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Adoption of Recommended Cultivation Practices by the Mandarin Growers

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A B S T R A C T

The present study was conducted in Chandur Bazar and Achalpur talukas of Amravati district of Maharashtra state. The sample of study comprised of 120 mandarin growers purposively selected from six villages of each Chandur Bazar and Achalpur taluka of Amravati district. The salient findings of the present study revealed that 65.83 per cent of respondents belonged to medium category of adoption about recommended technologies of mandarin. The findings of correlation analysis revealed that characteristics such as education, annual income, extension contact innovativeness and risk preference were having positively significant with knowledge and adoption. As far as constraints in adoption of recommended technologies of mandarin are concerned, all of respondents (100%) faced the constraint of non availability market storage facility and location of research station at large distance, followed by 96.67 per cent of the respondents faced the constraints of high cost of labour for orchard operation. Majority (94.17%) of the respondents faced the constraints of high cost of transportation. It was observed that 91.67 per cent of the respondents faced the constraints of complexity of message and difficulty in its interpretation. Near about 87.50 per cent of the respondent faced the constraint of lacking of training activities. 83.33 per cent of the respondents faced the constraint of high wages for skilled labour to perform various operation on farm. Nearly 57.00 per cent of the respondents faced the constraints of lack of awareness about latest technologies used in mandarin orchard. Hence this research study implied that extension functionaries have great scope to improve the adoption level of recommended technologies suggested by the Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola in study area.

Introduction

Mandarin is the most common among the citrus fruit occupying nearly two-third of the world total area. The leading mandarin producers are the united states, Brazil, Central and South America South Africa, Japan, China, India and Mediterranean country. Mandarin (*Citrus reticulata*) is most common among citrus grown in India. Citrus industry in India is the third largest industry of the country after mango and banana. India rank ninth among top Mandarin producing countries contributing 3% to the world`s total Mandarin production. Only 1.72% of country production is exported. Area under Mandarin in India was 404 thousand Ha and production was 4964 thousand MT during year 2018-19. The leading producer's states of Mandarin are Punjab, Maharashtra, Assam,

Andhra Pradesh, Karnataka, Madhya Pradesh, Tamil Nadu, Meghalaya, Tripura, Haryana, Rajasthan and West Bengal.

Mandarin occupies the second position among all fruits cultivated in Maharashtra. Thus, there is a great scope of increasing the fruit production by increasing the productivity besides bringing more area under fruits crops. At the first position in the list of top Mandarin producing states is the state of Maharashtra. The city of Nagpur is especially known for its production of Mandarin. It is known the Orange city because of its world-famous mandarins which are grown in this city. These Mandarin which area type of Mandarin are specifically best suited for the regions such as Vidarbha. Apart from Nagpur the other regions where Mandarin are grown in Maharashtra are Akola, Amravati, and Wardha.

The Mandarin is locally knows as *Nagpuri Santra* has reputation and it is the best of its kinds grown in India. The regular excessive bearing in the shallow soil exhaust Nagpuri Mandarin plants, earlier than those in deep soil. The Mandarin plants respond well to regular and timely supply of fertilizers with proper irrigation schedule in shallow soils. The demands for Mandarin are very high because of its nutritive value. It is very rich in vitamin C (ascorbic acid), fruit sugars and in addition to this it also contains vitamin A and B. Juice content is abundant, yellow in colour with excellent flavour, sweet in taste.

Since from last few years, horticulture in India has changed from traditional to modern. Mandarin production technology continuously changed and there is new addition in technology from outcome of an applied science. Various technologies have recommended by various agricultural universities to increase the Mandarin production. But the production of Mandarin is very low still now. There are certain reasons behind low production of Mandarin which may be inadequacy and implementation of useful information resulting in non-adoption of recommended Mandarin production practices by Mandarin growers. It is seen that there is the large gap between yield of Mandarin orchard recorded at research farm and its production at farmer's field. The reason behind the low production of Mandarin fruits may be due to non-adoption or poor adoption of recommended technologies of Mandarin by farmers which may be due to they are unaware about latest recommended technology and also there may be certain problems in its adoption at their own farm and also there may be some another component which may be affecting the adoption of recommended technologies of Mandarin cultivation. Hence this research study was undertaken with the following objectives.

To study the adoption of mandarin growers about recommended technologies.

To study the relationship between the profile of mandarin growers with their adoption about recommended technologies.

To identify the constraints of mandarin growers in adoption of recommended technologies

Materials and Methods

For the present study detailed methodology was developed for studying various aspects in line of the specific objectives. An exploratory design of social research was used for present study. The present study was conducted in Amravati district of Maharashtra state considering maximum area under mandarin. Out of 14 talukas in Amravati district two talukas, namely Chandur Bazar and Achalpur were purposively selected for study. From the selected talukas 12 villages were selected having area under mandarin. From each selected village, 10 mandarin growers were selected purposively for the present study. Thus, total 120 respondents were purposively selected for present study.

