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RESEARCH ARTICLE

ADOPTATION STATUS OF TECHNOLOGY IN MANDARIN ORANGE PRODUCTION IN JAJARKOT DISTRICT, NEPAL

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ABSTRACT

To know the level of adoption of different technologies in mandarin orange, survey was conducted on April 2019 in Jajarkot district. Survey was done with 70 farmers of Nalgad municipality, Bheri municipality and Kushe rural municipal. Focus group discussion and Key Informant Survey was done with progressive farmers and JTs. The study revealed that majority of high adopters are male (66.10%) and had education level of primary and secondary. Farmers with highest number of bearing trees had highest rate of adaptation. Overall increase in adaptation over two years was 29.55%. Most adapted technology was use of bordopaste (84%) and least adopted technology was sprinkler irrigation. Main reason for increase in adoption was subsidy. There was increase in production by 52% due to increase in adoption level. Major constraint for adoption was poor access to market followed by less technical knowhow. So, it is recommended to provide appropriate market for farmers to improve the adaptation level in mandarin orange production.

KEYWORDS

adaptation, Jajarkot, mandarin, technology.

1. INTRODUCTION

Diversified climate and land topography have been boon for cultivation of different kinds of fruits and vegetables in Nepal. Citrus is economically important crop distributed in hills and midhills of Nepal. Its cultivation is done at altitude of 550MASL-1300MASL (Arun, n.d.). Among citrus, mandarin is kept in 1st rank followed by sweet orange (Nath, 2011). Mandarin occupies 1/3rd of total area occupied by fruits and 2/3rd of area occupied by citrus (Ic, et al., 2015). In year 2017, total area harvested of mandarin was 3881 ha and production on the same year was 39113 mt. Production was increased by 17% in comparison to year 2016 (Votaw, 2007). In the year 2017/18 productive area of mandarin was highest in Jajarkot and yield was highest for lime among citrus crops. The productive area (in ha) of mandarin, sweet orange and lime was 150, 10 and 50 respectively whereas yield (mt/ha) of mandarin, sweet orange and lime was 10.1, 9 and 10.8 respectively (MOAD, 2018).

ADS (Agriculture Development Strategy) has emphasized Jajarkot has zone for citrus cultivation. Though Jajarkot district is highly potential district in mandarin cultivation, yield has not been increased as per expectation. Limited access to technology and poor technical knowhow can be the reasons for reduction in yield. So, the study was done to find the condition of technology adaption in Jajarkot over year 2017 and 2018. Also, study aims to rank constraints in adaption of technology.

2. MATERIALS AND METHODS

Survey was conducted in April 2019 on Nalgad municipality, Bheri municipality and Kushe rural Municipal based on the production of mandarin and number of growers.

Site	Location
Bheri Municipality	28.73N 82.22E
Nalgad Municipality	28.83N 82.35E
Kuse Rural municipal	28.84N 82.17E

Altogether 70 respondents (farmers) were surveyed with semi structured questionnaire. Primary data was collected through household survey. Focus Group Discussion was conducted to check validation of data. Key Informant Survey was conducted with progressive farmers, JT (Junior Technicians) and officers of PMAMP and Agricultural Knowledge Centre. Secondary data were collected through review of publications, literatures, articles, newspapers etc. Collected data was entered and analyzed through SPSS 20 and EXCEL 2019. Data were analyzed using chi-square test, indexing and simple descriptive method. Adoption score was calculated to find high adaptors and low adaptors in year 2017 and 2018.

High adapters and low adapters were categorized as;
Less than mean of adaption score = low adapters
More than mean of adaption score = high adapters

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3. Results

Table 1: Distribution of respondents based on gender, education and bearing trees

variables	Adaptation 2075		Chi square
	Low adapters	High adapters	
Gender			
Male	2	39	8.77** (P =0.003 at 1 df)
female	9	20	
education			
Literate	5	11	4.941*
Primary	2	24	(p = 0.1 at 3 df)
Secondary	4	20	
Higher secondary	0	4	
Bearing trees			
<50	9	7	26.25***
50-100	2	26	(p = 0.000 at 2 df)
>100	0	26	

Note: ***, ** and * shows significance level at 1%, 5% and 10% respectively.

Table shows that majority of male and female were high adapters. Percentage of female was higher (81%) in low adapters. In case of higher adapters percentage of male was higher. Education level of high adapters was higher than low adapters. This indicates education has influence on adaptation level. Majority of high adapters had education of primary and secondary level of education. Higher the number of bearing trees higher was the number of high adapters. Higher adapters with 50-100 bearing trees and > 100 trees were equal (44%). Education was significant at 5% level of significant for adaptation whereas number of bearing trees was highly significant with p value 0.000.

Table 2: Distribution based on land holding

Variable	Adapter 2075		T value	P value
	Low adapters	High adapters		
Land in ropani	3.27	13.7	8.812	6.29* at p=0.1

Note: ***, ** and * shows significance level at 1%, 5% and 10% respectively

Table shows that average land holding was higher (13.7 ropani) for high adapters than low adapters. This shows that increase in land holding resulted in increase in adaption level. Land holding was significant at 10% level of significant with adaptation.

