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A COMPARATIVE STUDY OF ADOPTION LEVEL OF BENEFICIARIES AND NON-BENEFICIARIES FARMERS REGARDING TURMERIC CULTIVATION

Yuvaraj Singh Dhruw[1]*, Govind Prasad[2] and Virendra Kumar Painkra[3]

[1]College of Agriculture and Research Station, Kurud, Dhamtari, IGKV (C.G.), India

[2]College of Agriculture and Research Station, Saja, Bemetara, IGKV (C.G.), India

[3]College of Agriculture and Research Station, Kunkuri, Jashpur, IGKV (C.G.), India

*Corresponding author E-mail: yuvrajdhruw.igkv@gmail.com

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ABSTRACT

The present study was conducted in Chhattisgarh plains. The aim of this study was to know the adoption level of beneficiaries and non-beneficiaries farmers regarding turmeric cultivation. The reach required sample size of 160 beneficiaries respondents, proportionate randomly method were used and equal numbers of non-beneficiaries respondents were also selected randomly from same villages. In this way, a total of 320 farmers were considered as respondents to respond as per the interview schedule design for the study. The study revealed that the majority of the beneficiaries (62.50%) and non-beneficiaries (64.38%) had medium level of adoption, followed by 25.00 per cent of the beneficiaries and 27.50 per cent of the non-beneficiaries had low level of adoption and 12.50 per cent of the beneficiaries and 8.12 per cent of the non-beneficiaries had high level of adoption regarding turmeric cultivation.

Keywords: Adoption level, beneficiaries, non-beneficiaries, turmeric cultivation.

Introduction

Horticulture plays an important role in Indian agriculture and ultimately in Indian economy and nutrition. Horticulture plantation constitutes specialized form of farm business and is of highly commercial in nature. During last few decades Indian horticulture has changed from traditional to modern.

Horticulture sector account for 30.4 per cent of India's agricultural GDP from 13.1 per cent cropped area. It has over the years, emerged as a growth engine of agriculture, making a significant contribution to agricultural GDP. Diversified and accelerated agricultural growth is critically dependent upon the development of horticulture sector. It plays a vital role in improving the productivity of land, generating employment ameliorating the economic condition of farmers and entrepreneurs and enhancing exports. India's horticulture sector is fascinatingly diversified and covers a wide range of fruits, vegetables, tuber crops, flowers, mushroom, spices, medicinal and aromatic plants and variety of plantation crops (Anonymous, 2022a).

India produces a wide variety of fruits, vegetables, root and tuber crops, flowers, ornamental plants, medicinal and aromatic plants, spices, condiments, plantation crops and mushrooms. These crops contributed a significant part of total agricultural produce in the country. Though these crops occupy about 10.7 per cent of the gross cropped area, they contribute over 30.4 per cent to the agricultural Gross Domestic Product and 37 per cent of total export of agricultural commodities in the country. The area and production of horticultural crops have increased considerably as compared to the situation a couple of decades ago. The areas under horticultural crops were increased from 24.1 million ha in 2013-14 to 28.9 million ha in 2023-24 with the corresponding increase in production from 277.3 million tonnes to 353.1 million tonnes (Anonymous, 2024a).

Turmeric is one of the important cash crops in India. India is the larger producer and exporter of turmeric in the world. Turmeric occupies about 6 per cent of the total area under spices and condiment products in India. In the year 2013-14 turmeric cultivation was 232 thousand

ha with the production of 1189 thousand tonnes. It reached to 305 thousand ha with the production of 1074 thousand tonnes in the year 2023-24 (Anonymous, 2024b).

Chhattisgarh is also one of the important states of turmeric cultivation. In the Chhattisgarh state about 10.785 thousands ha with the production of 100.971 thousand tones in the year of 2021-22 (Anonymous, 2022b).

Objective

To study the adoption level of beneficiaries and non-beneficiaries farmers regarding turmeric cultivation.

