A Relational Analysis of Level of Knowledge and Adoption of Mango Growers in Odisha, India

Subarnna Keshari Haripriya Padhan [a++*] and Siddhartha D. Mukhopadhyay [a#]

[a] Department of Agricultural Extension, Palli Siksha Bhavana, Visva-Bharati, Sriniketan, West Bengal, India.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Odisha is the 8th largest producer of Mango state in India and occupies 61.00 % of total fruit cultivated areas of the state. The present research has been conducted to ascertain the level of knowledge and adoption of improved farm practices by the Mango farmers as well as to ascertain the association between selected socio-personal, agro-economic, and communication variables with level of knowledge and adoption. The study was conducted in two purposively selected One District One Product (ODOP) districts for Mango, i.e. Subarnapur & Angul district of Odisha. Ten aspects of knowledge and nine broad aspects of adoption were considered for the present study. Data were collected from 180 respondents, 90 from each study district and analysed through

_____

++ Ph.D Research Scholar;
 # Professor;
*Corresponding author: E-mail: resext24@gmail.com;

statistical tools like Knowledge and Adoption Index, frequency, percentage, mean, standard deviation, correlation, multiple and step wise regression and ANOVA. It was found that Majority of the respondents were having medium and semi-medium level of overall knowledge and adoption respectively with no significant difference between study districts in this regard. Selected variables i.e. age, self-education, family-education, Mango farming experience, social participation, land holding, cultivable land, area under Mango, annual family income, overall information seeking behaviour, overall marketing behaviour, and overall adoption were found influencing the overall knowledge. Whereas, in case of level of adoption, all 11 variables out of the above mentioned 12 variables except overall level of adoption along with Mango yield index and overall knowledge were found having significant and strong correlation with overall adoption. The adjusted R^2 were found 0.788 and 0.766 respectively for regression of overall knowledge and overall adoption with selected socio-personal, agro-economic and communication variables. The step wise regression of overall knowledge with selected variables showed that, 5 variables viz, overall information seeking behaviour, overall marketing behaviour, self-education, Mango yield index and family education appeared as most important variables that explained the variation in overall knowledge level. Similarly, while doing regression of overall adoption with selected variables, 3 variables viz., overall knowledge, cultivable land, Mango yield index appeared as most important variables that explained the variation in overall adoption.

1. INTRODUCTION

India is the leading producer of Mango in the World and contribute a share of 50 percent of total Mango production in the world. India ranks 1st in Mango production among different Mango producing countries in the world (source: nhb.gov.in/report_file/mango) and estimated to produce 21 million metric ton of Mango in fiscal year 2023 (Source: www.statista.com). Odisha is the 8th largest producer of Mango state in India (source: https://agriculturereview.com) and occupies 61.00 % of total fruit cultivated areas of the state according to 2018-19 report (Source: https://agri.odisha.gov.in). One District One Product (ODOP) Programme is an initiative under Government of India where each district of the state contributes a leading product towards Indian economy and employment generation. The two districts i.e Subarnapur and Angul district of Odisha comes under ODOP as Major leading Mango producing districts(source:www.mofpi.gov.in). The Mango, being a commercial and king of fruit crop, the livelihood status of the farmers can only be increased through proper knowledge and adoption of improved production practices for which knowledge and adoption behaviour act as a crucial factor. Hence, it is important to study the Knowledge and Adoption behaviour of Mango growers (Karar et al. 2021). The present study was conducted to assess the following specific objectives.

1. To study the extent and overall level of knowledge and adoption of the respondents about improved Mango production practices.
2. To compare the knowledge and adoption level of the respondents between two study districts.
3. To study the relationship between selected characteristics of respondents with their knowledge and adoption level.

