



RESEARCH PAPER

Traditional pineapple production: Scope for scale up to enhance farmers' income

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Abstract : Pineapple is one of the most important horticultural crops in Manipur. The present study was conducted in Senapati, Churachandpur and Imphal West districts of Manipur. The pineapple production was recorded highest in Senapati district, followed by Churachandpur district. Traditionally the farmers use to market their produce for fresh consumption at nearby markets; however with increase in the establishment of small and medium scale processing industries the new marketing channels has evolved in the state. Four important marketing channels have been identified for the trade of pineapples, out of which channel comprising of Farmer – *Lalonbi*/ Women trader – Retailer was found as the most dominant through which about 64 per cent of the pineapple moved. The average farm productivity and returns to pineapple growers remain low for past few decades due to many bottlenecks. Emerging processing industry in the state will help the farmers in increasing the shelf life of the produce. Moreover, there is a need to develop infrastructural facilities, especially in remote production areas, so that the produce could be reached the market immediately after harvest. Practicing mix cropping could be a big boost among the traditional farmers of the state in the days to come.

Key Words : Pineapple, Farmer, Production, Manipur

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INTRODUCTION

Pineapple (*Ananas comosus*) is a tropical fruit with exceptional juiciness, vibrant tropical flavour and immense health benefits. Mature fruit contains sugar, a protein digesting enzyme bromelin, citric acid, malic acid, vitamin A and B (Joy, 2010). It can be used as supplementary nutritional fruit for good health with an excellent source of vitamins and minerals and contains considerable calcium, potassium, fiber, and vitamin C.

Pineapple is the third most important tropical fruit in the world after banana and citrus (Rohrbach *et al.*, 2003). The five leading pineapple producing countries are Costa Rica, Brazil, Philippines, Thailand and Indonesia (FAOSTAT, 2013). These countries produce the fruit primarily for fresh fruit markets and the processing industry. It can increase national income through the expansion of local industries and higher incomes for farmers involved in its production.

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This fruit is much liked and popular all over the world. Pineapples may be cultivated from a crown cutting of the fruit, possibly flowering in 20-24 months and fruiting in the following six months. Although it is tropical in nature, pineapple can adopt well top sub-tropical areas up to 1100 m above sea level if the area is free from frost. India is one of the major producers of pineapple contributing more than 8 per cent of the total world production. Indian pineapple in the form of canned slices, titbits, juice and jam are mainly exported to Nepal, UK, Spain and UAE. The major pineapple producing states in India are West Bengal, Assam, Bihar, Nagaland, Meghalaya, Manipur, Arunachal Pradesh and Kerala (Anonymous, 2004). India ranked seventh among the pineapple producing country in the world during 2013-14 (GoI, 2014).

The state of Manipur is in second position in terms of area coverage under pineapple cultivation and it contributes around 7.85 per cent of the total pineapple production of the country. Out of the major fruits in

Manipur, pineapple contributes the highest production to the total fruits production (28.72%) and it occupies 25 per cent of total fruit producing areas of the state (GoI, 2014). Area under pineapple production was observed to increase in Manipur, but the productivity is still low compared to the other states (GoM, 2014). There are ample scopes for bringing more land under fruit cultivation in the hilly areas of Manipur. There is sufficient scope for cultivation of pineapples in the medium and high range of the hills in the state. For the promotion of healthy growth of horticulture in Manipur, it is essential to develop horticultural marketing (Singh *et al.*, 2015).

Pineapple is cultivated in almost all the districts of the state with various levels of production. Senapati, Churachandpur, Thoubal, Imphal East and Imphal West districts are the prominent pineapple producing districts with higher productions. However, considering the remoteness of other districts, Imphal East, Imphal West and Thoubal districts have emerged as the major pineapple trading centres. Senapati district has reported

Table A : District wise area under pineapple production in Manipur (in ha)

District	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	CGR (%)
Imphal East	1440	1127	1254	1415	1430	1601	3.98
Imphal West	694	802	801	808	813	603	-1.85
Bishenpur	1725	1902	1980	2034	2060	1652	0.14
Thoubal	2624	1632	1644	1659	1665	1665	-6.11
Tamenglong	1028	1002	1006	1013	1072	1072	1.21
Senapati	3425	3848	3710	3720	3724	3780	1.14
Ukhrul	330	350	359	363	363	565	8.36*
Chandel	755	750	597	645	367	517	-10.70*
Churachandpur	2250	2250	2280	2500	2500	2593	3.24**
Total	14271	13663	13631	14157	13994	14048	0.09

*, ** and *** indicate significance of values at P=0.10, 0.05 and 0.01, respectively probability level
Source: National Horticulture Board and State Horticulture Dept.