Adoption

Adoption refers to the decision the make full use of innovation as the best course of action available. In

the present study, it was operationalized as the degree to which the extent of actual use of recommended technologies by mandarin growers. The list of statements regarding recommended technologies of mandarin by Dr. PDKV, Akola was selected. Based on 3 point continuum i.e. full adoption, partial adoption and no adoption, a numerical score of 2 for full adoption, 1 for partial adoption and 0 for no adoption for each practice was assigned. The total score obtained by the respondent from all the technologies was adoption score of an individual respondent.

Finally this raw adoption score obtained by an individual respondent was converted into adoption index as below

$$\text{Adoption Index} = \frac{\text{Obtained adoption score}}{\text{Obtainable adoption score}} \times 100$$

Results and Discussion

Adoption of Mandarin growers about recommended technologies

Technology wise adoption of Mandarin growers about recommended technologies shown in Table 1.

It is revealed from Table 1 that the complete adoption of respondents regarding recommended technologies of mandarin include micro irrigation (92.50%), choice of Ambia bahar (91.67%), application of micronutrients (85.83%), digging of pit (85.00%), per plant recommendation (83.33%), use of jambheri root stock (79.17%), use of organic fertilizer (75.00%), measures to control fruit drops (75.00%), measures to control leaf minor (70.83%), measures to control gummosis (70.00%), removal of dead wood (62.50%), measures to control dieback (58.33%), measures to control citrus psylla (41.67%). It is observed from Table 1 that the partial adoption of respondents regarding recommended technologies of mandarin include rejuvenation of old orchard (26.67%), rejuvenation of phytophothora infected orchard (25.00%), measures to control for mites (16.67%), measures to control dieback (8.33%), use of grass for mulching (10.00%), use of growth regulator (5.84%), use of bio fertilizer (2.50%).

Overall adoption of the respondents about recommended technologies of mandarin

It is seen in Table 2 that majority of respondents i.e. 65.83 per cent had possessed medium level of adoption, followed by 12.50 per cent had possessed low level of adoption and 21.67 per cent had possessed high level of adoption about recommended technologies of mandarin.

Thus, it is concluded that majority of the respondents i.e. 65.83 per cent had medium level of adoption.

Similar types of finding were observed by More (2016); Kadu (2016) and Wankhede (2016).

Relationship between selected characteristics of respondents with their adoption

The coefficients of correlation of the selected characteristics with adoption of respondents about recommended technologies have been furnished in Table 3.

It is noted in Table 3 that the education, extension contact, innovativeness and risk preference were found positive and highly significant with adoption at 0.01 per cent level of probability, whereas annual income had positively significant with adoption at 0.05 per cent level of probability hence, null hypothesis (H_0) is rejected in this case. The positive significant relationship shows that when the level of the above variables *viz.* education, annual income, extension contact, innovativeness and risk preference increases, then the adoption of the respondents about recommended technologies will also increase.

Table.1 Then the respondents were classified into three categories *i.e.*, low, medium and high as follows.

Sl. No.	Adoption	Index range
1	Low	Up to 33.33
2	Medium	33.34 to 66.66
3	High	Above 66.66

Table.2 Distribution of the respondents according to their technology wise adoption about recommended technologies of mandarin

Sl. No.	Practices	Respondents (n=120)		
		Full adoption	Partial adoption	No Adoption
		Freq. (%)	Freq. (%)	Freq. (%)
1	Digging of pit (1m×1m×1m)	102 (85.00)	12 (10.00)	06 (05.00)
2	Optimum plant spacing (6m×6m)	91 (75.83)	15 (12.50)	14 (11.67)
3	Use of Jambheri root stock	95 (79.17)	10 (8.33)	15 (12.50)
4	Use of Rangpur lime root stock	15 (12.50)	10 (8.33)	95 (79.17)
5	Use of organic fertilizers	90 (75.00)	0 (0.00)	30 (25.00)
6	Use of bio-fertilizers	32 (26.66)	03 (2.50)	85 (70.84)
7	Use of micro-nutrients	103 (85.83)	12 (10.00)	5 (4.17)
8	Use of growth regulators	33 (27.50)	07 (5.84)	80 (60.66)
9	Use of Bordeaux paste before rainy season	24 (20.00)	12 (10.00)	84 (70.00)
10	Use of Bordeaux paste after rainy season	84 (70.00)	12 (10.00)	24 (20.00)
11	Double ring method to irrigate	09 (7.50)	0 (0.00)	111 (92.50)
12	Micro-irrigation	111 (92.50)	0 (00.00)	9 (7.50)
13	HDP (High density planting) method	00 (00.00)	00 (00.00)	120 (100.00)
14	Use of grass for mulching	26 (21.67)	12 (10.00)	82 (68.33)
15	Use of polythene for mulching	32 (26.67)	10 (8.33)	78 (65.00)