2. METHODOLOGY

Ex-post-facto research designed was used for the present study. The study was conducted in two purposively selected ODOP districts, as leading Mango growing areas i.e. Subarnapur and Angul district of Odisha. From each district two blocks were selected purposively namely, Sonepur and Ullunda block from Subarnapur district and Athmallik and Kishorenagar block from Angul district on the basis of maximum area and production of Mango and from each block clusters of villages were selected randomly. 45 numbers of respondents were selected randomly among the Mango growers from each cluster of villages totalling to 180 respondents for the study. Knowledge and adoption level of the respondents were studied under different aspects based on the package of practices prevailing in the study area and review of literature, viz., varieties, land preparation, propagation, planting, irrigation, manures and fertilizers application, use of growth regulator, plant protection measures, yield and harvest and post-harvest management. Under each aspects certain question were framed based on the

context of the study and prevailing practices in the study area and the respondents were asked to give answer against each question with a rating of 3 point continuum scale i.e. no knowledge, partial knowledge and full knowledge and no adoption, partial adoption and full adoption with corresponding score of 0,1 and 2 respectively (Modified Hardikar,1998, 3-point scale based on the context of the study) in order to access their knowledge and adoption level. These aspects and questions were incorporated in the interview schedule for data collection. The data were collected from the respondents by using a personal interview schedule. Collected data were classified, tabulated and analysed through statistical tools like, Index, frequency, percentage, mean, standard deviation, correlation, multiple regression, stepwise regression and ANOVA. The index value of each aspect under knowledge and adoption level of individual respondent were calculated by using the following formula.

Knowledge or adoption Index = Score obtained/Score maximum × 100

The overall knowledge and adoption level of individual respondent were calculated by taking average of all indices of aspects under level of knowledge and adoption as formula described below.

Overall Knowledge or adoption = sum of all indices under different aspects/Numbers of aspects.

The index value was categorised into 4 groups i.e. low, semi-medium, medium and high with corresponding index value of 0-25, 25.1-50, 50.1-75 and 75.1-100 respectively. The relational statistics were calculated by using SPSS.

To compare the knowledge and adoption level the following null hypothesis have been formulated.

H_{01}: There is no significant difference of knowledge level between two study districts' respondents.

H_{02}: There is no significant difference of adoption level between two study districts' respondents.

3. RESULTS AND DISCUSSION

The extent of knowledge of the respondents has been calculated by using the formula of Knowledge Index as given in methodology section and presented in Table 1 in two Major categories against each aspect of knowledge level i.e. Major 1 (having highest concentration of respondents) and Major 2 (having second highest concentration of respondents).

From the Table 1, it can be observed that Majority of the respondents had semi-medium level of knowledge (Major 1) followed by medium level of knowledge (Major 2) about the Mango varieties in case of Subarnapur district, Angul district and total respondents (35.56%, 38.89%, 37.22% as Major1 and 31.11%, 37.78%, 34.45% in Major 2 categories respectively).

While considering the land preparation and propagation practices it can be observed that the majority of respondents had medium level of knowledge followed by high level of knowledge in case of Subarnapur district, Angul district and total respondents (65.56%, 82.22%, 73.89% in Major 1 category and 34.44%, 17.78%, 26.11% in Major2 category respectively for land preparation and 38.89%, 51.11%, 45.00% in Major 1 catgory and 33.33%, 28.89%, 31.11% in Major 2 category in case of propagation practices respectively).

While considering the planting practices it was found that the majority of respondents had medium level of knowledge (Major 1) followed by high level of knowledge (Major 2) in case of Angul district and total respondents (56.67% and 51.11% in Major 1 category respectively) whereas in case of Subarnapur district most of the respondents (Major 1) were found having high level of knowledge (53.33%) followed by medium level (45.56%) of knowledge (Major 2). While considering irrigation practices it was found that the majority of respondents were having high level of knowledge followed by semi-medium level of knowledge in case of Subarnapur district and total respondents (50.00% and 43.89% in Major 1 respectively), whereas in case of Angul district most of the respondents (Major 1) were found having semi-medium level of knowledge (45.55%) followed by high level (37.78%) of knowledge (Major 2).