Materials and Methods

The present study was conducted in Chhattisgarh plains. Five districts were selected purposively on the basis of maximum area and maximum number of turmeric growers. From each selected districts, 2 blocks were selected purposively for the study on the basis of maximum area and maximum number of turmeric growers. From each selected block, 4 villages were selected purposively on the basis of maximum area and maximum number of turmeric growers. From each selected villages, 4 beneficiaries and 4 non-beneficiaries were selected randomly for the comparison between both groups. In this way total 320 farmers were considered as respondents for the study. Data were collected by the personal interview method using structured schedule. An *Ex-post-facto* research design was used in the present investigation.

To measure the adoption level of turmeric growers a schedule was prepared with 16 practices of turmeric cultivation for the present study. The weightage of "2" for "fully adopted", "1" for "partially adopted" and "0" for "not adopted" were assigned for each practice. The total score obtained by the respondents from all 16 practices was the adoption score of the individual respondent.

The respondents were classified into three categories *viz.* low, medium and high level of adoption on the basis of mean and S.D.

Level of adoption	Criteria
Low	Below Mean – S.D.
Medium	Between Mean ± S.D.
High	Above Mean + S.D.

Results and Discussion

The data presented in Table 1 reveals that most of the beneficiaries (62.50%) had medium level of adoption, while 25.00 per cent of them had low and 12.50 per cent had high level of adoption regarding turmeric cultivation.

Similarly, in case of non-beneficiaries, 64.38 per cent of the respondents had medium level of adoption, followed by 27.50 per cent had low and 8.12 per cent of them had high level of adoption regarding turmeric cultivation.

Table 1: Distribution of the respondents according to their overall adoption level about improved turmeric cultivation practices.

S. No.	Adoption level	Respondents				'Z' value
		Beneficiaries		Non-beneficiaries		
		F	%	F	%	
1	Low	40	25.00	43	27.50	5.970**
2	Medium	100	62.50	103	64.38	
3	High	20	12.50	14	8.12	
	Mean	18.00		15.88		
	SD	3.03		2.02		
** 0.01 level of probability						

The calculated 'Z' value for adoption level was 5.970 which was found to be significant at 0.01 level of probability. Thus the earlier stated null hypothesis that there is no difference between adoption level of beneficiaries and non-beneficiaries was rejected. Hence, it can be concluded that there is significant difference between beneficiaries and non-beneficiaries regarding adoption level of turmeric cultivation.

It can be concluded that both the beneficiaries and non-beneficiaries respondents had medium level of adoption about turmeric cultivation.

This trend might be due to the fact that the beneficiaries were having more exposure to the techniques of turmeric cultivation through participation in extension activities, close contact with department of agriculture and horticulture officials in learning the new skills.

This results in line with the findings of Karpagam (2006), Sasane *et al.*, (2010), Sawant *et al.*, (2013), Ovhar and Wakle (2013), Babu *et al*., (2015) and Chavai *et al.*, (2015).

Adoption of beneficiaries and non-beneficiaries respondents regarding improved turmeric cultivation practices

Beneficiaries

The data on adoption of improved cultivation practices of turmeric by the respondents are presented in Table 2. The findings reveal that majority of the respondents had fully adopted different aspects of improved cultivation practices like adoption of improved variety (100%), method of planting (85.62%), inter-cropping (61.25%), operation of earthing-up (56.88%), recommended seed rate (45.00%), recommended spacing and irrigation management (43.13%), ploughing and field preparation (40.62%), balance dose of fertilizers (39.38%), application of pesticide (30.62%), application of FYM as recommended (10.00%), chemical used for seed treatment (8.75%), application of fungicide (6.25%), use

Table 2: Distribution of the respondents according to their adoption regarding improved turmeric cultivation practices.

