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## Attitude of farmers towards adoption of sustainable cultivation practices of pineapple in Nagaland

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### Abstract

In today's world, sustainable agriculture is of utmost importance and need of the hour due to limited natural resources and globalization. The present study was conducted in three leading pineapple producing districts of Nagaland with an aim to study the attitude of the pineapple growers towards sustainable cultivation practices of pineapple based on ex-post facto research design. Thirteen villages from four RD Blocks were purposively selected with a sample size of 275 respondents based on proportionate random sampling procedure. Attitude scale based on Likert's technique was developed for the study. Findings revealed that more than half of the respondents were aged between 35-55 years with 41.45 percent educated upto middle school, majority of them had medium level of experience in pineapple cultivation, sources of information utilized, social participation, scientific orientation and risk taking ability. About half of them had small size of land under pineapple cultivation. Majority of them showed favourable attitude towards sustainable pineapple cultivation. Variables education, experience in pineapple cultivation, sources of information utilized, size of land under pineapple cultivation, social participation, scientific orientation and risk taking ability were found positively significant with their attitude.

**Keywords:** Pineapple cultivation, sustainability, attitude, socio-economic, Nagaland

### Introduction

Pineapple (*Ananas comosus* L. Merr.), belonging to Bromeliaceae family is one of the most popular and commercial tropical fruit crops in the world. Pineapple is consumed in fresh and processed form. As per the FAO Corporate Statistical Database (2020), the highest pineapple producing countries in the world include Philippines, Costa Rica, Brazil, Indonesia and China. India occupies the 6<sup>th</sup> rank in the world with a total production of 1,799,000 tonnes. Pineapple cultivation in India is confined to high rainfall and humid coastal regions in the peninsular India and hilly areas of north-east region. Pineapple in India is cultivated in almost all the states. According to the Ministry of Agriculture and Farmers Welfare, Government of India (2020 – 2021), the total production of pineapple in the country was 17,98,710 metric tonnes cultivated in an area of 1,05,580 ha. Nagaland had a total production 1,14,770 metric tonnes. Pineapple grown in Nagaland is popularly known for its sweetness and excellent quality in terms of size, appearance and TSS. Pineapple in Nagaland has been cultivated by the farmers since time immemorial as a rainfed crop and organic by default. It is available in two seasons July – August in summer and October – January in winter. Giant Kew, Kew and Queen varieties of pineapple are widely grown in the state. Pineapple has been identified as one of the important horticultural crops by the Government of Nagaland and various initiatives have been undertaken to enhance pineapple cultivation in the state. The state has achieved the distinction of branding the pineapple with the tag “Naga Pineapple”. However, the continuous use of land for pineapple cultivation may harm the soil health resulting in soil degradation, erosion, loss of soil fertility and disruption of flora and fauna. Sustainable agriculture is an alternative strategy which remedies to these problems. Rao and Rogers (2006) <sup>[21]</sup> defined sustainable agriculture as a practice that meets current and long term needs for food, fibre and other related needs of society while maximizing net benefits through conservation of resources to maintain other ecosystem services and function and long-term human development. Considering the potential contributions of pineapple cultivation in the state and the importance of sustainable agricultural practices in today's world, the present study was undertaken to study the attitude of pineapple growers towards adoption of sustainable cultivation practices of pineapple.

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## Materials and Methods

The study was conducted in three leading pineapple producing districts in Nagaland viz, Dimapur, Peren and Mokokchung where thirteen villages were purposively selected from four RD blocks. A total of 275 respondents were selected based on random proportionate sampling procedure using ex-post facto research design. Variables such as age, education, experience, size of land holding under pineapple cultivation, sources of information utilized, social participation, scientific orientation, market orientation and risk taking ability were selected for the present study. Age was measured by chronological age in years. Variables such as experience and size of land under pineapple cultivation were measured with the help of structured interview schedule. Education was measured by using the modified scale of Venkataramaiah (1983) [26]. The variables-sources of information utilized, social participation, scientific orientation, risk taking ability were empirically measured by using the scales developed by Ramchandran (1974) [19], Trivedi and Pareek (1963) [25] with due modifications, Supe (1969) [24] with due modifications respectively. Attitude scale was developed for the present study using Likert's technique (1932) [12]. Data were collected from the respondents with the help of pretested interview schedule. The collected data were coded, tabulated, classified and analysed by statistical tools like mean, standard deviation, correlation etc using SPSS software.

