Alinteri Journal of Agriculture Sciences

RESEARCH ARTICLE

Quest for the Profitability and Sustainability of Tea And Pine Apple Plantation in Unorganized Sectors of Assam, India

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ARTICLE INFO

ABSTRACT

Country like India is mostly dependent upon the agriculture produce as even in the twenty-first-century agriculture is the backbone of Indian economy. The main challenge for any activity is to know whether it is going to survive. This study focuses on determining the profitability and sustainability of tea and pineapple growers. Both the plantation grows well in the studied region. The researcher used a structured questionnaire for collecting data from the growers. Cost-Benefit Ratio, Profit volume, break-even point, Margin of safety, and profit is ascertained in the study. In both the plantation the results show the CBR is greater than one, which implies it is economically feasible. The total cost of planting tea in one acre of land is Rs 189505. Whereas the total cost pineapple plantation is Rs 49600. The average total revenue that planters generate from sales proceeds of tea is Rs 400925 and for pineapple is Rs 287000 from one acre of land. The tea planters are earning a net profit of Rs 211420 and pineapple planters are earning a net profit of Rs 237400. It can be said that the growers earn a fairly good sum of money. None of the pineapple growers are using any kind of fertilizer or chemicals which make them organic and healthy to consume. Both tea and pineapple Plantation can generate good revenue and are feasible investment decisions to take on, among the two pineapples is generating more revenue than tea.

Introduction

India from its history is known for its rural economy, most of the people are dependent upon the agriculture produce directly. In the 21st century the economy of India has moved from an agrarian economy to a service-based economy. The most common reason given for this shift in the economy is due to non-profitability in their crops. It is reported that most farmers in India don't get a fair price for their crops. That's the reason why people are shifting from agriculture to better job opportunities. In the northeastern part of India, especially in the state of Assam where there are plenty of hills which are more congenial for plantation of Tea and Pine Apple is witnessing a downfall in the plantation. Tea is a perennial shrub, whose bud and two leaves are used in making tea. In India it is commonly known as "chai" or "cha".

The pineapple (Ananas comosus) is a tropical plant that bears an edible fruit; also called pineapples are the most economically significant plant in the plant family Bromeliaceae. India ranks 5th in terms of total cultivation output in the year 2017 as per UN reports of the Food and Agriculture Organization Corporate Statistical Data. Pineapple is cultivated in an area of 89 thousand hectares hilly land and total production is 1415.00 thousand tons per annum. It is abundantly grown in almost the entire North East region of India, other states like West Bengal, Kerala, Karnataka, Bihar, Goa, and Maharashtra. The major pineapple growing countries in the world are Brazil, followed by Thailand, Philippines,

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Costa Rica, China, and India. The total area under pineapple cultivation in the world is 909.84 thousand hectares with production around 19412.91 thousand tons.

(Bakhsh et al., 2006) studied Profitability and Cost in Growing Mango Orchards finds that cost and benefit ratio doesn't serve a true measurement for making decisions. The benefit-cost ratio is positive in his study. It shows the growing mango is profitable in the selected region of study. (Uzunoz & Akcay, 2016) analyzed the Profitability Analysis of Investment of Peach and Apple Growing in Turkey by using Cost-benefit Ratio, Net Present Value, and Internal rate of return. The researcher concludes that in the selected region peach and apple farming is economically viable and can be an important source of income for the farmers. (John et al., 2017) finds the benefit-Cost Analysis of Apiculture Enterprise in District Pulwama and Srinagar as per the researcher's findings the business was profitable. It has become a source of small scale employment opportunities and creating jobs for rural people to reduce poverty in the rural economy. (Sharma, 2019) conducted a Cost-Benefit Analysis of Small Tea Growers in Padumani Development Block of Golaghat District of Assam finds the CBR greater than one. Which mean plantation decision will be a profitable one. He also finds the sector is very promising and can generate a quite number of Employments.

The rationale of the Study

The study will be useful for the unemployed youth, farmers thinking of shifting to other crops, government agencies so that they can form new policies to make it more profitable. It will also help the people to those who are in a dilemma to choose one option between tea and pineapple. The study will help understand the economic feasibility of plantation. The objectives set in the next section will help them to determine the actual amount they need to invest at the initial stage on per hectare basis and how much they can expect in return, thus it will help them in decision making.

Objectives of the Study

- To determine the Cost-benefit Ratio of Tea and Pine Apple plantation.

- To determine the Fixed cost, Variable cost, and Total cost for Tea and Pine Apple plantation.