From the table it is also evident that Majority of the respondents had semi-medium (34.44% and 37.78%) level of knowledge (Major 1) followed by low (31.12% and 32.22%) level of knowledge (Major 2) about manures and fertilisers in case of Subarnapur district and Angul district respectively while a considerable percentage of respondents of Subarnapur district were also found having

medium level of knowledge regarding manures and fertilisers as Major 1 category (34.44%). In case of total respondents, majority of respondents were found having semi-medium level of knowledge (Major 1) followed by medium level of knowledge (Major 2) about manures and fertilisers (36.11% and 32.22% respectively).

While considering the use of growth regulators it can be observed that Majority of respondents had low level of knowledge (63.33%, 64.44%, 63.89% in Major 1 category) followed by semi-medium level of knowledge (31.11%, 30.00% and 30.55% in Major 2 category) respectively in case of Subarnapur district, Angul district and total respondents.

It is also observed that Majority of the respondents had semi-medium (40.00% and 35.55%) level of knowledge (Major 1) followed by low level (33.33% and 33.89%) of knowledge (Major 2) about plant protection measures in case of Angul district and total respondents respectively, where as in case of Subarnapur district most of the respondents (Major 1) were having low level of knowledge (34.44%) followed by semi-medium and medium level (31.11% each) of knowledge (Major 2) about plant protection measures.

While considering the yield and harvest and post-harvest management it was found that Majority of respondents had high level of knowledge followed by medium level of knowledge in case of Subarnapur district, Angul district and total respondents (57.78%, 60.00%, 58.89% and 54.44%, 42.22%, 48.33% in Major 1 category respectively in case of yield and harvest and post-harvest management whereas 25.56%, 22.22%, 23.89% and 25.56%, 30.00%, 27.78% in Major 2 category respectively in case of yield and harvest and post-harvest management).

Table 2 represents the extent of adoption of respondents about 9 Mango production practices in 2 categories i.e. Major 1 and Major 2 as it was done in case of knowledge level assessment. While considering the varieties, propagation practices and harvest and post-harvest management it was found that the majority of respondents had semi-medium level of adoption (46.67%, 45.56%, 46.11% for varieties; 62.22%, 63.33%, 62.78% for propagation practices and 47.78%, 67.78%, 57.78% for harvest and post-harvest management respectively) as Major 1 category followed by medium level of adoption (35.56%, 30.00%, 32.78% for varieties; 35.56%, 36.67%, 36.11% for propagation practices and 34.44%, 26.67%, 30.56% for harvest and post-

harvest practices respectively) as Major 2 category in case of Subarnapur district, Angul district and total respondents respectively.

While considering the land preparation and planting practices it was found that Majority of respondents had medium level of adoption (Major 1) followed by semi-medium level of adoption (Major 2) in case of Subarnapur district and total respondents respectively (57.78%, 51.67% and 48.89%, 42.22% respectively in major 1 followed by 30.00%, 40.55% and 35.55% and 37.78% respectively in major 2) where as in case of Angul district most of the respondents (51.11% and 40.00% respectively in Major 1) were having semi-medium level of adoption followed by medium level of adoption (45.56% and 35.56% respectively in Major 2 category).

While considering the irrigation, manures and fertilisers application, use of growth regulators and plant protection measures it was found that Majority of respondents had low level of adoption (66.67%, 77.78% and 72.22% for irrigation management; 86.67%, 82.22% and 84.44% for manures and fertiliser application; 93.33%, 100.00%, 96.67% for use of growth regulator; and 88.89%, 93.33%, 91.11% for plant protection measures respectively in Major 1 category) followed by semi-medium level of adoption as Major 2 category in case of Subarnapur district, Angul district and total respondents.

Table 3 represents the overall level of knowledge and adoption of improved Mango growing practices of the farmers on the basis of Knowledge Index (KI) and Adoption Index (AI) calculated by using the formula as given in the methodology section. From Table 3 it is evident that majority of the respondents of both the districts and total respondents had medium level of knowledge about different improved mango cultivation practices (38.89%, 44.45% and 41.67% respectively for Subarnapur district, Angul district and total respondents) followed by semi-medium level of knowledge (31.11%, 32.22% and 31.67% respectively for Subarnapur district, Angul district and total respondents). The mean Knowledge Index was found to be 62.81, 61.12 and 61.97 respectively for Subarnapur district, Angul district and total respondents. The results of these findings are supported to some extent by the findings of Meti (1998), Bheemappa (2001), Ramasubramanian and Manoharan(2002),Shashikiran et.al,.(2020), Kumar et al., (2022) and Kemekar and Salunkhe (2023).