Table B : District wise pineapple production in Manipur (in MT)

District	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	CGR (%)
Imphal East	17950	14042	15630	18327	17738	20328	4.33
Imphal West	8958	10086	10074	10284	10294	7296	-2.66
Bishenpur	3989	4171	4335	4456	4488	18172	25.07
Thoubal	30697	20325	20473	20612	20630	20630	-5.38
Tamenglong	2987	3003	3009	3027	3748	12220	24.66*
Senapati	35985	40226	38213	39045	39067	43848	2.67*
Ukhrul	6120	6747	6950	7020	7020	7966	4.22*
Chandel	9810	7410	5850	6335	3653	6204	-11.65
Churachandpur	20250	22500	22500	25000	25000	29819	6.96**
Total	136746	128510	127033	134106	131638	166483	3.22

*, ** and *** indicate significance of values at P=0.10, 0.05 and 0.01, respectively probability level
Source: National Horticulture Board and State Horticulture Dept.

the highest pineapple production of 43848 MT in 2019-20. In 2019-20, highest positive changes in production of pineapple have been observed in almost all the districts. The farmers are always interested in maximizing their profit and not merely production. Therefore, there is a need to scale up the production to enhance farmers' income in the state. In this connection, the present work has undertaken with the following objectives:

- Examine production performance of pineapple farmers in selected districts of Manipur
- Strategize the business plans for scaling up the sector

MATERIAL AND METHODS

The present study was conducted in three districts of Manipur. Senapati, Churachandpur and Imphal West districts had chosen purposively, as it covers majority of the area under pineapple cultivation in the state. Six villages viz. Chiru and Sangaithel of Imphal West district, Thayong and Khunou of Senapati district and Khousabung and Bunglon of Churachandpur district were selected randomly for the study which was conducted in 2019-2020. Total 60 numbers of respondents were selected randomly from the selected villages. The necessary primary data was collected from the respondents with the help of a semi-structured questionnaire and the secondary data was collected by referring to published reports and database of various relevant sources and their website. The selected farmers were categorised into four categories as mentioned below.

Area of production	Group	Frequency	Percentage (%)
<0.25 ha	A	9	15.00
0.25 - 0.50 ha	B	20	33.33
0.51 – 1.00 ha	C	18	30.00
>1.00 ha	D	13	21.67
Total		60	100

The data collected were analyzed with the help of following analytical tool to meet up the objective of the study.

Compound Growth Rate (CGR):

The compound growth rate was worked out by using exponential potential function of the form

$$Y = ab^t$$

$$\ln y = \ln a + t \ln b$$

$$\text{CGR} = (\text{Antilog } b - 1) \times 100$$

where,

y = Dependent variable

a = Intercept b = Regression coefficient

t = Time in years

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Pineapple production:

Pineapple was one of the most important horticultural crops in the selected districts. Based on the field survey it was assessed that a sizable number of farmers were associated with pineapple cultivation in the districts. The production clusters of pineapple were spread along the hill slopes of the districts with almost all the tehsils contributing towards pineapple production. Major varieties of pineapple grown in the state were Queen and Kew, out of which the predominant variety was Queen. While fruits of Queen variety were smaller in size, they had better aroma and flavour. Fruits were golden yellow in colour and had spines. Average weight of the fruit was approximately 600 gm. The harvesting season of Queen starts from end of May/beginning of June and can go up to the end of August. Kew variety is generally bigger in size and can weigh up to 1.5 kg. They do not have spines and are used mostly for processing purpose. It was observed that Queen variety contributes for about 90 per cent of the pineapple production in the cluster.

The annual production of pineapple is presented in Table 4. The total productions of pineapple in 2020 were found as 81,000 nos., 2,70,000 nos., 4,86,000 nos. and 5,46,000 nos. for groups A, B, C and D, respectively. Though compound growth rates of pineapple production in all the groups (9.14 for A, 2.90 for B, 7.57 for C and 3.98 for D) were found positive, it was significant at 10% level only in group C. Overall Table 4 shows slight increase in pineapple production in all respondent groups over the years.