- To determine the revenue generated per acre for Tea and Pine Apple.

- To determine the Profit on sale of Pine Apple per piece.

- To determine the profit on the sale of Tea leaves per Kilogram.

Materials and Methods

Area and Population

The study is conducted in the Morongi developmental Block of Golaghat, the upper Assam districts along with Karbi Anglong districts of Assam. The population of the study is roughly known, as the study is conducted in the unorganized sector and the planters are scattered. As the number of tea and pineapple growers data in the targeted region is known but the actual location of the growers are not known. They are doing plantation on their level. All the growers of the studied region have been taken as the population of the study.

Sample Size

The size of the sample for the study is determined after the pilot survey. The pilot survey schedule uses interval scale and nominal and in the form of 5 points Likert scale. 15 statements are used on a Likert scale. The variance calculated after the pilot survey for tea plantation is 0.195 and for pineapple plantation is 0.241. The variation implies that larger the variance; larger will be the sample size and smaller the variance smaller will be sample size. The formula to be used in determining the sample size is as follows:

Sample size determination for Tea Plantation (Kothari. C.R., Garg.G 2019)

$$n = \frac{Z_{\alpha/2}^2 \, N \, \delta^2}{(N-1)e^2 + Z_{\alpha/2}^2} \tag{1}$$

This formula is used in the calculation because the population is finite. The calculation is done at a 5% level of significance and a 95% level of confidence.

$$n = \frac{(1.96)^2 * 233 * .195}{(233-1)(0.05)^2 + (1.96)^2}$$

$$n = \frac{3.84 * 45.435}{232 * 0.0025 + 3.84}$$

$$n = \frac{174.47}{0.58 + 3.84}$$

n = 39.4

n ≈ 40

After the calculation the sample size turns out to be 39.4. So, 40 respondents were taken as sample size.

Sample size determination for Pine Apple Plantation

$$n = \frac{Z_{\alpha/2}^2 \, N \, \delta^2}{(N-1)e^2 + Z_{\alpha/2}^2} \tag{2}$$

The calculation is done at a 5% level of significance and a 95% level of confidence.

$$n = \frac{(1.96)^2 * 207 * .241}{(241-1)(0.05)^2 + (1.96)^2}$$

$$n = \frac{3.84 * 49.88}{240 * 0.0025 + 3.84}$$

$$n = \frac{191.53}{0.6 + 3.84}$$

n = 43.13

n ≈ 43

The calculation of the sample size turns out to be 43.13. So, 43 respondents were selected as sample size.

Method

The convenience and Snowball sampling method are used for the study. As the growers of tea and pineapple are scattered in various places in the studied region and unavailability of any reliable data about growers of unorganized sector. The researcher has chosen this method to collect data from the growers as it suits the purpose of the study. All the data collected is in INR.

Data Collection

Keeping objective in mind data has been collected from both primary and secondary sources. Primary data is collected with the help of a structured schedule keeping in mind the objectives of the study. Utmost care has been taken while collecting data, only reliable and authentic information for the study is included in the study. Secondary sources of data collected from books, journals, periodicals, government websites magazines.

Tools for Analysis

Cost-Benefit Analysis: It is a process for estimating the cost involved and probable profit to be derived from a business opportunity. It is used to ascertain the soundness of any business investment opportunity and provide a basis for making decisions. Those projects are taken into consideration whose outcome is more than one. To determine the cost of cultivating green tea leaves and the revenue earned from per acre of land. It will be determined by the following:

Cost-Benefit Analysis (CBA) = $\frac{TR}{TC}$ (3)

Where, TR = Total Revenue, TC = Total Cost.

Profit Volume ratio: PV ratio also called a contribution margin ratio. It is a measurement of the rate of change of profit due to a change in volume of sales. It expresses the gross profit made on one unit op production as a fraction of the percentage of its selling price. It shows the relationship between contribution and the value of sales. The contribution is derived after deduction Variable cost from Sales and Variable cost are those cost which increases or decreases as the output increases or decrease. It is used to measure efficiency. It is determined by the following formula

P/V ratio=$\frac{\text{Contribution}}{\text{Sales}} \times 100$ (4)

