

Research Paper

Study on Economics of Pineapple Cultivation in Manipur, India

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ABSTRACT

The present study was conducted in Manipur which has the highest area and production of pineapple among the North Eastern Hill Region of India. Two hilly districts of Manipur namely Senapati and Churachandpur were selected based on highest area under pineapple. It was found that the pineapple cultivation is economically feasible. It is evident that the cost C_3 of pineapple for 4-year period is ₹ 315620.60 per hectare with a total return of ₹ 571459.64 per hectare and the overall net return is ₹ 255839.04 per hectare. The investment in cultivation of pineapple in hilly districts of Manipur is profitable as further indicated by the benefit cost ratio which is 1.71. Therefore, pineapple cultivation could be an important source of livelihood and income of the farmers. It was found that farmers in Manipur faced many problems in the marketing of pineapple. These are lack of proper transportation which ranked first followed by unavailability of nearby market, unavailability of storage facility, low price of the product and lack of processing unit. It is suggested that the early fruit bearing and stress tolerant varieties may be recommended to make pineapple orchard more profitable as there is no return in 1st year of its establishment. Similarly, organic certification of this crop may be initiated either by the government or private agencies as organic cultivation is followed by default in this state which may attract the exporters and consumers and thereby investment in marketing may be enhanced.

HIGHLIGHTS

- ① The investment in cultivation of pineapple in hilly districts of Manipur is profitable.
- ② The BCR exceeding one indicates that the pineapple cultivation is expected to generate incremental value.
- ③ Cultivation of pineapple could be an important source of livelihood and income keeping in view the major problems encounter by the farmers.

Keywords: Pineapple, Cost of cultivation, Profitability and marketing

Pineapple (*Ananas comosus*) belongs to the Bromeliaceae family and is known as queen of fruits. Pineapple acts as a good source of vitamins A, B and C, calcium, magnesium, potassium and iron (Anonymous, 2012). It is known as the queen of fruits because of its excellent flavour and taste. These plants are drought tolerant and well adapted to the tropical sandy soils with pH ranging from 4.5 to 6.5 (Ubi *et al.* 2005). Pineapple is a well-positioned fruit since its trade is oriented towards developed countries such as Japan, USA and the European Community (Coveca, 2002). It is the third most important tropical fruit crop after banana and citrus

(Hassan *et al.* 2012), contributing to over 20 per cent of the world production of tropical fruits (Coveca, 2002). It is also a source of bromelin, a digestive enzyme. India ranks 3rd in the world in area and 6th in production with an area of 91.90 thousand hectares and production of 13.86 lakhs million ton during 2010 (NHB, 2010). About 70 per cent of total production is consumed as fresh fruit in countries producing pineapple.

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Pineapple is abundantly grown in almost entire North East region of India. Manipur ranks 1st in area and production of pineapple among the North East hill states in 2018-19 (Anonymous, 2019). The two most important varieties of pineapple viz., Kew (big size) and Queen (small size) are produced on commercial scale in Manipur. Scientific information on establishment cost, operating cost and labour input requirement in pineapple orchard would be of a great importance for pineapple producers as well as for financing institutions. The study on economics as well as profitability of pineapple production is scanty in North East region. Therefore, an attempt has been made in this study to examine the economics, profitability and constraints of pineapple production in Manipur, India. The specific objectives of the study are (i) to work out the economics of pineapple production and (ii) to identify the major problems faced by the farmers in the marketing of pineapple

Database and Methodology

The study was conducted purely based on primary data. Two hilly districts of Manipur viz., Senapati and Churachandpur were selected purposively based on highest acreage under pineapple among the five hilly districts. Two blocks from each district were selected in consultation with the experts of KVKs located in the selected districts at the event of selecting the area under study. Then the list of villages of each block was collected and three villages from each block were selected randomly. Finally, the list of pineapple growers of selected village was collected and ten pineapple growers from each village were selected by employing the technique of simple random sampling without replacement. Thus, a sample of 120 farmers comprising of 60 pineapple growers from each district was selected as the ultimate sample unit of the study. Primary data was collected during 2018-2019 through personal interview with the help of pre-tested survey schedule.