Table 1. Extent of Knowledge of the Respondents about different Mango production practices

Level of knowledge on different practices	Subarnapur		Angul		Total	
	Major 1 (%)	Major 2 (%)	Major 1 (%)	Major 2(%)	Major 1 (%)	Major 2 (%)
Varieties	Semi-medium (35.56)	Medium (31.11) & High (31.11)	Semi-medium (38.89)	Medium (37.78)	Semi-medium (37.22)	Medium (34.45)
Land preparation	Medium (65.56)	High (34.44)	Medium (82.22)	High (17.78)	Medium (73.89)	High (26.11)
Propagation practices	Medium (38.89)	High (33.33)	Medium (51.11)	High (28.89)	Medium (45.00)	High (31.11)
Planting practices	High (53.33)	Medium (45.56)	Medium (56.67)	High (42.22)	Medium (51.11)	High (47.78)
Irrigation	High (50.00)	Semi-medium (32.22)	Semi-medium (45.55)	High (37.78)	High (43.89)	Semi-medium (38.89)
Manures and fertiliser application	Semi-medium (34.44) & Medium (34.44)	Low (31.12)	Semi-medium (37.78)	Low (32.22)	Semi-medium (36.11)	Medium (32.22)
Use of growth regulator	Low (63.33)	Semi-medium (31.11)	Low (64.44)	Semi-medium (30.00)	Low (63.89)	Semi-medium (30.55)
Plant protection measures	Low (34.44)	Semi-medium (31.11) & Medium (31.11)	Semi-medium (40.00)	Low (33.33)	Semi-medium (35.55)	Low (33.89)
Yield	High (57.78)	Medium (25.56)	High (60.00)	Medium (22.22)	High (58.89)	Medium (23.89)
Harvest and post-harvest management	High (54.44)	Medium (25.56)	High (42.22)	Medium (30.00)	High (48.33)	Medium (27.78)

Table 2. Extent of adoption of respondents about improved Mango production practices

Extent of adoption of different practices	Subarnapur		Angul		Total	
	Major 1 (%)	Major 2 (%)	Major 1 (%)	Major 2(%)	Major 1 (%)	Major 2 (%)
Varieties	Semi-medium (46.67)	Medium (35.56)	Semi-medium (45.56)	Medium (30.00)	Semi-medium (46.11)	Medium (32.78)
Land preparation	Medium (57.78)	Semi-medium (30.00)	Semi-medium (51.11)	Medium (45.56)	Medium (51.67)	Semi-medium (40.55)
Propagation practices	Semi-medium (62.22)	Medium (35.56)	Semi-medium (63.33)	Medium (36.67)	Semi-medium (62.78)	Medium (36.11)
Planting practices	Medium (48.89)	Semi-medium (35.55)	Semi-medium (40.00)	Medium (35.56)	Medium (42.22)	Semi-medium (37.78)
Irrigation	Low (66.67)	Semi-medium (22.22)	Low (77.78)	Semi-medium (22.22)	Low (72.22)	Semi-medium (22.22)
Manures and fertiliser application	Low (86.67)	Semi-medium (10.00)	Low (82.22)	Semi-medium (17.78)	Low (84.44)	Semi-medium (13.89)
Use of growth regulator	Low (93.33)	Semi-medium (4.45)	Low (100.00)	Semi-medium (0.00)	Low (96.67)	Semi-medium (2.23)
Plant protection measures	Low (88.89)	Semi-medium (8.89)	Low (93.33)	Semi-medium (6.67)	Low (91.11)	Semi-medium (7.78)
Harvest and post-harvest management	Semi-medium (47.78)	Medium (34.44)	Semi-medium (67.78)	Medium (26.67)	Semi-medium (57.78)	Medium (30.56)

