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An Economic Analysis on Production of Hill Banana in Dindigul District of Tamil Nadu, India

B. Chandru[1*], A. Rohini[2], M. Chandrakumar[2] and V. Anandhi[3]

[1]Department of Agricultural and Rural Management, Tamil Nadu Agricultural University, Coimbatore-641 003 (Tamil Nadu) India.
[2]Faculty, Department of Agricultural and Rural Management, Tamil Nadu Agricultural University, Coimbatore-641 003 (Tamil Nadu) India.
[3]Faculty, Department of PS & IT, Tamil Nadu Agricultural University, Coimbatore-641 003 (Tamil Nadu) India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study was primarily concentrated on hill banana cultivation. The purpose of this study is to find the economics of hill banana cultivation and the problems faced by the hill banana farmers during the production of hill bananas in the Dindigul district of Tamil Nadu. Economics of the hill banana cultivation was done by finding the cost and returns associated with the hill banana cultivation and constraints faced by the hill banana farmers with Garrett's ranking technique. Many previous research on the production of various agricultural commodities was focused on a specific area and/or a specific commodity. There was a little study on banana production and limitations in some regions in Tamil Nadu. As a result, the focus of this research will be on hill banana production in the Dindigul district. Purposive and convenience sampling technique was used in this study. Primary data were collected by the personal interview with a well-structured interview schedule. The cost and returns of hill bananas were calculated per hectare. The average cost of production of hill

**Corresponding author: E-mail: bmchandru25@gmail.com;*

bananas was estimated to be □2.04 lakh/ha. The average gross return was □5.04 lakh/ha and the average net return was estimated to be □2.99 lakh/ha. The result of the study shows that hill banana cultivation was highly profitable and the benefit-cost ratio (BC Ratio) was more than unity (2.46). The major constraints faced by hill banana farmers in the cultivation of hill bananas were pest attack (insects) followed by disease attack, lack of labor availability, animal attack, and drought. The findings will assist policymakers in developing appropriate programs and adjusting strategies for improving hill banana production in Tamil Nadu.

Keywords: Hill banana cultivation; economic analysis; cost and returns; production constraints and Garrett's ranking.

1. INTRODUCTION

India is one of the world's largest producers of agricultural goods, second only to China in terms of fruits and vegetables. India has a variety of agroclimatic conditions that are ideal for producing nearly all types of horticulture crops, including tropical, subtropical, and temperate crops. Globalization has created several possibilities and difficulties for Indian trade. India produced 145.8 million tonnes of horticultural crops in 2002 and 311.7 million tonnes of horticultural crops in 2018, demonstrating the country's remarkable rise in horticulture production. In 2018, India's fruit crops contributed around 31.2 percent of overall horticulture production. Based on the area under cultivation in 2018, mango (2.258 million ha) ranks first, followed by citrus (1.003 million ha) and banana (0.884 million ha). Based on production amount, banana (30.81 million tonnes) ranks first, followed by mango (21.82 million tonnes) and citrus (12.55 million tonnes) [1]. India, being the world's top producer of fruits and vegetables, plays a significant role in commodity commerce on a global scale.

In India, the banana is the most important horticultural crop. It is a significant crop in India and across the world, with a unique growing technique and trading procedures developed by various types of farmers (small, medium, large size). In India, mostly they belonged to fertile land. In the current scenario, India is the largest banana-producing country in the world and has produced about 30.81 million tonnes of banana in the year 2018. India contributes about 27% to the total world banana production and followed by China (9.7%) and Indonesia (6.3%). Brazil, Ecuador, Philippines, Gautemala, Colombia, Angola, and Tanzania are some of the leading banana-producing countries in the world [2].

1.1 Production Status of Banana in India and Tamil Nadu

In India, Andhra Pradesh stands first in banana production with 5.01 million MT. Andhra Pradesh (16.24 percent), Gujarat (14.52 percent), Maharashtra (13.66 percent), Tamil Nadu (10.41 percent), and Uttar Pradesh (10.3 percent) are the top five states account for 65 percent of the country's total banana production. With 0.11 million hectares under banana production, Karnataka ranks top in India, accounting for 12.51 percent of overall banana cultivation. followed by Kerala (12.36%), Andhra Pradesh (10.1%), Tamil Nadu (9.35%), and Maharashtra (9.15%). India has witnessed a 2.1% and 4.8% growth in the area under cultivation and production of bananas respectively in 2018 over the year 2017. Among the states growing bananas, Madhya Pradesh has the highest productivity of 69.54 MT/Ha. In Tamil Nadu, banana is one of the trinity of fruits (the others being mango and jackfruit). The state's banana crop covers 0.089 million hectares and produces 3.21 million tonnes. In Tamil Nadu, banana productivity is 38.79 MT/ha. The major banana-growing districts in Tamil Nadu include Trichy, Coimbatore, Tuticorin, Erode, Kanniyakumari, Dindigul, Theni, Tiruvannamalai, and Tirunelveli [1].