Price received by the farmer:

The price received by the farmer for each pineapple was found in between Rs. 8.00 and 22.00, with average

Table 4: Pineapple production details of the selected farmer

Group of farmers	Pineapple production (in nos.)			CGR (%)
	2018	2019	2020	
A (n=9)	68,000 (7,556)	70,000 (7,778)	81,000 (9,000)	9.14
B (n=20)	2,55,000 (12,750)	2,60,000 (13,000)	2,70,000 (13,500)	2.90
C (n=18)	4,20,000 (23,333)	4,55,000 (25,278)	4,86,000 (27,000)	7.57*
D (n=13)	5,05,000 (38,846)	5,60,000 (43,077)	5,46,000 (42,000)	3.98

* Significant at 10 per cent probability level
Figures in parentheses indicate average pineapple production of the farmers of each group

prices of Rs. 11.25, Rs. 11.75, Rs. 15.25 and Rs. 15.50 for group A, B, C and D, respectively in 2020. The farmers having larger cultivable areas had better bargaining powers with the traders because of their higher yields, access to distant traders and larger size of more than half of their harvest, and hence fetched higher prices in comparison to the smaller farmers.

Table 2 : Price received by the pineapple farmers

Group of farmers	Price (Rs./ piece)		
	2018	2019	2020
A	6-12 (7.50)	8-15 (8.25)	8-20 (11.25)
B	6-12 (8.50)	8-15 (9.50)	8-20 (11.75)
C	6-12 (9.75)	8-16 (11.00)	8-22 (15.25)
D	6-14 (10.50)	8-17 (12.25)	8-22 (15.50)

Figures in parentheses indicate average price received by the farmers

Sale details of produced pineapples:

Traditionally the farmers used to sell their produce only for fresh consumption either at farm-gate or in nearby markets. But, with the establishment of small and medium scale processing industries in Manipur, the new marketing channels had evolved in last two years. A few farmers had already signed agreements with some industries to sell their produce for further processing into pineapple juice, squash, dry candy, canned pineapple, jam etc. From Table 6 it could be clearly stated that large farmers of groups C and D were more interested to connect with the processing industries, which in turn

would help them in improving their overall standard of living by earning remunerative prices.

Marketing channels used for selling of pineapples:

Four important channels have been identified for the trade of pineapples in the study areas. Out of the four prevalent channels, Channel II (Farmer – *Lalonbi*/ Women trader – Retailer) was found as the most dominant channel through which about 64 per cent of the total pineapple moved.

In channel II, generally no sorting and grading was done at farmer's level. The *lalonbi* collected the produce from the small farmers and packed the pineapple in gunny/PP bags and transported the produce using pick up vans to the nearest market place/ processing plants. It may be noted that the *lalonbi* herself may be a farmer as well. The *lalonbi* bought the produce per piece basis and the price could be as low as Rs. 8/piece (it also went up to Rs. 25/piece if the fruit weigh approximately 600 grams). Transportation to the nearest market costs approximately Rs. 50 paise or Rs. 1/piece.

Channel I was particularly true for those farmers who have pineapple fields alongside the road. For them it was easier to evacuate the daily harvest to a roadside hut and solicit customers who were using that state/ national highway. It may be noted that here the pineapples were sold in small lots comprising of 3-6 pieces. No sorting or grading was done and the produce was generally fully ripened unlike in channel II, where partially ripened fruits were harvested. A lot was sold at a price as low as Rs. 20 during peak season, while the same could be sold up to Rs. 100 during the lean period. Some farmers had also brought the produce to main market of Imphal (typically post mid-night/early in the morning) to sell till the noon. Any unsold item was generally not carried back by the farmers and left to be wasted. The wastage sometimes could be up to 10-15 per cent of the total produce. Direct selling by farmers accounted for about 21 per cent of total production.

Channel III and IV were understood to be the preferred channels by the farmers, not because of higher

Table 3 : Targeted customers of pineapple producers

Group	Targeted customers		
	2018	2019	2020
A	General public	General public	General public
B	General public	General public	General public
C	General public	Public and processing plant	Public and processing plant
D	General public	Public and processing plant	Public and processing plant

Table 4 : Marketing channels with intermediaries and quantity handled in sale of pineapple

Channels	Intermediaries	Quantity handled (in %)
Channel I	Farmer – Consumer	21.53
Channel II	Farmer – <i>Lalonbi</i> (Women trader) – Consumer	64.17
Channel III	Farmer – <i>Lalonbi</i> (Women trader) - Processor – Wholesaler – Retailer - Consumer	8.20
Channel IV	Farmer – Processor – Retailer - Consumer	6.10

value realization, but due to easy hassle-free sale and less time-consuming transactions. However, the overall quantity going through these channels were very limited. With the establishment of small and medium scale processing plants at different parts of the state it is expected that Channels III and IV could be preferred by the farmers in future, provided they will receive satisfactory prices for their produce from the industries.