## Results and Discussion

### Profile of the pineapple farmers

Table 1 revealed that more than half (59.64%) of the respondents were aged between 35-55 years followed by 26.54 percent aged above 55 years and 13.82 percent aged below 35 years. The mean age was found to be 47.98 years. Middle aged farmers have more energy, responsibility and more involvement in farming activities than the other age group. Similar findings were observed by Alam and Usmani (2019) and Olah and Okhon (2022). It also revealed that (41.45%) of the respondents were educated up to middle school followed by 28.73 percent educated up to high school, 18.18 percent up to primary school, 7.27 percent illiterate, 3.64 percent matriculated and 0.73 percent were graduates. Education plays a key role in bringing desirable changes in an individual and society. Most of the respondents were educated and these might have helped the respondents in gathering knowledge on the various sustainable cultivation practices of pineapple. This finding was in accordance with the findings of Patra and Kense (2021) [17]. In case of experience in pineapple cultivation, the mean years of experience in pineapple cultivation was 9.73 years where, majority (68.36%) of the respondents had medium level followed by high level (20.00%) and low level (11.64%) of experience. More than half (54.91%) of the respondents were marginal farmers followed by 43.27 percent small farmers and only 1.82 percent were semi-medium farmers which is supported by the findings of Alam and Usmani (2019) [1], Kharlukhi and Jha (2021) [9] and Rabina *et al.* (2021) [18]. Majority (69.09%) of the respondents had medium level of sources of information utilised followed by high (20.00%) and low (10.91%) of sources of information utilised. This result was in conformity with the findings of Rabina *et al.* (2021) [18]. It was also found that majority (64.36%) of the respondents had medium level of social participation followed by 20.71 percent and 14.91 percent with low and high level of social participation

respectively. Saryam and Jirli (2020) [23], Kharlukhi and Jha (2021) [9] and Hiwarale *et al.* (2023) [7] reported similar findings. Majority (78.18%) of the respondents had medium level scientific orientation while 12.73 percent and 9.09 percent of the respondents had high and low level of scientific orientation respectively with a mean score of 34.81. This result was supported by the findings of Bidve *et al.* (2021) [2], Kharlukhi and Jha (2021) [9], Gayathri and Sahana (2022) [5]. Further, it was found that 64.00 percent of the pineapple growers had medium level risk taking ability while 19.27 percent of them had high level and 16.73 percent low level of risk taking ability. This finding was in concurrence with the results of Kumar *et al.* (2021) [10] and Kakki *et al.* (2022) [8].

**Table 1:** Socio-economic and psychological characteristics of the pineapple farmers N= 275

Variables	Category	Frequency	Percentage (%)
Age Mean (47.98)	< 35 years	38	13.82
	35 – 55 years	164	59.64
	> 55 years	73	26.54
Education	Illiterate	20	7.27
	Primary	50	18.18
	Middle	114	41.45
	Highschool	79	28.73
	Matriculate	10	3.64
	Graduate	02	0.73
Experience in pineapple cultivation Mean (9.73)	Low (< 5.57 years)	32	11.64
	Medium (5.57 – 14.91 years)	188	68.36
	High (> 14.91 years)	55	20.00
Size of land under pineapple cultivation Mean (3.59)	Marginal (< 2.5 acres)	151	54.91
	Small (2.5- 5.0 acres)	119	43.27
	Semi-medium (5.01- 10.00 acres)	05	1.82
Sources of information utilized	Low	30	10.91
	Medium	190	69.09
	High	55	20.00
Social participation	Low	57	20.73
	Medium	177	64.36
	High	41	14.91
Scientific orientation	Low	25	9.09
	Medium	215	78.18
	High	35	12.73
Risk taking ability	Low	46	16.73
	Medium	176	64.00
	High	53	19.27

### Attitude of farmers towards sustainable cultivation practices of pineapple

Table 2 revealed that majority (73.45%) of the respondents had favourable attitude towards adoption of sustainable cultivation practices of pineapple followed by less favourable (14.18%) and more favourable (12.37%) attitude with a mean score of 43.01. This maybe as a result that majority of the respondents were educated, majority of them had medium level of experience in pineapple cultivation, social participation, sources of information utilized and scientific orientation. Many of the pineapple growers agreed on the importance of sustainable agriculture to conserve the environment for increased agricultural production. This finding was supported by the findings of Ghosh and Hasan (2013) [6], Londhe and Kadam (2022) [13] and Sarwar *et al.* (2022) [22].

**Table 2:** Distribution of pineapple growers based on their attitude towards adoption of sustainable cultivation practices of pineapple N= 275

Degree of Attitude	Frequency	Percentage (%)	Mean Score	SD
Less favourable (< 40.00)	39	14.18	43.01	3.01
Favourable (40.00 – 46.02)	202	73.45		
More favourable (> 46.02)	34	12.37		

**Relationship between selected characteristics of pineapple growers and their attitude towards sustainable cultivation practices of pineapple**