Table 3. Overall knowledge and adoption level about improved Mango production practices among the respondents

Knowledge/ Adoption Index (KI / AI)	Knowledge level						Adoption level					
	Subarnapur (90)		Angul (90)		Total=180		Subarnapur (90)		Angul (90)		Total=180	
	F	%	F	%	F	%	F	%	F	%	F	%
0-25 (Low)	0	0.00	0	0.00	0	0.00	12	13.33	17	18.89	29	16.11
25.1-50 (Semi-Medium)	28	31.11	29	32.22	57	31.67	66	73.33	62	68.89	128	71.11
50.1-75 (Medium)	35	38.89	40	44.45	75	41.67	11	12.23	11	12.22	22	12.22
75.1-100 (High)	27	30.00	21	23.33	48	26.66	1	1.11	0	0.00	1	0.56
Mean	**62.81**		**61.12**		**61.97**		**39.19**		**36.33**		**37.76**	
SD	**15.26**		**15.38**		**15.34**		**11.77**		**10.73**		**11.35**	

Table 4. Comparison between knowledge and adoption level of respondents

ANOVA (level of significance =.005)		Sum of Squares	df	Mean Square	F	P value
Overall knowledge	Between Groups	128.954	1	128.954	.543	.462
	Within Groups	42280.442	178	237.531		
	Total	**42409.397**	**179**			
Overall adoption	Between Groups	367.618	1	367.618	2.863	.092
	Within Groups	22852.355	178	128.384		
	Total	**23219.973**	**179**			

While looking into the level of adoption it was found that Majority of the respondents had semi-medium level of adoption of different improved Mango cultivation practices (73.33%, 68.89% and 71.11% respectively for Subarnapur district, Angul district and total respondents) followed by low level of adoption (13.33%, 18.89% and 16.11% respectively for Subarnapur district, Angul district and total respondents). The mean Adoption Index was found to be 39.19, 36.33 and 37.76 respectively for Subarnapur district, Angul district and total respondents which are much lower than the Knowledge Index implying that although the respondents are having reasonably higher level of knowledge about improved Mango production practices that are not reflected in their level of adoption. The results of these findings are supported by the findings of Islam et al., (2021) to some extent.

Table 4 represents the analysis of variance of knowledge and adoption level of respondents between two study districts i.e. Subarnapur and Angul district. The F-value were found 0.543 and 2.863 and P value were found 0.462 and 0.092 respectively for the variables of overall knowledge and overall adoption. Here both the P value > 0.005, which indicates that there is no significant difference among group means. Hence the null hypothesis accepted and

alternative hypothesis rejected and it can be concluded that there is no significant difference in knowledge and adoption level of respondents between two study districts. This result is quite expected since the same package of practices were implemented under ODOP (One District One Product) programme, more or less same type of facilities regarding Mango cultivation are available that reflect towards more or less same type of adoption and also there was no significant difference in geographical condition in both the study districts.

Table 5 represents the association of socio-personal, agro-economic and communication variables with overall knowledge and overall adoption level of respondents. It was found that out of the 17 selected variables, 12 variables i.e. age, self-education, family-education, Mango farming experience, social participation, land holding, cultivable land, area under Mango, annual family income, overall information seeking behaviour, overall marketing behaviour, and overall adoption were found influencing the overall knowledge and other 5 variables i.e. family size, income from Mango, Mango trees per acer, Mango yield index and overall constraints were found having no association with overall knowledge. These 12 variables had significant and strong correlation with overall knowledge.