Problems faced by the farmers in traditional pineapple farming:

Despite the popularity of fruit crops, especially pineapple, in Manipur and availability of sizable area to majority of the farmers, the average farm productivity and returns to pineapple growers remains low. This may be attributed to multiple factors such as:

- Small and marginal landholdings of a group of farmers; thus, low volumes of individual marketable surplus
- Low density plantation
- Absence of nutrition management leading to low productivity
- Limited know-how among farmers on emerging best practices for production
- Lack of technical advisory services
- Lack of exposure visits and in-depth trainings of farmers
- Inadequate labour force during peak season creates problem in weed control which hampers growth of the fruits leading to low productivity
- Difficulty in evacuating produce from the hilly slopes due to lack of appropriate infrastructure leading to loss of the produce at the field itself
- Lack of farm proximate post-harvest infrastructure leading to no primary processing unit in the form of sorting, grading or even appropriate packing
- Lack of appropriate marketing infrastructure (in terms of display, storage of surplus produce, ripening) to sell the produce
- Absence of farmer producer groups/companies/cooperative structures. Thus, integration into value chain

and benefits of negotiation not availed by the farmers

- Absence of branding and promotion of pineapples grown in the State.

Plans for scaling up the sector and enhancing farmers' income:

Giving emphasis on processing:

Considering the future demand and changing food habit, the value addition of perishable crops like pineapple have huge potential to take up processing as an enterprise. Considering the increasing demand for processed products, self help groups and unemployed youth should be motivated to enter into this lucrative business by developing proper plans and schemes by the competent authorities.

Building cold storage and warehouses:

India is one of the largest producers of many agricultural perishables and, yet, nearly 20 per cent of India's fresh produce is wasted because of lack of adequate (cold) storage facilities. Reducing waste of pineapple, as it is perishable fruit, will augment farm income. Most small farmers do not risk growing perishable crops. Hence, establishment of cold storage facilities at strategic locations is the necessity to support the farmers.

Practicing mix cropping system:

Practicing mix cropping could be a big boost among the traditional farmers of the state in the days to come. Onubuogu *et al.*, 2014 had asserted that farmers adopt mixed cropping practice for many reasons which includes; to efficiently manage a piece of land, check climate change, to ensure food security, food availability all year round, increased income and reduced incidence of pests and diseases.

Skill and entrepreneurship development:

The cultivation of the pineapple is usually carried out by local farmers, who follow the traditional method of cultivation. In order to produce export-grade pineapple,

the traditional production method need to be changed and quality control measure need to be taken up to meet up the standardized protocol to follow on global scale.

Geographical indication status:

The authenticity of the traditional cultivation and production of pineapple can be protected through seeking Geographical Indication (GI) status. This could be achieved by formation of producer society or association involving key cultivar of the produce and sought the 'Geographical indication' certification from the Government of India. The GI is not only give a sense of satisfaction among the local people to enjoy the uniqueness of the product with assured quality, which are hailing from the region but also, a great sense of pride and ownership is attached to the product (Muthukumar and Naveena, 2019).

Conclusion:

Pineapple has numerous health benefits and provides economic potential for farmers, entrepreneurs and consumers. The area under pineapple cultivation and production were highest in Senapati district, followed by Churachandpur and Thoubal districts, respectively. Four effective marketing channels were observed during the study, out of which the channels involving processing industries were most recent and turning to be beneficial for both the farmer as well as the entrepreneur. The prospect of pineapple farming is bright in the coming years due to increasing popularity of the fruit both as fresh and processed products. To facilitate the distribution of the highly perishable fruit, authorities should develop transportation facilities, wherever necessary. For good economic returns from pineapple, growers should pay due attention for considering all recommended practices based on locality. Emerging processing industry in the state will help increasing state economy and reduce waste of fresh pineapple due to its perishable nature. To enhance the pineapple production in the study areas,

there is a need to develop infrastructural facilities to reduce post-harvest losses. Moreover, suitable scientific package of pineapple cultivation in local dialect should be prepared for the pineapple orchardist.

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