Correlation coefficient was ascertained in order to study the relationship between selected characteristics of pineapple growers and their attitude towards sustainable cultivation practices of pineapple. Table 3 revealed that variables education, experience, sources of information utilized, size of land under pineapple cultivation, social participation, scientific orientation, risk bearing ability and market orientation had positive and significant relationship with the attitude of the pineapple growers at 1 percent level of significance. Level of education had positive and significant relationship with the attitude of pineapple growers where ‘r’ value was 0.009. Thus, it may be inferred that attitude of the pineapple growers towards sustainable cultivation practices depend on education. The higher the level of education of the farmers, higher will be the attitude towards sustainable cultivation practices of pineapple. Experience in pineapple cultivation had positive and significant relationship with attitude, where ‘r’ value was 0.047. This implied that with more years of experience in pineapple cultivation, the attitude of the respondents towards sustainable cultivation practices tends to be more favourable. There was positive and significant relationship between sources of information utilized and attitude of the respondents (r= 0.386). This might be due to the fact that with more utilization of information sources, more is the exposure of the respondents to different practices of sustainable cultivation, which might have helped the respondents in developing more favourable attitude towards sustainable cultivation practices of pineapple. The correlation value between size of land under pineapple cultivation and attitude of respondents was 0.101, which was found to be statistically significant. This may infer that respondents with larger farm size tend to have greater attitude towards sustainable cultivation practices of pineapple. The relationship between social participation and attitude was found to be positively significant (r= 0.193). Respondents having higher social participation tend to possess more favourable attitude towards sustainable cultivation practices of pineapple. This may be due to the reason that with more social participation and interaction, the respondents might have more contact with different types of individuals, see new experiences and ideas which might have helped them in developing a favourable attitude towards sustainable cultivation practices of pineapple. Scientific orientation had positive and significant relationship (r= 0.349) with the attitude of the respondents. Pineapple growers with good scientific orientation will prefer to know the latest sustainable cultivation practices. The table further revealed that risk bearing ability had positive and significant relationship (r= 0.137) with their attitude. It is expressed as the degree to which a farmer is oriented to take risk and courage to take up various practices. This inferred that respondents having more courage to take risk exhibited more favourable attitude

towards sustainable cultivation practices of pineapple. Kumar *et al.* (2012) [11], Rana *et al.* (2017) [20], Nataraju *et al.* (2019) [15] and Dharmanand *et al.* (2020) [4] also found similar results.

**Table 3:** Relationship between selected characteristics of pineapple growers and their attitude towards sustainable cultivation practices of pineapple

Sl. No.	Variables	Correlation Coefficient (r)	p-value
1.	Age	-0.006**	<0.01
2.	Education	0.009**	<0.01
3.	Experience in pineapple cultivation	0.047**	<0.01
4.	Sources of information utilized	0.386**	<0.01
5.	Size of land under pineapple cultivation	0.101**	<0.01
6.	Social participation	0.193**	<0.01
7.	Scientific orientation	0.349**	<0.01
8.	Risk bearing ability	0.137**	<0.01

\*Significant at 1%

**Multiple regression of the independent variables with the attitude of the respondents**

A perusal of the Table 4 revealed the multiple regression analysis of the pineapple growers to examine the contribution of the eight independent variables to the dependent variable viz., attitude of the respondents towards sustainable cultivation practices of pineapple. It was found that out of the eight independent variables fitted in the multiple regression analysis, two variables *i.e.*, sources of information utilized and scientific orientation contributed positively and significantly to the attitude level of the respondents and thus, they may be considered as good predictors towards the attitude of the respondents.

The R<sup>2</sup> value of 0.484 depicted that all the independent variables jointly contributed 48.4 percent towards the total variation in the attitude of the respondents towards sustainable cultivation practices of pineapple.

**Table 4:** Multiple regression of the independent variables with the attitude of the pineapple growers

Independent variables	Regression coefficient	SE (b)	t value	p value
Age	0.002	0.017	0.122	0.902
Education	-0.059	0.176	-0.338	0.735
Experience in pineapple cultivation	0.013	0.037	0.364	0.715
Sources of information utilized	0.373	0.071	5.240	<0.01**
Size of landholding under pineapple cultivation	0.124	0.112	1.102	0.271
Social participation	0.145	0.076	1.889	0.059
Scientific orientation	0.260	0.058	4.464	<0.01**
Risk bearing ability	0.010	0.122	0.088	0.929

\*Significant at 1% R<sup>2</sup>= 0.484 F= 10.209

**Conclusion**

It may be concluded that most of the respondents were aged between 35- 55 years, educated up to middle school, possessed medium level of experience in pineapple cultivation and most of them had 2.5- 5 acres of land under pineapple cultivation. Majority of the respondents had medium level of sources of information utilized, social participation, scientific orientation and risk taking ability. Most of them had favourable attitude towards sustainable cultivation practices of pineapple. The variables age, education, experience in pineapple cultivation, sources of

information utilized, size of landholding under pineapple cultivation, social participation, scientific orientation and risk bearing ability were found to be important and significant in influencing the degree of favourableness of attitude towards sustainable cultivation practices of pineapple. Since majority of the respondents had favourable attitude towards sustainable cultivation practices of pineapple, the importance of developing more sustainable behaviour for sustainable agriculture can be taken into account by considering the various variables identified in influencing their attitude. Policy workers, extension workers and authorities should work strategically to intensify the farmers' knowledge and information on sustainable practices through training programmes, capacity building programmes and exposure trips. Effective linkage between research, extension and farming system may be created to provide timely support to the pineapple farmers to address the varied degree of constraints faced by them and provide needed help for adoption of sustainable cultivation practices and obtain higher productivity and profitability.

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