Table 5. Correlation of selected variables with knowledge and adoption level

Selected characteristics	Pearson Correlation(r), N=180	
	Overall Knowledge	**Overall Adoption**
Age	-.255**	-.181*
Self-education	.737**	.597**
Family education	.374**	.294**
Family size	.027	.062
Mango farming experience	.503**	.364**
Social participation	.469**	.378**
Land holding	.181*	.260**
Cultivable land	.198**	.299**
Area under Mango	.169*	.236**
Average Annual family income	.264**	.275**
Income from Mango	.118	.119
Mango trees per acre	-.035	-.058
Mango yield index	.052	.175*
Overall information	.827**	.742**
Overall Marketing behaviour	.511**	.374**
Overall Constraints	.032	-.006
Overall Knowledge	1	.862**
Overall Adoption	.862**	1

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed)*

On the other hand, except overall adoption, 11 variables out of the above mentioned 12 variables along with two other variables namely, overall knowledge and mango yield index were found having significant and strong correlation with overall adoption. This result is quite expected because increase in age leads to decrease in memory and grasping power and increase in health-related issues as a result the knowledge and adoption regarding different package of practices decrease. Increase in self-education, family-education, Mango farming experience, social participation, land holding, cultivable land, area under Mango, annual family income, information seeking behaviour, marketing behaviour and adoption level lead to increase in knowledge level. Similarly, increase in self-education, family-education, Mango farming experience, social participation, land holding, cultivable land, area under Mango, annual family income, Mango yield index, information seeking behaviour, marketing behaviour and knowledge lead to increase in adoption level of respondents regarding different package of practices. The results of these findings are supported by the findings of Patil et al*., (1999), Yadava et al., (2007), Sumathi & Rathakrishnan, (2008), Singh et al., (2010) and Kumar et al., (2022) to a great extent.

Table 6 represents the results of regression analysis of overall knowledge with selected socio-personal, agro-economic and communication variables. The adjusted R^2 was found .788 which indicates 78.00% of variation in the dependent variables i.e. overall knowledge was explained by the 16 selected independent variables viz, age, self-education, family education, family size, Mango farming experience, social participation, land holding, cultivable land, area under Mango, annual family income, income from Mango, Mango trees per acer, Mango yield index, overall information seeking behaviour, overall marketing behaviour and overall constraints.

Table 7 depicts the results of stepwise regression of overall knowledge with the selected socio-personal, agro-economic and communication variables. From stepwise regression 5 variables viz,. overall information seeking behaviour, overall marketing behaviour, self-education, Mango yield index and family education came out as the most important variables that explained 78.00% (adjusted R^2 = .784) variation in overall knowledge level. Out of these 5 variables 1 variable i.e overall information was found out as the most important variable explaining 68.00% (adjusted R^2 = .682) variation in overall knowledge level.

Table 6. Regression of overall Knowledge with selected variables

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-18.829	9.870		-1.908	.058
Age	-.038	.059	-.027	-.652	.515
Self-education	.602	.252	.156	2.391	.018
Family education	.612	.261	.107	2.343	.020
Family size	-.147	.215	-.027	-.684	.495
Mango farm experience	.223	.103	.089	2.165	.032
Social participation	-.117	.459	-.010	-.255	.799
Land holding	-.202	.151	-.117	-1.340	.182
Cultivable land	.179	.119	.137	1.503	.135
Area under Mango	.020	.719	.003	.027	.978
Average Annual family income	1.018E-06	.000	.028	.449	.654
Income from Mango	-3.496E-06	.000	-.040	-.367	.714
Mango trees per acre	.043	.043	.042	1.013	.313
Mango yield index	.063	.026	.146	2.380	.018
Overall information	.530	.071	.465	7.455	.000
Overall marketing behaviour	.854	.190	.269	4.504	.000
Overall constraints	.151	.083	.068	1.818	.071
a. Dependent Variable: overall knowledge					
R Square	Adjusted R Square				
.807	.788				

Table 7. Step wise regression of overall knowledge with selected variables

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.827[a]	.683	.682	8.68466
2	.860[b]	.740	.737	7.89431
3	.875[c]	.766	.763	7.50116
4	.885[d]	.782	.777	7.26274
5	.889[e]	.790	.784	7.15516

a. Predictors: (Constant), overall information

b. Predictors: (Constant), overall information, overall marketing behaviour

c. Predictors: (Constant), overall information, overall marketing behaviour, self-education

d. Predictors: (Constant), overall information, overall marketing behaviour, self-education, Mango yield index

e. Predictors: (Constant), overall information, overall marketing behaviour, self-education, Mango yield index, family education

