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Identification of Technological Gap in Orange Production Technology in West Siang District of Arunachal Pradesh, India

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A B S T R A C T

Orange is one of the major horticultural crops in Arunachal Pradesh. The agro-climatic conditions of West Siang district suits the production of orange crop. A research was conducted during the year 2018-19 in technological gap in orange production technology. West Siang district was purposively selected as it is one of the major orange producing districts of Arunachal Pradesh and is second largest in acreage of land under orange cultivation after Changlang as per Arunachal Pradesh Agriculture Census 2010-2011. Out of Six blocks, three blocks were purposively selected namely Aalo East, Liromoba and Aalo West. Multistage sampling procedure was followed. Further five villages from each block having maximum area under orange crop were selected. Orange growers were randomly selected from these fifteen villages by using stratified random sampling with proportionate allocation. Data was collected through a well-structured scheduled followed by interview method. After the analysis of result it was observed that the highest technological gap was found in intercrops, pest management, disease management and seed treatment. Study reveals that variables like Education, Extension participation, Contact with extension agencies, innovative proneness and cosmopoliteness were found to be significant and negatively correlated with the technological gal of orange production technology. Other variables such as age, total annual income, size of land holdings, area under orange crop, Risk orientation and market orientation were found to be insignificant with the technological gap in orange production technology. R2 value in the regression analysis reveals that all the variables put together could explain 85.50% variation in the consequent variable.

Introduction

India has a wide range of climate and soil on which a large number of horticultural crops such as fruits, vegetables, ornamental, medicinal, plantation crops and spices etc are grown. India has achieved self-sufficiency in food grain production but not in fruit production in recent years, greater attention is being paid to the horticulture for better utilization and development of wastelands, which are not suitable for economic cultivation of field crops. Orange (*Citrus sinensis*) or sweet orange (to distinguish it

from the related species such as sour orange, *C. aurantium*) is a plant in Rutaceae that originated in southern china, where it has been cultivated for millennia. Oranges are now grown commercially worldwide in tropical, semi-tropical and some warm temperate regions, and have become the most widely planted fruit in the world. Oranges are world's most popular fruit, and are eaten fresh and used for juice. Oranges contain potent bioflavonoids critical for maintaining blood capillary health, which in turn staves off varicose veins and thrombosis. Such bioflavonoids also help the body treat hemorrhoids, bleeding kidneys, and bleeding gums. Additionally, Vitamin C helps maintain collagen health, which keeps skin youthful and healthy (Source: Health Benefits Derived from Sweet Oranges). Vitamin C also keeps the immune system strong, warding off winter colds and hastening recovery time. A compound in the peel of the orange proved to lower cholesterol more effectively than some prescription drugs.

The area under Orange cultivation of Arunachal Pradesh during the year 2016-2017 is 32850.45 Ha. and the production is 79212.550 MT (Source: Department of Horticulture, Arunachal Pradesh). Productivity of Orange in Arunachal Pradesh during the year 2016-2017 is 2.41tonnes per hectare (Source: Director of Horticulture, Arunachal Pradesh) whereas the productivity of Orange in India during the year 2016-2017 is 11.08 tonnes per hectare (Source: book Horticulture Statistics at a glance of Ministry of Agriculture and Farmer's Welfare Department). There is a huge difference in productivity between the national and state level in comparison. It is therefore worthwhile to assess the technological gap and the reason responsible for causing this gap in productivity. Keeping these in view a study was conducted in West Siang District of Arunachal Pradesh to find out the relationship between the technological gap and socio-economical, psychological and communication behaviour of the farmer. The study was also conducted to assess the extent of technological gap in recommended orange production technology by the farmers of West Siang District of Arunachal Pradesh.

Keeping in view the difference between the productivity of the orange in state and the productivity of orange in national level we assume that there is a gap between technology recommended for orange and the adoption of technology at field level by the farmers.

The main objectives of this study include, to determine the extent of technological gap in recommended orange production technology. And also to find out the relationship between personal and socio economic characteristics of the farmers with the technological gap.

Materials and Methods

The present study was conducted in the year 2018-19 in West Siang district of Arunachal Pradesh. *Ex post facto* design was used for conducting the research. West Siang district was purposively selected out of the twenty three districts in Arunachal Pradesh. West Siang district consists of six blocks out of which three block namely Aalo East, Liromoba and Aalo West blocks were selected purposively for the study. Further five villages were selected from each blocks thus fifteen villages were selected from three blocks.

The District Horticultural officer (DHO), Horticultural Developmental officer (HDO) and the gram panchayats were consulted for making a complete list of respondents cultivating orange crop in these three blocks. Further 150 respondents were selected from the complete list of orange growers of the three blocks using stratified random sampling

with proportionate allocation. Structured interview schedule method was used to interview the respondents.

Different variables were selected for the study after consulting with various experts of agriculture and an intensive review work. Both the dependent and independent variables were selected.

The technological gap was regarded as the dependent variable (Y) and Age (X1), Education (X2), Total annual income (X3), Size of land holdings (X4), Area under orange crop (X5), Extension participation (X6), Risk orientation (X7), Contact with extension agencies (X8), Innovative proneness (X9), Market orientation (X10) and cosmopoliteness (X11).

To find out the degree of association between dependent variable and independent variable multiple regression analysis and Pearson's correlation coefficient were used and calculated.

