



Imperatives of Technology Adoption Among Farmers Growing Horticultural Crops in Wokha District of Nagaland

Benthunglo Lotha¹ and K. K. Jha²

1. PG Scholar 2. Prof. & Head, Dept of Agril. Extension, NU: SASRD, Nagaland

Corresponding author e-mail: benthungloshitiri@gmail.com

ABSTRACT

A study was undertaken in the state of Nagaland to examine the socio-economic & psychological characteristics of the respondents, level of technology adoption and its association with the selected variables. Ex-post facto research design was followed for the study. The study was conducted purposively in Wokha district of Nagaland comprising three blocks viz., Wokha, Bhandari and Wozhuro. Further 15 respondents from two villages each for Orange, Banana, Pineapple and Litchi crops were selected making a sample size of 120 respondents. Major findings of the study revealed that the majority of respondents were middle aged (35-55 years), male, had medium size of family, primary level educated, had medium level information sources utilization, extension contact and experience in cultivation of selected horticultural crops. Most had small land holding size. The highest mean annual income and income from crop was highest for orange growers with Rs.179723.33 and Rs.138023.33 respectively. 99.17 per cent of the farmers were not exposed to training, had medium level of scientific orientation, risk orientation, knowledge level, favorable attitude towards improved practices and medium level adoption. Variables- family size, experience in cultivation, size of land holding, knowledge and attitude showed positive and significant correlation with adoption of improved cultivation practices. The study recommends more exposure visits and need based training programmes for increasing awareness, knowledge and technological skills of farmers. Further the government should take initiative for strengthening marketing support, procurements and provide incentives to set up processing units thereby reducing post-harvest losses and eventually improving the socio-economic status of the concerned farmers.

Key words : Technology adoption; Knowledge; Horticultural farmers; Wokha; Nagaland.

Technology adoption in agriculture is an engine of economic growth and an important way to improve food security around the world, furthermore, the rise in world population has increased the demand for food and stimulated the need for innovations to increase food production and feed the growing human population. Thus, this focuses attention on the importance of technology adoption in the food industry (Chavas and Nauges, 2020).

India is the second largest producer of fruits in the world (Usha et al., 2015). The production of fruits in the country was estimated to be 102.76 million tonnes in the present year as compared to 102.08 million tonnes which was achieved in the year 2019-20 (Bhosale, 2021). There is an immense potential in the horticulture sector in Northeast India. At present horticultural crops account for 18.60% of cultivated area. In terms of its contribution to national production, the region accounts for about 5.1% for

fruits and 4.5% for vegetables (De, 2017).

Nagaland is located in North-east India and enjoys salubrious climate suitable for growing a wide range of crops. About 50% of the total areas have economic cultivable land and the mainstay of the people of the State is land based, i.e., Agro-horticultural activities (Deka and Thirugnanavel, 2020). Based on climatic suitability, topography and market potential, the Horticulture Department has identified orange, pineapple, banana and passion fruit as potential crops in Nagaland for commercial development (Humtsoe, 2013).

Wokha district, with wide variations in agro-climatic situations, is conducive for cultivation of several horticultural crops. Major cultivated fruit crops include banana, pineapple, lemon, mandarin orange, passion fruits, peach, palm, papaya, litchi, kiwi, guava, jackfruit and mango (Ray et al., 2015). Total area under Orange, Banana, Litchi and Pineapple

in the district during the year 2017-18 is 680 ha, 847.50 ha, 48.75 ha and 637.50 ha respectively. Total production of Orange, Banana, Litchi and Pineapple in the district during 2017-18 is 5950.00 MT, 11107.50 MT, 273.75MT and 10125.00MT respectively (*Anonymous, 2020*).

Therefore, it is pertinent to know the reasons of knowledge gap in technology adoption and interventions required to promote new technologies among farmers. Hence, the present study was undertaken having research questions to know the extent and gaps in adoption of recommended practices which could help extension workers and scientists to modify their approach of working with the farmers. The study was designed by selecting the following objectives:

- To study the socio-economic & psychological characteristics of the selected farmers.
- To find out the level of technology adoption among the respondents and association of selected independent variables with technology adoption.

METHODOLOGY

Ex-post facto research design was used for the present study. The present study was conducted in the state of Nagaland. Wokha district besides having favorable agro climatic conditions, considerable numbers of farmers are engaged in cultivation of Orange, Banana, Pineapple and Litchi crops. Therefore, Wokha district was purposively selected for the present study including three blocks viz., Wokha, Bhandari and Wozhuro. Further 15 respondents having at least 5 years farming experience, from two villages each for Orange, Banana, Pineapple and Litchi crops were selected making a sample size of 120 respondents.