Cost of cultivation for pineapple in Manipur was examined by adopting the same process as recommended by the Commission for Agricultural Costs and Prices (CACP). These are cost A_1 , A_2 , B_1 , B_2 , C_1 , C_2 and C_3 . The cost of pineapple cultivation was calculated for five years i.e., starting from the year of establishment and for four years. Returns

from pineapple were examined by adopting gross farm income, farm business income, family level income, net farm income and farm investment income. The identity of these measures is as follows:

- ◆ Gross Farm income (GFI) = Value of main product + Value of by product
- ◆ Farm business income = GFI – Cost A_2
- ◆ Family level income = GFI – Cost B_2
- ◆ Net farm income = GFI – Cost C_3
- ◆ Farm investment income = Farm business income – wages of family labour

The economic feasibility of pineapple orchard was examined on the basis of net present worth (NPW), benefit cost ratio (BCR) and internal rate of return (IRR). The technique of Garrett’s ranking was adopted to examine the major problems in marketing of pineapple.

RESULTS AND DISCUSSION

Pineapple is tropical plant and has a great economic significance. Cultivation of pineapple is a capital-intensive enterprise and has high initial establishment cost. The initial cost of establishment of pineapple orchard in the study area consists of the preparation of land and layout, cost of plantation, cost of planting materials and cost of fencing is presented in Table 1. The total cost of establishing a pineapple orchard was observed to be ₹ 71155.81/ha. The expenditure on establishment of the pineapple orchard was found to be highest at the occurrence of cost of planting material (39 per cent) followed by cost of plantation (39.85 per cent), preparation of land (16 per cent) and fencing (4.52 per cent).

Table 1: Cost of establishment of pineapple orchard

Particulars	Cost (₹/ha)	%
Preparation of land and layout	11384.33	16.00
Cost of plantation (Digging, planting and filling of pit)	28203.18	39.64
Fencing	3215.043	4.52
Planting material	28353.26	39.85
Total	71155.81	100.00

Apart from the initial cost of investment, the operational cost of pineapple orchard was worked out and presented in Table 2. The major operational cost of pineapple orchard is intercultural operation,

Table 2: Operational cost of pineapple orchard (₹/ha)

Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	Overall
Intercultural operation	19376.76 (100.00)	22164.85 (61.69)	26028.24 (57.09)	28290.96 (62.31)	95860.80 (65.52)
Harvesting	—	9144.29 (25.45)	11548.87 (25.33)	10458.49 (23.03)	31151.65 (21.29)
Transportation	—	4618.46 (12.85)	8012.33 (17.57)	6657.03 (14.66)	19287.81 (13.18)
Total	19376.76 (100.00)	35927.60 (100.00)	45589.44 (100.00)	45406.47 (100.00)	146300.26 (100.00)

Note: Figures in parentheses are percentage to the total.

Table 3: Cost of cultivation using different cost concepts (₹/ ha)

Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	Overall
Establishment cost	71155.81	—	—	—	—
Hired labour	14950.95	28185.49	36232.90	35649.23	115018.57
Depreciation	349.73	349.73	349.73	349.73	1398.90
Land revenue	—	—	—	—	—
Subtotal	15300.67	28535.21	36582.63	35998.96	116417.47
Interest on working capital @ 7%	1071.05	1997.47	2560.78	2519.93	8149.22
Cost A ₁	87527.53	30532.68	39143.41	38518.88	195722.50
Rent paid for leased in land	—	—	—	—	—
Cost A ₂	87527.53	30532.68	39143.41	38518.88	195722.50
Interest on owned fixed assets (excluding land)	4980.91	4980.91	4980.91	4980.91	19923.63
Cost B ₁	92508.43	35513.59	44124.32	43499.79	215646.13
Rental value of land less land revenue + rent paid for leased-in land	10000.00	10000.00	10000.00	10000.00	40000.00
Cost B ₂	102508.43	45513.59	54124.32	53499.79	255646.13
Imputed value of family labour	4425.81	7742.11	9356.53	9757.24	31281.69
Cost C ₁	96934.24	43255.69	53480.85	53257.03	246927.82
Imputed value of family labour	4425.81	7742.11	9356.53	9757.24	31281.69
Cost C ₂	106934.24	53255.69	63480.85	63257.03	286927.82
10% of C ₂	10693.42	5325.57	6348.09	6325.70	28692.78
Cost C ₃	117627.67	58581.26	69828.94	69582.73	315620.60

manuring and transportation. It revealed from the study that operational cost increases with the increase in duration of plantation. The total operational cost was worked out as ₹ 19376.76/ha in the first year, ₹ 35927.60/ha in the 2nd year, ₹ 45589.44/ha in the 3rd year and ₹ 45406.47/ha in the 4th year. The component wise analysis shows that cost on intercultural operation increases with the increase in duration of plantation. Cost of harvesting and transportation was turned out to be higher in the 3rd year, may be due to higher production of pineapple during this year. The overall cost of intercultural operation varies from 57.09 per cent in the 3rd year to 100 per cent in the 1st year.