Table 8. Regression of adoption with selected variables

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	4.195	7.758		.541	.589
age	.053	.046	.051	1.155	.250
Self-education	-.091	.199	-.032	-.455	.650
Family education	-.010	.206	-.002	-.049	.961
Family size	-.086	.167	-.021	-.513	.609
Mango farm experience	.017	.081	.009	.211	.833
Social participation	-.237	.357	-.028	-.665	.507
Land holding	-.047	.118	-.036	-.394	.694
Cultivable land	.175	.093	.182	1.880	.062
Area under Mango	-.240	.559	-.047	-.429	.669
Average Annual family income	-1.432E-06	.000	-.053	-.811	.419
Income from Mango	5.910E-06	.000	.091	.798	.426
Mango trees per acre	.019	.033	.025	.583	.561
Mango yield index	.055	.021	.173	2.641	.009
Overall information seeking behaviour	.136	.064	.162	2.128	.035
Overall marketing behaviour	-.131	.156	-.056	-.836	.405
Overall constraints	-.005	.065	-.003	-.080	.936
Overall knowledge	.584	.061	.789	9.584	.000

a. Dependent Variable: overall adoption

R Square		Adjusted R Square
.788		.766

Table 8 represents the results of regression analysis of overall adoption with selected socio-personal, agro-economic and communication variables. The adjusted R^2 was found .766 which indicates 76.00% of variation in the dependent variables i.e overall adoption was explained by the 17 selected independent variables viz,. age, self-education, family education, family size, Mango farming experience, social participation, land holding, cultivable land, area under Mango, annual family income, income from Mango, Mango trees per acer, Mango yield index, overall information seeking behaviour, overall marketing behaviour, overall constraints and overall knowledge.

Table 9. Step wise regression of overall adoption with selected variables

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.862[a]	.743	.742	5.78633
2	.872[b]	.761	.758	5.60291
3	.881[c]	.776	.772	5.43916

a. Predictors: (Constant), overall knowledge
b. Predictors: (Constant), overall knowledge, cultivable land
c. Predictors: (Constant), overall knowledge, cultivable land, Mango yield index

Table 9 depicts the results of step wise regression of overall adoption with the selected socio-personal, agro-economic and communication variables. From step-wise regression 3 variables viz,. overall knowledge, cultivable land and Mango yield index came out as most important variables that explained 77.00% (adjusted R^2 = .772) variation in overall adoption level. Out of these 3 variables 1 variable i.e. overall knowledge was found out as most important variable explaining 74.00% (adjusted R^2 = .742) variation in overall adoption level.

4. CONCLUSIONS

From the study it can be concluded that the Majority of the respondents had a semi-medium to high level of knowledge regarding different package of practices and low to medium level of adoption regarding different package of practices of Mango cultivation. Majority of the respondents had medium level (50.1-75 index value) of knowledge and semi-medium level (25.1-50.00 index value) of adoption in case of Subarnapur district, Angul district and total respondents. There was no significant difference of knowledge and adoption level of respondents between two study districts. In correlation analysis out of the 17 selected variables 12 variables i.e. age, self-education, family-education, Mango farming experience, social participation, land holding, cultivable land, area under Mango, annual family income, overall information seeking behaviour, overall marketing behaviour, and overall adoption were found having significant and strong correlation with the overall level of knowledge with adjusted R^2 = .788. Except overall adoption, 11 variables out of the above mentioned 12 variables were found having significant and strong correlation with overall level of adoption and additionally overall knowledge and Mango yield index were found having strong association with overall level of adoption with adjusted R^2 =.766. While calculating stepwise regression of overall level of knowledge, overall information

seeking behaviour was found out as most important variable explaining 68.00% (adjusted R^2 = .682) variation in overall level of knowledge. Similarly, while calculating step wise regression of overall level of adoption, overall level of knowledge was found out as most important variable explaining 74.00% (adjusted R^2 = .742) variation in overall adoption level. The study suggests that extension should have taken up more intensive efforts towards enhancement of level of knowledge and consequent level of adoption of improved Mango growing practices.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

Bheemappa, A. (2003). Entrepreneurship development in agriculture. *Yojana, 47*(12), 19-20.