S. No.	Practices	Respondents					
		Beneficiaries			Non-beneficiaries		
		NA	PA	FA	NA	PA	FA
		F (%)	F (%)	F (%)	F (%)	F (%)	F (%)
1	Field preparation (One deep ploughing than 2-3 harrowing)	00(0.00)	95(59.38)	65(40.62)	00(0.00)	108(67.50)	52(32.50)
2	Improved variety (Roma, Prabha. Narendra haldi-1and B.S.R.-2)	00(0.00)	00(0.00)	160(100.00)	00(0.00)	00(0.00)	160(100.00)
3	Seed rate(18-22 qha^{-1})	00(0.00)	88(55.00)	72(45.00)	00(0.00)	96(60.00)	64(40.00)
4	Method of planting(Ridge & furrow, 60-65 cm)	00(0.00)	23(14.38)	137(85.62)	00(0.00)	29(18.12)	131(81.88)
5	Spacing(30X20 cm)	00(0.00)	91(56.88)	69(43.12)	00(0.00)	93(58.12)	67(41.88)
6	Use of fungicide for Seed treatment	87(54.37)	59(36.88)	14(8.75)	149(93.13)	10(6.25)	1(0.62)
7	Earthing up (3-4 month after planting)	00(0.00)	69(43.12)	91(56.88)	00(0.00)	90(56.25)	70(43.75)
8	Inter-cropping (Ladies finger, chilli and coriander etc.)	00(0.00)	62(38.75)	98(61.25)	1(0.62)	65(40.62)	94(58.76)
9	Use of mulching	155(96.87)	00(0.00)	5(3.12)	158(98.75)	00(0.00)	2(1.25)
10	Application of FYM(20-25 tha^{-1})	2(1.25)	142(88.75)	16(10.00)	0(0.00)	149(93.12)	11(6.88)
11	Balance dose of fertilizers(N=150, P=100, K=120 kg ha^{-1})	00(0.00)	97(60.62)	63(39.38)	2(1.25)	100(64.37)	58(34.38)
12	Chemical methods for weed control	148(92.50)	11(6.88)	1(0.62)	150(93.75)	8(5.00)	2(1.25)
13	Water management(8-10 days intervals)	00(0.00)	91(56.88)	69(43.12)	00(0.00)	106(66.25)	54(33.75)
14	Application of pesticide	70(43.75)	41(25.63)	49(30.62)	105(65.62)	44(27.50)	11(6.88)
15	Application of fungicide	92(57.50)	58(36.25)	10(6.25)	119(74.37)	35(21.88)	6(3.75)
16	Harvesting stage(7-9 month)	00(0.00)	110(68.75)	50(31.25)	00(0.00)	136(86.25)	24(13.75)

Figures in parentheses indicate the percentage; **NA:** No adoption; **PA:** Partial adoption; **FA:** Full adoption

of mulching (3.12%) and recommended herbicide for weed control (0.62%).

However, it was observed that the majority of the respondents had partially adopted the improved cultivation practices like application of FYM as per recommendation (88.75%), harvesting time and methods (68.75%), balance dose of fertilizers (60.62%), ploughing and field preparation (59.38%), recommended spacing and irrigation management (56.88%), recommended seed rate (55.00%), operation of earthing up (43.12%), inter-cropping (38.75%), chemical used for seed treatment (36.88%), application of fungicide (36.25%), application of pesticide (25.63%), method of planting (14.38%) and application of herbicide for weed control (6.88%).

It was also found that the majority of the respondents had not adopted the cultivation practices like use of mulching (96.87%), application of herbicide for weed control (92.50%), application of fungicide (57.50%), use of fungicide for seed treatment (54.37%), application of pesticide (43.75%) and application of FYM as per recommended (1.25%).

Non-beneficiaries

The data on adoption of selected non-beneficiaries of turmeric cultivation are presented in Table 2. The findings reveal that the majority of the respondents had full adopted different aspect of improved cultivation practices like adoption of improved variety (100%), method of planting (81.88%), inter-cropping (58.76%), operation of earthing up (43.75%), recommended spacing (41.88%), recommended seed rate (40.00%), balance dose of fertilizes (34.38%), irrigation management (33.75%), ploughin and field preparation (32.50%), harvesting time and methods (13.75%), application of FYM as per recommended and application of pesticide (6.88%), application of fungicide (3.75%), use of mulching and application of herbicide for weed control (1.25%) and recommended seed treatment (0.62%).