Where, Contribution = Sales- Variable Cost

Break-even point: BEP is that point where there is no profit no loss situation prevails. Or in other words we can say BEP as a point of intersection where total Expenses (cost) and total Revenue (sales) curve cut each other. Graphically, it is a point where total cost and total revenue curve meet. BEP can be shown with the help of the following diagram.
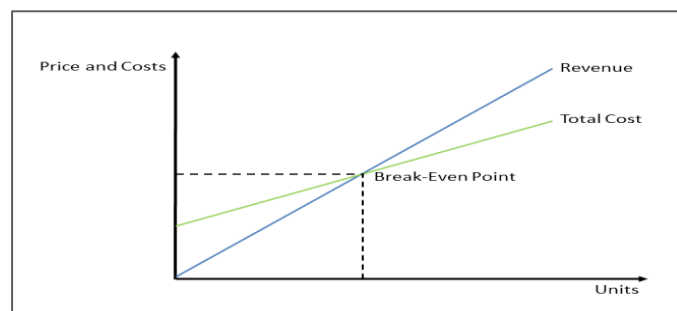

Figure 1. Break-even curve

Figure 1 showing Break Even point. It can be calculated by the following formula:

BEP=$\frac{\text{Total fixed cost}}{\text{Contribution}}$ (5)

Contribution= selling price – variable cost

Or; Fixed cost + profit.

The margin of Safety: The margin of safety is a measure of risk. The excess of sales over the Break-Even of sales is known as the Margin of Safety. With the high Margin of Safety businesses have a low risk of Shut down and with low margin businesses have a high rate of Shut down. Higher the margin the better for the business. It is represented as:

Actual sales- BEP (6)

Where, BEP = Break-Even Point

Profit on sale: It is used to determine the gross profit on the sale, Symbolically it is written as

Profit on Sale = Sales-TC (7)

Where, TC= Fixed Cost + Variable Cost

The cost of producing per kilogram of the raw leaf will be studied per strata. Along with the return, the cultivators will be getting after selling the leaf to the middleman or directly to the nearby factory

Results and Discussion

Cost Components along with Analysis for Tea Plantation

The tea plant & plantation cost include the cost of preparing land for planting, the cost of the tea plant, and planting of each tea plant. Fertilizer and insecticide in fixed cost indicate for those chemicals used once during plantation to protect the tea plant from insects and other diseases. The wage for plucking of leaves is paid Rs. 4 per kg of leaves.

The total output in a year is 26068 kilograms. The average rate as responded by the grower is taken at Rs. 15.38/kg. The price of raw leaves ranges from Rs 23 to 9 Rs per kg. The growers get an amount of Rs 400926 per acre from the sale proceeds.

Table 1. Fixed and variable cost components

Fixed Cost per Acre/ Year		Variable Cost per Acre/ Year	
Particulars	Amount in Rs. (INR)	Particulars	Amount in Rs. (INR)
Land Revenue	700	Wage for Spraying chemical	3834
Sprayer	1237	Wage for leaf plucking	104272
Tea Plant & plantation	2025	Fertilizers/Insecticide	52500
Fertilizers/Insecticide	122	Wage for pruning tea bushes	4725
Handheld cart	1400	Bamboo Fences	14350
Weighting Scale	830	Bamboo Basket	490
Spade	260	Tarpaulin	760
		Nylon Bag	750
		Pruning Knife	1250
Total	**6574**	**Total**	**182931**

Source: Field Survey

Table 2. Output, rate and amount derived from the sale of leaf

Fixed cost in Rs.	Fixed cost/ kg in Rs.	Variable cost in Rs.	Variable cost/ kg in Rs.	Total cost in Rs.	Total cost / kg in Rs.	Total Output in Kg	Rate/ Kg	Amount in Rs
6574	0.25	182931	7.01	189505	7.26	26068	15.38	400926

Source: Field Survey

The fixed cost per kg is derived by dividing the fixed cost from the total output and variable cost is derived by dividing variable cost by total output. Similarly total cost per unit or kg is derived after dividing total cost by total output. The variable cost per kg is Rs 7.01 and the fixed cost is Re 0.25. The total cost per kg is Rs 7.26.

Table 3. Fixed cost, variable cost, total cost, output and selling price

Fixed Cost	Variable Cost	Total Cost	Output in Kg	Selling Price in Rs.
6.574	182931	189505	26068	15.38

Source: Field Survey

The exhibits show fixed cost incurred in one acre of land is Rs 6574 variable cost Rs 182931 while the total cost is Rs 189505. The output per acre during per harvesting season is 26068 kg having an average selling price of Rs 15.38.