Table 3: Percentage of adaption in year 2074 and 2075

Technologies	2074	2075
Bordopaste	45.7914	84.285
Pruning saw	51.4285	78.571
Secature	61.4285	77.142
Spray tank	28.571	50
Ring application of fertilizer	44.285	77.142
Mulching	28.571	47.142
Vitamins	28.571	65.714
Sprinkle irrigation	12.857	30
Improved variety	37.142	75.714

The table shows percentage of adaption of different technologies. Out of 9 technologies mostly adapted technology was secature (61.428%) in 2074 whereas most adapted technology was bordopaste (84.285%) in 2075. In both the years least adapted was sprinkle irrigation (12.87% and 30%). In the year 2074 respondents having better access to market had better adaptation. But in 2075 access of market had no significant impact due to subsidy offered by prime minister agriculture project citrus zone Jajarkot.

Table 4: Frequency of adapters

Variables	2074	2075
Adapters		
Low adapters	30(42.9)	11(15.3)
High adapters	40(57.1)	59(84.7)

Figure in parenthesis indicates percentage.
Table reveals that majority of respondents (42.9%) were low adapters in 2075 where as majority of respondents (84.7%) were high adapters in 2075. Increased in level of adaption was due to subsidy.

Table 5: Production level for adapters

Variable	Low adapters	High adapters	Mean difference	F value	T value
Production 2074	5.21	14.6	9.38	5.17**	8.314
Production 2075	3.901	18.23	14.32	5.799***	14.495

Note: ***, ** and * shows significance level at 1%, 5% and 10% respectively
Table shows production in quintal for year 2074 and 2075. It was found that production was significantly affected by level of adaption (p = 0.000). In 2074, low adapters had adaption score of less than 0.36 while in 2075, low adapters had adaption score of less than 0.6. There was 52.667% increase in production in 2075 in comparison to 2074. High adapters had more production than low adapters. Also increased in adaption had increased production.

Table 6: Training of respondents

variable	Adaptation 2074		Adaptation 2075	
training	Yes	no	Yes	no
	24(33.33)	46(63.9)	43(59.7)	27(37.5)

Table shows that majority of respondents (63.9%) had not received training in 2074 where as majority (59.7%) had training in 2075.

Table 7: Problems in technology adaptation

Problems	weightage	Index	rank
small land holding	28.5	0.407143	V
no proper road	36.75	0.525	IV
poor access to market	59.5	0.85	I
lack of technical knowhow	59	0.842857	II
low purchasing power	47.25	0.675	III

Table shows that first ranked problem was poor access to market. Due to geographical topography, transportation cost is high and poor road access. Equipments were not available in Jajarkot. Nepalgunj and Surkhet were markets to buy equipment. Lack of technical knowhow was ranked as second. Farmers had limited access to sources of communication and were not aware about use of technologies at proper time.

3.1 Suggestions given by farmers

In order to solve the problems related to technologies adaption, farmers were asked to provide suitable suggestion. Majority of respondents (98%) suggested to provide market so that they could buy equipments and get knowledge of using them. About 63% of respondents suggested to provide technologies in subsidies. Least (13%) farmers suggested to provide trainings related to technology implementation.

4. Discussion

The study was carried out to analyze the adaption status of technologies in mandarin orange in Jajarkot district. The study was conducted with the aim of knowing the adaptation status, factors for adaptation and constraints in adaptation in mandarin orange. Survey was conducted in Bheri municipality, Nalgad municipality and Kushe rural municipal with 70 respondents. Survey was done with semi structured questionnaire. The mean adaption score in 2075 was 0.6 in Jajarkot. This result is in contrast with adaption score in which was 0.2 but this is similar with the adoption score of 2074 (0.36) (Chaudhary, 2011). Majority of high adapters had primary and secondary education. Respondents with higher education are limited. This result is similar with (Rai et al., 2012). Majority of respondents had large orchard (>100 bearing trees) and medium orchard (50-100 bearing trees). Average land holding of high adapters was 13.7 ropani. Adaptation in pruning was found contrast with in 2075 but it was found similar with i.e. 51.42% in 2074 (Rai et al., 2012; Kasirye, 2009). Adaptation percentage in pruning was 71% in 2075. Percentage of adaptation in pruning was found less (27.78%) in (Meena et al., 2012). Adaptation of mulching in Jajarkot was 47.142% but this value was found about double (97.78%) in (Meena et al., 2012). Adaptation of improved varieties in 2075 was 77%. This result was found nearly similar with (Yadav, 2013). Overall increase in production through adaptation was 52%. Major constraint was poor access to market in Jajarkot district. The result was found partly similar with (Kasirye, 2009) .

5. Conclusion

Citrus is highly potential crop in hills and midhills of Nepal. The study showed increased in adaptation level of technology among farmers of Jajarkot. The main reason of increase was subsidy. Adoption level was highest for bordopaste and lowest for sprinkle irrigation. Increased in adoption had increased in production by 52.67%. Major obstacles were poor access of market followed by lack of technical knowhow. So, it is suggested to provide trainings related to technology use and manage proper market for equipments availability.

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