Table 3 portrays the cost of cultivation of pineapple by using different cost concepts. The overall Cost A₁ for pineapple cultivation is found to be ₹ 195722.50/ha. Cost A₂ and Cost A₁ are same as the respondents have not any leased-in land during the study period. The other costs such as B₁, B₂, C₁, C₂ and C₃ were worked out as ₹ 215646.13/ha, ₹ 255646.13/ha, ₹ 246927.82/ha, ₹ 286927.82/ha and ₹ 315620.60/ha, respectively. It was found that the cost C₃ is highest in 3rd year except the cost involved in 1st year. The cost of cultivation and cost of involvement of labour was found highest in 1st year i.e., ₹ 71155.81/ha and ₹ 14950.95/ha, respectively which was due to high cost of establishment.

Table 4: Returns from pineapple cultivation (₹/ ha)

Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	Overall
Production (MT/ha)	—	11.59	21.83	18.77	52.19
Gross Farm Income	—	127947.01	239573.25	203939.38	571459.64
Farm business income	-87527.53	97414.33	200429.84	165420.49	375737.13
Family level income	-102508.43	82433.42	185448.93	150439.59	315813.51
Net farm income	-117627.67	69365.74	169744.32	134356.65	255839.04
Farm investment income	-91953.34	89672.22	191073.31	155663.26	344455.45

Various returns from pineapple cultivation are presented in Table 4. Pineapple starts to producing fruits from second year onwards and it reaches at peak in the 3rd year and decline onwards. The overall production of pineapple during the four-year period is found to be 52.19 MT per hectare. About 41.83 per cent of the total production is produced in 3rd year itself and the rest of the production is concentrated to the 2nd and 4th year. Similarly, the gross farm income (GFI) per hectare is found to be highest (41.92 per cent) in the 3rd year. The overall GFI was found to be ₹ 571459.64/ha. The farm business income, family level income, net farm income and farm investment income was also found to be highest in the 3rd year.

Table 5: Economic viability of pineapple orchard

Particulars	Value
NPV (₹/ha)	191716.29
B:C ratio	1.71
IRR (%)	76.98

The economic viability of pineapple is calculated based on 7 per cent annual rate of discount and presented in Table 5. The Net Present Value (NPV) of pineapple orchard was found to be ₹ 191716.29/ha and the Benefit Cost Ratio (BCR) is 1.71 which exhibits the cultivation of pineapple in Manipur is profitable. Similar finding was reported by Rymbai *et al.* (2012) and they found that the pineapple cultivation was economically feasible in Meghalaya. The internal rate of return of pineapple is worked out and found to be 76.98 percent.

It is evident from the foregoing discussion that pineapple cultivation is profitable but the growers in Manipur faced various problems in the marketing of pineapple. The five major problems in marketing of pineapple were identified and Garrets average score

of these problems are worked out and presented in Table 6.

Table 6: Problems faced by the farmer in marketing of pineapple in Manipur

Particulars	Garrets Score	Garrets Average score	Rank
Lack of proper transportation	8285.00	69.04	1
Unavailability of nearby Market	6675.00	55.63	2
Unavailability of storage facility	6510.00	54.25	3
Low price of the product	5155.00	42.96	4
No nearby processing unit	3375.00	28.13	5

Lack of proper transportation ranked first among these problems followed by unavailability of nearby market, unavailability of storage facility, low price of the product and lack of processing unit are also reported by the growers in marketing of pineapple from orchard. Therefore, pineapple could be a more profitable proposition to the growers of Manipur if these problems are eliminated at the field level.

CONCLUSION

In view of the above discussion, it was found that the pineapple cultivation is a profitable venture. It is evident that the cost C₃ of pineapple for 4-year period is ₹ 315620.60 per hectare with a total return of ₹ 571459.64 per hectare. The overall net return is ₹255839.04 per hectare. The investment in cultivation of pineapple in hilly districts of Manipur is profitable as further indicated by the benefit cost ratio which is 1.71. Therefore, pineapple cultivation could be an important source of livelihood and income of the farmers keeping in view the major

problems in marketing of pineapple. The early fruit bearing and stress tolerant varieties may be recommended to make pineapple orchard more profitable as there is no return in 1st year of its establishment. Similarly, organic certification of this crop may be initiated either by the government or private agencies since organic cultivation is *prima facie* to attract the exporters and consumers and thereby investment in marketing may be enhanced.

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