However, it was observed that the majority of the respondents had partially adopted the improved cultivation practices like application of FYM as per recommended (93.12%), harvesting time and methods (86.25%), ploughing and field preparation (67.50%), irrigation management (66.25%), balance dose of fertilizes (64.37%), recommended seed rate (60.00%), spacing (58.12%), earthing up operation (56.25%), inter-cropping (40.62%), application of pesticide (27.50%), application of fungicide (21.88%), method of planting (18.12%), seed

Table 3: Comparison between beneficiaries and non-beneficiaries respondents in relation to their adoption regarding improved turmeric cultivation practices.

S. No.	Practices	Mean value		'Z' value
		B	NB	
1	Field preparation	1.406	1.325	1.509
2	Improved variety	2.000	2.000	00
3	Seed rate	1.450	1.400	0.902
4	Method of planting	1.856	1.819	0.907
5	Spacing	1.431	1.419	0.225
6	Seed treatment	0.544	0.075	8.318**
7	Earthing up	1.569	1.438	2.361*
8	Inter-cropping	1.613	1.581	0.561
9	Use of mulching	0.063	0.025	1.145
10	Application of FYM	1.088	1.063	0.779
11	Balance dose of fertilizers	1.394	1.331	2.131*
12	Chemical methods for weed control	0.081	0.075	0.185
13	Water management	1.431	1.338	2.016*
14	Application of pesticide	0.869	0.413	5.500**
15	Application of fungicide	0.488	0.294	3.013**
16	Harvesting stage	1.306	1.138	3.630**

B: Beneficiaries; **NB:** Non-beneficiaries

treatment (6.25%), and application of herbicide for weed control.

It was also found that the majority of the respondents had not adopted the cultivation practices of turmeric like use of mulching (98.75%), application of herbicide for weed control (93.75%), seed treatment (93.12%), application of fungicide (74.37%), application of pesticide (65.62%), balance dose of fertilizers (1.25%) and inter-cropping (0.62%).

Comparison between beneficiaries and non-beneficiaries respondents with respect to adoption regarding improved turmeric cultivation practices

The data presentation in Table 3 depicts the difference between beneficiaries and non-beneficiaries regarding turmeric cultivation. The calculated 'Z' value for field preparation was 1.509 which was found to be non-significant. Thus, the earlier stated null hypotheses that there is no difference between beneficiaries and non-beneficiaries is not rejected. Hence, it can be concluded that there is no difference between beneficiaries and non-beneficiaries regarding field preparation in turmeric.

The calculated 'Z' value for seed rate was 0.902 which was found to be non-significant. Thus, the earlier stated null hypotheses that there is no difference between beneficiaries and non-beneficiaries is not rejected. Hence, it can be concluded that there is no difference between beneficiaries and non-beneficiaries regarding seed rate in turmeric.

The calculated 'Z' value for methods of planting was 0.907 which was found to be non-significant. Thus, the earlier stated null hypotheses that there is no difference between beneficiaries and non-beneficiaries is not rejected. Hence, it can be concluded that there is no difference between beneficiaries and non-beneficiaries regarding method of planting in turmeric.

The calculated 'Z' value for spacing was 0.225 which was found to be non-significant. Thus, the earlier stated null hypotheses that there is no difference between beneficiaries and non-beneficiaries is not rejected. Hence, it can be concluded that there is no difference between beneficiaries and non-beneficiaries regarding proper spacing in turmeric.

The calculated 'Z' value for seed treatment was 8.318 which was found to be significant at 1 per cent level of probability. Thus, the earlier stated null hypotheses that there is no difference between beneficiaries and non-beneficiaries is rejected. Hence, it can be concluded that there is significant difference between beneficiaries and non-beneficiaries regarding seed treatment in turmeric.