Table 4. Results of financial tools for tea plantation

Cost Benefit Ratio	Contribution	Profit Volume Ratio	Break Even Point	Margin of Safety	Profit on sale/Kg
2.11	8.37	54.42	785.42	388847	8.12

Source: Field Survey

Cost Components along with Analysis for Pine Apple Plantation

Per acre the seed required is around 15000 which costs around Rs 12000. The first thing which the growers required is the cleaning of the land where pineapple is to be planted. For cleaning the area where the plantation is to be done it required 20 man-hour days per day costing @200 amounting to Rs 4000. Once the seeds were planted it becomes ready to be harvested within 2 years. It requires cleaning of grasses in six months. For 15000 seeds planted it will bear fruit in around 10000. Harvesting per fruit cost Re 1. The total cost for one acre of land is Rs 49600.

Table 5. Cost components per acre

Particulars	Units	Rate per Unit cost in Rs.	Amount in Rs.(INR)
Plantation Seed (F)	(15,000 seeds)	@.80	12000
Spade(F)	2	@200	400
Knife (F)	10 pcs	@150	1500
Land Revenue (F)			700
Labour charges for cleaning for plantation (V)	20 man hour	@200	4000
Labour charges for plantation (V)	45 man hour	@200	9000
Cleaning of bushes half yearly (V)	60 man hour	@200	12000
Harvesting (V)	10,000	@ 1	10000
Total			**49600**

Source: Field Survey. (F)= Fixed Cost, (V) = Variable Cost

Table 6. Fixed cost, variable cost and total cost

	Fixed Cost in Rs	Variable Cost in Rs	Variable Cost per Unit	Total Cost in Rs
Small Fruit	1459	3501	3.50	4960
Medium Fruit	4380	10500	3.50	14880
Big Fruit	8759	21001	3.34	29760
Total	14600	35000		49600

Source: Field Survey

Table 7. Fixed cost, variable cost and total cost

Fruit Grade	Production in pieces	Average Selling price	Revenue	Proportionate Total Cost	Cost per piece
Small Fruit	1000	8	8000	4960	4.96
Medium Fruit	3000	23	69000	14880	4.96
Big Fruit	6000	35	210000	29760	4.96
Total	10000		287000	49600	

Source: Field Survey

Table 8. Results of financial tools for pine apple plantation

Cost Benefit Ratio	Fruit Type	Contribution	Profit Volume Ratio	Break Even Point	Margin of Safety	Profit on sale/Piece
	Small	4.5	56.25	324.22	5406.24	3.04
5.79	Medium	19.5	84.78	224.61	63833.97	18.04
	Big	31.65	90.42	276.74	200314.1	30.04

Source: Field Survey

The cost-benefit ratio for the plantation of tea is 2.11 and for Pine Apple the ratio is 5.79. The implication for the cost-benefit ratio is that if it is greater than 1 then it implies that it is profitable. In both the plantation the CBR is favorable for the growers which means it is economically feasible. The total cost of planting tea in one acre of land is Rs 189505. Whereas the total cost pineapple plantation is Rs 49600. The average total revenue that planters generate from sales proceeds of tea is Rs 400925 and for pineapple is Rs 287000 from one acre of land. The tea planters are earning a net profit of Rs 211420 and pineapple planters are earning a net profit of Rs 237400. In percent terms tea planters earn about 211 percent return per annum from per acre of land while pineapple planters earn 578 percent returns which is quite high, so in comparative terms pineapple is more profitable. From selling per kilogram of tea leaves the planters earn Rs 8.12. From sale proceeds of small fruit, medium fruit, and big fruit of pineapple the growers can earn Rs 3.04, 18.04, and 30.04 respectively. It can be said that the growers earn a fairly good sum of money. None of the pineapple growers are using any kind of fertilizer or chemicals which make them organic and healthy to eat.

Conclusion

The study finds many answers to cost-related questions regarding plantation. In both the plantation it was found that it is economically feasible. The farmers along with the government should work together for the benefit of the planters. Overall the profitability is good. As Assam is producing more than half of the tea production in India, it continues to have profitability. The youth who were looking for jobs can take up entrepreneur activity and starts generating employment. The government has launched many schemes for the tea planters. Pineapple being a perishable commodity if the government sets up some food processing industry in pineapple farming areas the farmers can earn more money. The government is targeting to double the incomes of the farmers by 2022. The targeted region is near the international border so it makes it more advantageous for farmers, they can read the benefit of export if they continue to produce good quality products. The Act East policy of the government is also in effect which will help the farmers to export. To conclude it can be said that both the plantation is having good economically and financially viability.

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