The selected independent variables included age, gender, family size, family type, educational status, information sources utilization, extension contact, experience in cultivation, size of land holding, annual income, income from the selected crops, training exposure, scientific orientation, risk orientation, knowledge on improved cultivation practices, attitude towards improved cultivation practices. Adoption of improved cultivation practices was elected as dependent variable.

The primary data was obtained by holding personal interviews with the help of a pre-tested structured schedule. The secondary data and

corresponding information were accumulated from concerned departments, different publications, journals, magazines, pertinent text books and sources from the internet. The data collected from the respondents were scored, tabulated and analyzed for arriving at valid inferences.

RESULTS AND DISCUSSION

Socio-economic & psychological characteristics of the selected farmers : The findings in Table 1 revealed that most (55.00%) of the respondents cultivating different horticultural crops were middle aged (35-55 years) where majority (58.33%) of the respondents were male. These findings were in line with the findings of *Jha (2012)* for age and *Phukan et al. (2017)* for gender of respondents. Majority (68.33%) of the respondents had medium sized family ranging from 4-9 members where majority (90%) of them lived as a nuclear family. These findings were in the line with the findings of *Jha et al. (2019)* for family size and *Baseera and Bhardwaj (2018)* for family type of the respondents. Most (45.00%) of the respondents had education up to primary level and majority (65.83%) of the respondents had medium level of information sources utilization while, 18.33 per cent and 15.83 per cent of them had high and low level of information sources utilization respectively. These findings were in line with the findings of *Samajdar et al. (2016)* for education and *Kharlukhi and Jha (2021)* for information sources utilization of the respondents. It was observed that majority of the respondents had medium level of extension contact (55.00%) and medium level of experience (84.17%) in cultivation of selected horticultural crops. These findings were in accordance with the findings of *Yetwakar and Dnyaneshwar (2018)* for extension contact and *Prashanth et al. (2018)* for experience of the respondents.

Most (60.00%) of the respondents had small size of land holding (2.47-4.94 acre) while, (77.5%) of all category of horticultural farmers had land under 2.47-4.94 acre. This finding was in line with the findings of *Meena et al. (2017)* for size of land holding of the respondents. The highest mean annual income among the horticultural crops from all sources was found among orange growers (Rs. 179723.33), whereas, the highest mean annual income of orange growers was found to be Rs. 138023.33.

Table 2 revealed that orange growers had the

Table 1. Distribution of respondents based on Socio-economic & psychological characteristics of the selected farmers (N=120)

Variables	Category	%
Age Mean =51.63 Sd =12.1	Young(<35)	10.00
	Middle(35-55)	55.00
	Old(>55)	35.00
Gender	Male	58.33
	Female	41.67
Family size Mean =68.5 Sd =2.49	Small (<4)	17.5
	Medium(4-9)	68.33
	Large (>9)	14.16
Family type	Joint	10.00
	Nuclear	90.00
Educational status	Illiterate	11.6
	Primary	45.00
	Middle school	22.5
	High School	18.33
	Graduate & above	2.5
Information sources Mean =15.11 Sd =2.71	Low (<12.39)	15.83
	Medium (12.39-17.83)	65.83
	High (>17.83)	18.33
Extension contact Mean =3.14 Sd =1.79	Low (<1.35)	22.5
	Medium (1.35-4.9)	55.00
	High (>4.9)	22.5
Experience in cultivation Mean =12.19 Sd =10.86	Low (<1.32)	0.00
	Medium (1.32- 23)	84.17
	High (>23)	15.83
Land holding (acre) Mean =3.19 Sd =1.15	Marginal (<2.47)	29.17
	Small (2.47-4.94)	60.00
	Semi medium (4.94-9.88)	10.83
Annual income Mean =Rs. 133786.08 Sd =66394.73	Low (<2.47)	29.17
	Medium (2.47-4.94)	60.00
	Semi medium (4.94-9.88)	10.83
Training exposure Mean =0.008, Sd =0.09	Not received	99.17
	Received	0.83
Scientific orientation Mean =15.79 Sd =3.41	Low (<1.32)	20.83
	Medium (1.32- 23)	60.83
	High (>23)	18.33
Risk orientation Mean =11.47 Sd =1.76	Low(<9.7)	13.33
	Medium(9.7 to 13.2)	72.5
	High(>13.2)	14.17
Knowledge on improved cultivation practices Mean =11.19, Sd =2.9	Low (<8.28)	23.33
	Medium (8.28- 14.1)	60.83
	High (>14.1)	15.83
Attitude towards improved cultivation Mean =29.07, Sd =2.28	Less favorable (<26.79)	8.33
	Favorable (26.79 to 31.35)	83.33
	More favorable (>31.35)	8.33