The calculated 'Z' value for earthing up was 2.361 which was found to be significant at 5 per cent level of probability. Thus, the earlier stated null hypotheses that there is no difference between beneficiaries and non-beneficiaries is rejected. Hence, it can be concluded that there is significant difference between and beneficiaries and non-beneficiaries regarding earthing up in turmeric.

The calculated 'Z' value for inter-cropping was 0.561 which was found to be non-significant. Thus, the earlier stated null hypotheses that there is no difference between beneficiaries and non-beneficiaries is not rejected. Hence, it can be concluded that there is no difference between beneficiaries and non-beneficiaries regarding inter-cropping in turmeric.

The calculated 'Z' value for use of mulching was 1.145 which was found to be non-significant. Thus, the earlier stated null hypotheses that there is no difference between beneficiaries and non-beneficiaries is not rejected. Hence, it can be concluded that there is no difference between beneficiaries and non-beneficiaries regarding use of mulching in turmeric.

The calculated 'Z' value for Application of FYM was 0.779 which was found to be non-significant. Thus, the earlier stated null hypotheses that there is no difference between beneficiaries and non-beneficiaries is not rejected. Hence, it can be concluded that there is no difference between beneficiaries and non-beneficiaries regarding application of FYM in turmeric.

The calculated 'Z' value for application of fertilizers was 2.361 which was found to be significant at 1 per cent level of probability. Thus, the earlier stated null hypotheses that there is no difference between beneficiaries and non-beneficiaries is rejected. Hence, it can be concluded that there is significant difference between and beneficiaries and non-beneficiaries regarding application of fertilizers in turmeric.

The calculated 'Z' value for chemical methods of weed control was 0.185 which was found to be non-significant. Thus, the earlier stated null hypotheses that there is no difference between beneficiaries and non-beneficiaries is not rejected. Hence, it can be concluded that there is no difference between beneficiaries and non-beneficiaries regarding chemical methods of weed control in turmeric.

The calculated 'Z' value for water management was 2.016 which was found to be significant at 1 per cent level of probability. Thus, the earlier stated null hypotheses that there is no difference between beneficiaries and non-beneficiaries is rejected. Hence, it can be concluded that there is significant difference between and beneficiaries and non-beneficiaries regarding water management in turmeric.

The calculated 'Z' value for application of pesticide was 5.500 which was found to be significant at 1 per cent level of probability. Thus, the earlier stated null hypotheses that there is no difference between beneficiaries and non-beneficiaries is rejected. Hence, it can be concluded that there is significant difference between beneficiaries and non-beneficiaries regarding application of pesticide in turmeric.

The calculated 'Z' value for application of fungicide was 3.013 which was found to be significant at 1 per cent level of probability. Thus, the earlier stated null hypotheses that there is no difference between beneficiaries and non-beneficiaries is rejected. Hence, it can be concluded that there is significant difference between beneficiaries and non-beneficiaries regarding application of fungicide in turmeric.

The calculated 'Z' value for harvesting stage was 3.630 which was found to be significant at 1 per cent level of probability. Thus, the earlier stated null hypotheses that there is no difference between beneficiaries and non-beneficiaries is rejected. Hence, it can be concluded that there is significant difference between beneficiaries and non-beneficiaries regarding harvesting stage in turmeric.

Conclusion

It can be concluded that both the beneficiaries and non-beneficiaries respondents had medium level of adoption. But there was a significant difference between beneficiaries and non-beneficiaries farmers in adoption level about turmeric cultivation. Therefore, extension personnel of the study area should notice that for making further improvement in the adoption levels of beneficiaries there is a need to provide required finance through crop loans for turmeric cultivation, developing risk free, low cost and location specific technologies, need based trainings and supply of agricultural and horticulture information materials. The non-beneficiaries respondents also should be encouraged to participate in the training session and other extension activities so that they are convinced about turmeric production technology and might adopt them in the near future.

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