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Enhanced Pineapple Production in Nagaland: Impact of Soil and Rainfall

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ABSTRACT

India is one of the major producers of pineapple contributing more than 8.00 per cent of the total world production. Indian pineapple in the form of canned slices, titbits, juice and jam are exported to Europe, middle-east and beyond. Some of the other important pineapples growing countries of the world are Hawaiian Islands, Philippines, Malaysia, Thailand, Brazil, Ghana, Kenya etc. Pineapple (*Ananas comosus*) is a herbaceous perennial crop belonging to the order Farinasae, family Bromeliaciae and is one of the important commercially grown tropical fruit in the world. It is a good source of vitamin A, vitamin B and fairly rich in vitamin C, minerals like calcium, phosphorus and iron. Although tropical in nature, pineapple can adapt well to sub-tropical areas up to 1,100 m above sea level if the area is free from frost. Pineapple is one of the most important and leading fruit crop cultivated in Nagaland. Total area under crop was 2,045 hectare with a production of 4,970 metric tonnes during 2015-16. Basically, 'Kew' and 'Queen' varieties are grown in the state. The pineapples grown here are marketed soon after the harvesting. The disposal of pineapple for consumer in state is not satisfactory.

Key words : *Nagaland, Pineapple, Impact, Rainfall, Production.*

Introduction

Pineapple (*Ananas comosus*) is a herbaccous perennial crop belonging to the order Farinasae, family Bromeliaciae and is one of the important commercially grown tropical fruit in the world. Although tropical in nature, pineapple can adopt well to subtropical areas up to 1,100 m above sea level if the area is free from frost (Sharma *et al.*, 2016). Pineapple is one of the most important commercial fruit of the world. It is a good source of vitamin A, vitamin B and fairly rich in vitamin C, minerals like calcium, phosphorous and iron. Pineapple is also used for juice, squash, jam, mixed jam and in canned form; fruit cane is used for preparing candy (Dhakre and Sharma, 2009). The crop is annually grown on areas 2,675 hectares with the production of about 52,037 metric tons (average of five year during the year 2004-05 to 2015-16) in Nagaland (Sharma *et al.*, 2009). It has been observed that there are wide fluctuations year to year in the production and productivity of pineapple in Nagaland, which may be attributed mainly due to variations in area under crop.

India is one of the major producers of pineapple

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contributing more than 8.00 per cent of the total world production. Indian pineapple in the form of canned slices, titbits, juice and jam are exported to Nepal, U.K., Spain and U.A.E. Other important pineapple growing countries of the world are Hawaiian Islands, Philippines, Malaysia, Thailand, Brazil, Ghana and Kenya etc. During 2015-16, India produced 1.26 million tonne of pineapples from about 80,000 hectare of land (Sharma *et al.*, 2016). The major pineapple states in India are West Bengal, Assam, Bihar, Nagaland, Meghalaya, Manipur, Arunachal Pardesh and Kerala.

The North Eastern Region of India produces about 49.00 per cent of the total pineapple of the country. The favourable soil and climatic conditions possibly offer unique opportunity for growing several varieties of fruits. The total area in NER was to the tune of 45,167 hectare with a production of 4,48,668 metric tonne (Sharma *et al.*, 2015)a. However, the productivity in the NER is 15.03 tonne per hectare which is much less as compared to the rest of the country where the average works out to be 23.55 tonne per hectare (Sharma *et al.*, 2015)b.

Besides, horticultural crops being perishable in nature needs improved post harvest which is limited only to some areas leading to poor quality of commodities making the fruit market glut followed by great depression in the price level. Thus, minimizing the losses with an effective means to increasing the per capita availability of fruits without bringing additional area under these crops should be done. The agro-climatic condition prevailing in the north east region is quite suitable for pineapple cultivation but due to marketing problem farmers are being discouraged to increase their area and production (Sema *et al.*, 2009). It has been observed that there are wide fluctuation year to year of the production and productivity of pineapple in the Nagaland, which may be attributed mainly due to variation in area under crop.

Therefore, keeping in view the above facts it is important to evaluate the factors governing the production of pineapple keeping these views the present study on the impact of cropped area, rainfall on production of pineapple in Nagaland during the year 2004-05 to 2015-16 was undertaken (Anon., 2018).

Research Methodology

Time series secondary data were collected for area, production of pineapple from Statistical Abstract, North Eastern Council, Shillong, Hand Book of Horticulture, Directorate of Economics and Statistics, Kohima, Statistical Hand Book, Directorate of Economics and Statistics, Government of Nagaland, Kohima for the period 2004-05 to 2015-16 (Anon., 2018). The choice of model to be adopted for the study depends upon the type of data and problem in hand. Multicollinnearity in the data was evaluated which was found to be insignificant. Therefore, for a good measure a multiple linear regression approach was adopted from Singh and Sharma (2020)a.

Regression Equation

It is of form:

$Y = a + \beta_1 X_1 + \beta_2 X_2 + e$ …….. (1).

Whereas: Y = Total production of Pineapple in metric tones (MT),

X_1 = Total area (in hectare),

X_2 = Annual average rainfall (in mm),

Table 1. Regression Coefficient and ANNOVA of Pineapple crop

S. No.	Crop	Constant	Regression coefficient		R^2
			X_1	X_2	
1.	Pineapple	8962.152	16.22*	676.87ns	0.262
			(1.774)	(0.144)	
			ANNOVA		
2.	SV	SS	DF	MSS	F Ratio
3.	Regression	1.5E+09	2	7.6E+08	1.790 NS
4.	Residual	4.2E+09	10	4.2E+08	
5.	Total	5.8E+09	12		

(Figure in parentheses is standard error of respective regression coefficient)
(R^2 - Coefficient of multiple determinations, * Significant at 0.5 per cent levels, NS - Non significant).

a = Intercept and

e = Random disturbance term.

β_1 and β_2 are the partial regression coefficients of the respective explanatory variables. The function was fitted by the method of ordinary least squares applied to the data. The result was estimated from the regression equation (1) and complied in the Table 1.

Results and Discusion

Table 1 reveals that the coefficient of multiple determinations (R^2) for the pineapple was found to be 0.262, this indicates that 26.20 per cent of the total variation in the production of pineapple was explained by gross cropped area (X_1) and average rainfall (X_2). The partial regression coefficient of X_1 and X_2 for the elasticities of production of pineapple were positive respectively but only β_1 was significant at 5 per cent level of significance. ANOVA for multiple linear regressions was evaluated and coefficient of multiple determinations (R^2) was also found to be significant. Similar Study were carried out by the Singh and Sharma, (2020)b.

Conclusion

The main conclusion of the study was that there is a linear effect of cropped area has definitely minor effects / influence on the production of pineapple as evidence by the data, but the influence of rainfall is not significant contribution in the total variation of the pineapple production / crop. In case of pineapple production, further study is required to find out an efficient function and factors, which are responsible for the production and productivity of the pineapple in the state of the Nagaland.

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