Hardikar, D. P. (1998). Perfection of development programme derived by women beneficiaries of Ratnagiri District (Unpublished Ph.D. thesis). University of Dharwad.

Islam, A., Bose, D. K., & Alam, N. (2021). Impact of training program on adoption behavior of mango growers in Faizabad district of Uttar Pradesh. *Asian Journal of Agricultural Extension, Economics & Sociology, 39*(2), 76-81. https://doi.org/10.9734/ajaees/2021/v39i23 0531

Karar, H., Bashir, M. A., Alajmi, R. A., Metwally, D. M., Haider, M., Haider, N., Raza, S., Bakhsh, A., & Haddadi, R. (2021). Farmers' knowledge, perception, and management of *mango mealy bug, Drosicha mangiferae* Green (Hemiptera: Monophlebidae), on *Mangifera indica* in Punjab, Pakistan. *Saudi Journal of Biological Sciences, 28*(7), 3936-3942.

Kemekar, P., & Salunkhe, S. R. (2023). Knowledge of farmer first programme beneficiaries about demonstrated technologies. *Gujarat Journal of Extension Education, 35*(1), 51-55. https://doi.org/10.56572/gjoee.2023.35.1.0013

Kumar, G., Yadav, R. N., Doharey, R. K., Yadav, V., & Kumar, M. (2022). Knowledge level of mango orchardists in relation to different practices of mango in Meerut Districts, Uttar Pradesh, India. *Asian Journal of Agricultural Extension, Economics & Sociology, 40*(11), 38-44. https://doi.org/10.9734/ajaees/2022/v40i111683

Meti, S. K. (1998). Technology reach perception, knowledge, adoption and attitude towards improved agriculture technology by small and marginal farmers in Tungabhadra Command Area (Ph.D. thesis). University of Agricultural Sciences, Dharwad.

Odisha Agriculture Statistics. (2018-19). Government of Odisha, Department of Agriculture & Farmers' Empowerment. Retrieved from https://agri.odisha.gov.in

Office Memorandum dated 14.03.2024. Approved List of One District One Product (ODOP) under PMFME Scheme-reg. Retrieved from https://www.mofpi.gov.in

Patil, V. G., Mahadik, R. P., & Patil, A. S. (1999). Entrepreneurial behaviour of littlegourd growers. *Maharashtra Journal of Extension Education, 18*, 240-243.

Production volume of mango across India FY 2012-2023. (2023, August 24). Retrieved from https://www.statista.com/statistics/1039683/india-production-volume-of-mango

Ramasubramanian, M., & Manoharan, M. (2002). Knowledge and adoption behaviour of mango growers. *Madras Agricultural Journal, 89*(10-12), 582-585. https://doi.org/10.29321/MAJ.10.A00265

Report of the MANGO-NHB. Retrieved from https://nhb.gov.in/report_files/mango/mango.htm

Shashikiran, S., Sankangoudar, S., & Hiremath, D. (2020). Knowledge level of farmers about organic farming practices. *Journal of Pharmacognosy and Phytochemistry, 9*(5), 817-820.

Singh, K., Singh, G. P., & Priyadarshi, A. (2010). Extent of adoption of improved practices of mango production by mango growers in Muzaffarnagar district of Uttar Pradesh. *Indian Research Journal of Extension Education, 10*(3), 107-113.

Sumathi, P., & Rathakrishnan, T. (2008). Adoption of improved practices in mango cultivation by small and big farmers in Dharmapuri district. *Madras Agricultural Journal, 95*, 239-241.

Top 10 Mango Producing Countries & States in India. Retrieved from https://agriculturereview.com/mango-producing-countries-and-states-in-india

Yadava, R. N., Singh, D., & Sharma, T. D. (2007). Relationship between extent of adoption of improved mango cultivation practices and socio-economic features of mango orchardists of western Uttar Pradesh. *Progressive Agriculture, 7*, 31-33.