16	Production of 800-1200 fruits as per recommendation to per plant for better quality	100 (83.33)	00 (00.00)	20 (16.67)
17	Choice of Amba Bahar	110 (91.67)	00 (00.00)	10 (8.33)
18	Choice of Mrig Bahar	20 (16.67)	00 (00.00)	100 (83.33)
19	Measures to control fruit drop	90 (75.00)	10 (8.33)	20 (16.67)
20	Rejuvenation of old orchard	12 (10.00)	32 (26.67)	76 (63.33)
21	Rejuvenation of phytophothora infected orchard	14 (11.67)	30 (25.00)	76 (63.33)
22	Measures to control alternate host	10 (8.33)	00 (00.00)	110 (91.67)
23	Measures to control citrus psylla	50 (41.67)	12 (10.00)	58 (48.33)
24	Measures to control dieback	70 (58.33)	10 (8.33)	40 (33.33)
25	Removal of dead woods after every harvesting and spray of carbendazim	75 (62.50)	20 (16.67)	25 (20.83)
26	Fruit thinning by hand	00 (00.00)	00 (00.00)	120 (100.00)
27	Fruit thinning by use of Ethrel	8 (6.67)	0 (00.00)	112 (93.33)
28	Measures to control leaf minor	85 (70.83)	10 (8.33)	25 (20.83)
29	Measures to control for mites	60 (50.00)	20 (16.67)	40 (33.33)
30	Measures to control Gummosis	84 (70.00)	12 (10.00)	24 (20.00)

(Figures in parenthesis indicate percentage)

Table.3 Distribution of respondents according to their overall adoption about recommended technologies of mandarin

Sl. No.	Adoption	Respondents (n=120)	
		Frequency	Percentage
1	Low	15	12.50
2	Medium	79	65.83
3	High	26	21.67
	Total	**120**	**100.00**

Table.4 Correlation coefficients of selected characteristics of the respondents with their adoption

Sl. No.	Variables	' r ' values
1	Education	0.5250**
2	Land holding	0.0287 ^{NS}
3	Irrigation source	-0.0185 ^{NS}
4	Area under orchard	0.1011 ^{NS}
5	Method of irrigation	0.1407 ^{NS}
6	Annual income	0.1850*
7	Extension contact	0.5143**
8	Innovativeness	0.3856**
9	Risk preference	0.5609**

***Significant at 0.01 per cent level NS- Non- significant*
**Significant at 0.05 per cent level*

Table.5 Distribution of the respondents according to constraints faced in adoption of recommended technologies

Sl. No.	Constraints	Frequency (n=120)	Percentage
1	High cost of transportation	113	94.17
2	Availability of market storage facility	120	100
3	Complexity of message and difficulty in interpretation	110	91.67
4	Irregularity of field visit by concerned authority	90	75
5	Lack of training	105	87.50
6	High wages for skilled labour	100	83.33
7	High cost of labour	116	96.67
8	Lack of participation in extension activities	80	66.67
9	Lack of awareness about latest technologies	57	47.50
10	Location of research station at large distance	120	100

The variables land holding, irrigation source, area under orchard and method of irrigation were found no relationship with adoption so these were non-significant hence, null hypothesis (H_0) is accepted in this case. This finding clearly indicates that more number of the selected independent variables had positively and significant correlated with adoption of recommended technologies of mandarin.

The similar finding were observed by More (2016) and Wankhede (2016) that independent variable namely education, annual income, extension contact significantly related with adoption. More (2016) observed innovativeness had significantly related with adoption. Kadu (2016) observed risk preference had significantly related with adoption.

Constraints faced by mandarin growers in adoption of recommended technologies of mandarin

It was observed from Table 4 that concerns with the constraints faced by the respondents in adoption of recommended technologies of mandarin shows that all of respondents (100%) faced the constraint of availability market storage facility and location of research station at large distance, followed by 96.67 per cent of the respondents faced the constraints of

high cost of labour for orchard operation. Majority (94.17%) of the respondents faced the constraints of High cost of transportation. It was observed that 91.67 per cent of the respondents faced the constraints of complexity of message and difficulty in its interpretation.

Near about 87.50 per cent of the respondent faced the constraint of lacking of training activities. 83.33 per cent of the respondents faced the constraint of high wages for skilled labour to perform various operation on farm.

Lack of participation in extension activities is the another constraint faced by more than half (80.00%) of the respondents. Nearly 57.00 per cent of the respondents faced the constraints of lack of awareness about latest technologies used in mandarin orchard.

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