Results and Discussion

Extent of technological gap of orange production technology

In table 1, it is found that maximum farmers have full gap in adoption of intercrops practices (83.00%), pest and disease management (77.00%), seed treatment (63.00%) and 7.00% in methods of weed management. Respondents had cent percent 'partial gap' in practices like storage and size of pit.

In table 2, it is found that majority of the farmers were found under medium category of technological gap (69.00%) followed by low category (16.00%) and high category (15.00%).

Correlation of coefficient between the variables and the technological gap of orange production technology

Correlation- it is used to denote the degree of association between dependent and independent variable in the present study. In the present study linear correlation coefficient was used.

From the data presented in table 3 it is obvious that variables like education, extension participation, contact with extension agencies, innovative proneness and cosmopoliteness shared a negative and significant relationship with the technological gap of orange production technology whereas variables like Age, Total annual income, Size of land holdings, Area under orange crop, Risk orientation and market orientation shared non-significant relationship with the technological gap of orange production technology. These findings supports the findings of Jadhav (2009), Anchule (2000), Kadam (1993) and Chavan (2014), Angadi (2000), Gopal (2004), Wabhitkar (2006) and Thorat (2003) and Rajashekhar (2009).

Table 4 reveals that the multiple regression analysis showed that variables like Education (X2), Innovativeness proneness (X9) and Cosmopoliteness (X11) contributed negatively and significantly to the prediction of technological gap of orange production technology. These three variables had considerable effect on technological gap of orange production technology. All the variables collectively contributed 85.50% variation in the associated variable.

In conclusion, the findings of the study reveal that the majority of the respondents belonged to medium level of technological gap category followed by low and high level of technological gap category. With the help of correlation analysis it was found that five

variables namely education, extension participation, contact with extension agencies, innovative proneness and cosmopoliteness shared negative and significant correlation with the technological gap whereas age, total annual income, size of land holdings, area under orange crop, risk orientation and market orientation were found to be non-significant. Education, Innovative proneness and cosmopoliteness were considered an important variable affecting the technological gap with innovative proneness being the most important of the three mentioned above. Problem faced by the majority of the respondents is lack of knowledge about recommended packages and practices of the orange crops and the technologies updated in orange cultivation.

Intensive and effective extension programme should be implemented in the villages so that the farmer will have ideas about the latest technologies and packages and practices used in orange production technology.

Table.1 Distribution of respondents according to the extent of technological gap in orange production technology

Sl. No	Packages of practices	Extent of technological gap					
		Full gap		Partial gap		Nil gap	
		Freq.	%	Freq.	%	Freq.	%
1	Recommended varieties	-	-	132	88	18	12
2	Time of planting	-	-	-	-	150	100
3	Spacing	-	-	74	49	76	51
4	Size of pit	-	-	150	100	-	-
5	Filling material used in pits	-	-	109	73	41	27
6	Seed treatment	95	63	30	20	25	17
7	Time of application of fertilizer	-	-	96	64	54	36
8	Method of application of fertilizer	-	-	97	65	53	35
9	Time and process of pruning	-	-	93	62	57	38
10	Methods of Weed management	10	7	90	60	50	33
11	Land preparation	-	-	23	15	127	85
12	Propagation by seed	-	-	104	69	46	31
13	No. of plants per ha	-	-	68	45	82	55
14	Irrigation	-	-	121	81	29	19
15	Intercrops	124	83	18	12	8	5
16	Pest management	116	77	25	17	9	6
17	Disease management	116	77	25	17	9	6
18	Harvesting	-	-	-	-	150	100
19	storage	-	-	150	100	-	-

Table.2 Distribution of respondents according to their overall technological gap in adoption of recommended orange production technology

Sl. No.	Category	Frequency	Percentage
1	Low	24	16
2	Medium	104	69
3	High	22	15
	total	150	100

Table.3 Correlation coefficient between the variables and the technological gap of orange production technology

Sl. No.	Independent variables	Correlation coefficient (r)
1	Age	-0.032^{NS}
2	Education	-0.542**
3	Total annual income	-0.157^{NS}
4	Size of land holdings	-0.31^{NS}
5	Area under orange crop	-0.008^{NS}
6	Extension participation	-0.251**
7	Risk orientation	-0.078^{NS}
8	Contact with extension agencies	-0.183*
9	Innovative proneness	-0.899**
10	Market orientation	0.077^{NS}
11	Cosmopoliteness	-0.0647**

Table.4 Values of Regression analysis of independent variables with technological gap of orange production technology

Sl. No.	Independent variables	beta	Regression coefficient (b)	Standard error (S.E)	't' value of 'b'
X1	Age	-0.061	-0.054	0.035	-1.530
X2	Education	-0.221	-1.548	0.344	-4.499**
X3	Total annual income	-0.023	-0.012	0.025	-0.486
X4	Size of land holdings	0.012	0.160	0.558	0.287
X5	Area under orange crop	-0.025	-0.788	1.270	-0.620
X6	Extension participation	0.017	0.064	0.220	0.291
X7	Risk orientation	0.033	0.136	0.247	0.550
X8	Contact with extension agencies	-0.067	-0.391	0.346	-1.129
X9	Innovative proneness	-0.697	-0.736	0.053	-13.989**
X10	Market orientation	0.121	0.412	0.172	2.387
X11	Cosmopoliteness	-0.136	-0.924	0.341	-2.711**

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