Table 2. Contribution of income from selected horticultural crops to the total income

Horticulture Crop	Mean annual Income of farmer (Rs.)	Mean income from the selected crop (Rs.)	Contribution of crop income towards mean annual income (%)
Orange	179723.33	138023.33	76.79
Litchi	120120.5	90170.97	75.06
Banana	96129.53	61879.53	64.37
Pineapple	139170.96	58420.5	41.97

highest (76.79 %) contribution from the income of orange to their total income, followed by Litchi growers (75.06%), banana growers (64.37%) and pineapple growers (41.97%). The reason for orange growers having the highest contribution of crop income to the total income was due to large scale cultivation of orange in the selected villages. Furthermore, there were fewer respondents who were engaged in other enterprises or services as compared to the other selected crops. Thus it was observed that horticultural crops had substantive contribution towards strengthening the income of farmers.

The findings also showed that a huge majority of the respondents (99.17%) didn't receive any training related to their crop enterprise. It was observed that majority of the respondents possessed medium level of scientific orientation (60.83%) and risk orientation (72.5%). These findings were in line with the findings of *Chouhan et al. (2018)* for scientific orientation and *Tekale and Mano (2016)* for risk orientation of the respondents. The study also indicated that most of the respondents had medium level of knowledge (60.83%) followed by low level (23.33%) and 15.83 per cent of them possessed high level of knowledge. Pineapple growers (54.03%) had the highest mean knowledge level. Majority of the respondents growing orange (90.00%), banana (66.67%), litchi (76.67%) and pineapple (73.33%) had favorable attitude towards adoption of improved cultivation practices. These findings were in line with the findings of *Prodhan et al. (2017)* for knowledge level and attitude of the respondents.

Level of technology adoption among the respondents : It was revealed from Table 3 that majority of the respondents (61.67%) had medium level of technology adoption whereas, 23.33 per cent of them had high level of technology adoption and 15.00 per cent of them had low level of technology adoption. These

Table 3. Distribution of respondents based on level of technology adoption

Variable	Level	%
Extent of technology adoption	Low (<8.3)	15.00
	Medium (8.3- 12.94)	61.67
	High (>12.94)	23.33
	Adoption Index (AI)	31.42

Table 4. Correlation between independent variables and adoption of improved cultivation practices of the respondents

Independent variables	Coefficient of correlation (r)	P value
Age	0.181*	0.046
Gender	-0.053 ^{NS}	0.564
Family size	0.265**	0.003
Family type	-0.174 ^{NS}	0.056
Educational level	-0.145 ^{NS}	0.112
Information sources utilization	0.020 ^{NS}	0.825
Extension contacts	0.120 ^{NS}	0.190
Experience in cultivation	-0.317**	0.000
Size of land holding	0.281**	0.001
Annual Income	0.012 ^{NS}	0.895
Income from the selected crops	0.081 ^{NS}	0.378
Training exposure	0.094 ^{NS}	0.305
Scientific orientation	0.090 ^{NS}	0.324
Risk orientation	0.102 ^{NS}	0.264
Knowledge	0.257**	0.004
Attitude	0.338**	0.000

*Significant at 5% level of probability

**Significant at 1% level of probability

NS-Non-Significant

findings were in line with the findings of *Chigadolli et al. (2019)*. Overall adoption index was found to be at 62.5 per cent.

Association of selected independent variables with adoption of production technology : It was inferred from Table 4 that independent variables viz., family size, experience in cultivation, size of land holding, knowledge and attitude had positive and significant correlation with the adoption of improved cultivation practices of the respondents at 1% level of probability while, the independent variable age had significant and positive correlation with the adoption of improved cultivation practices of the respondents at 5% level of probability. Hence, these variables were found to be important in influencing the adoption of improved cultivation practices by the horticultural farmers.

CONCLUSION

Findings of the study revealed that orange crop contributed most towards the income of farmers, however, most of the farmers had small size of land holding under this crop. Therefore, there is a need to expand the area for cultivation of horticultural crops in general and orange crop in particular for maximizing the income of farmers. Further majority of the respondents had medium level of technology adoption and the adoption index for all horticultural crops was found to be at 62.5 per cent. Variables viz., Age, family size, experience in cultivation, size of land holding, knowledge and attitude were found important in influencing the technology adoption of improved cultivation practices of the farmers. The study recommends for more exposure visits and need based training programmes for increasing the awareness, knowledge and technical skills of the farmers for adoption of recommended technologies by farmers. Furthermore, the government should take initiative for strengthening marketing support, procurements and provide requisite incentives for encouraging the farmers and FPOs for setting up processing units thereby promoting value added products that could reduce post-harvest losses as well as improve the socio economic status of the farmers.

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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