</i>	78	65.00
	5) Other (Potash solublizer bacteria, zinc solublizer)	21	17.50
2.	Use of biofertilizers for seed treatment.	59	49.16
3.	Use of biofertilizers during turmeric cultivation.	63	52.50
4.	Use of biofertilizers through drip irrigation.	27	22.50
5.	Use of biofertilizers by the spreading on soil.	21	17.50
6.	Drilling biofertilizers by mixing with fine cow dung / compost in soil at the time of sowing.	17	14.16
7.	Application of biofertilizers by drenching at root zone of turmeric.	56	46.66

Overall adoption of biofertilizers by respondents

Result of Table-3, indicated that 87.50 percent of respondents belonged to medium level of adoption, whereas 12.50 percent and 0.00 percent of biofertilizer users were in the low and high level categories of adoption, respectively. Similar findings were reported by Rathod (2017) [3].

Majority (65.00%) of the turmeric growers used *Rhizobium* followed by *Azotobacter* (52.50%), Phosphobacteria (30.00%), *Azospirillum* (19.16%), and other biofertilizers like potash solublizer bacteria and/or zinc solublizer bacteria (17.50%).

High majority (87.50%) of respondents belonged to medium level of adoption, whereas 12.50 percent and 0.00 percent of biofertilizer users were in the low and high level categories of adoption, respectively

Table 3: Distribution of the respondents according to their overall adoption

Sr. No.	Category	Respondents	
		Frequency	Percent
1.	Low (Up to 4)	15	12.50
2.	Medium (5 to 10)	105	87.50
3.	High (11 and above)	00	0.00
Total		120	100.00
Mean= 6.79 SD= 2.74			

Summery and Conclusions

Socio economic characteristics of the turmeric growers, it was found majority (67.50 percent) were middle aged, 27.50 percent were educated up to higher secondary education. Nearly half (49.16 percent) had medium size of land holding, majority (45.83%) were engaged in farming occupation, 62.50 percent had medium income, 58.33 percent were having medium social participation, more than half (52.50%) were having medium level of extension contact and more than half (66.67%) turmeric growers had medium level risk orientation.

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