1.2 About Hill Banana

Hill banana (AAB) is only found in the lower Pulney hills of Tamil Nadu. This is a rain-fed horticulture crop that grows between 3000 and 4500 feet above mean sea level. The most unique feature of this fruit is that it only thrives on virgin soil with a neutral to slightly acidic pH range and high humus content. It grows on the slopes and valleys of mountains. Another distinguishing trait of this fruit is that it retains clusters and takes only 18 months to produce. The crop is generally farmed organically, and it

requires at least 110 days of equally distributed rainfall every year, with a total volume of 1500 mm.

Here this hill banana is a very important crop to the farmers in the hilly and tribal areas. Profit from the hill banana cultivation is the main and major income for the farmers who are all involved in this cultivation, which is used for the development of their livelihood. It is important to know whether they are either profited or not? What are all the problems they face during production?

So thereby this study is carried out with the following objectives

i) To know the cost and returns associated with the hill banana cultivation and
ii) To know the constraints faced by farmers in the hill banana cultivation

1.3 Research Gap

Many previous research on the production of various agricultural commodities was focused on a specific area and/or a specific commodity. There was a little study on banana production and limitations in some regions in Tamil Nadu. As a result, the focus of this research will be on hill banana production in the Dindigul district and to fill the void.

2. LITERATURE REVIEW

More AD. In his study found that the total cost required for banana cultivation in the Parbhani district was Rs.2,423.63 when cost concepts A, B, and C were considered. The average yield per acre was 142.25 quintal, valued at Rs.4,271.60, with a net return of Rs.1,848.05 [3].

Arputharaj *et al*. IN their study on the economics of banana cultivation in Kerala discovered that an average of Rs.36,252 per hectare was spent on plantain cultivation costs. Human labor was the most expensive item of expenditure, accounting for nearly 23 percent of total cultivation expenses. The average yield per hectare was 14,991 kgs of plantain bunches worth Rs.56,205 [4].

Latha bastine *et al.* Found that the cost of cultivation per hectare was Rs.36,249 in their study on the economics of plantain production in Kerala. The revenues amounted to Rs.45,088 after deducting the costs of the family, hired labor, and manure per acre of plantain farming. According to the findings of the study, family labor accounts for 30.50 percent of total labor costs. As the size of the estate grew larger, the contribution of family labor shrank [5].

Maurya *et al.* Estimated that the cost of banana farming is Rs.20.160.7 per hectare. The gross return was Rs.49,958.75 and the net profit was Rs.29,798.05. Human labor, manures and fertilizers, and plant protection were the most expensive components [6].

Balaji *et al.* Used Garrett's ranking method to rank the constraints to groundnut production and marketing, which included pest and disease incidence, erratic rainfall, water scarcity, forest animals, a lack of good quality seeds, insufficient labor supply coupled with a high wage rate, a low level of adoption of recommended technologies, and a lower marketed surplus [7].

Kathirvel N Found out that the average total cost of production per acre of banana was Rs.61,320, the average gross return was Rs.71,638 and the average net income was Rs.10,318 in his study on the cost and returns of banana cultivation in Tamil Nadu with special reference to Karur district [8].

Sidhu *et al.* Calculated onion and cauliflower production costs to be Rs.49,563 and Rs.34,840 per hectare, respectively. Onion and cauliflower produced gross returns of Rs.1.24 lakh per hectare and Rs.72,912 per hectare, respectively, and net returns of Rs.74,597 and Rs.38,072 per hectare, respectively [9].

Umagouri *et al.* In their study on an economic analysis of the value chain of bananas in western Tamil Nadu calculated the economics of different banana varieties Nendran, Poovan, Kathali and Robusta. Find that the total cost of cultivation per hectare for these varieties ranged between Rs.86,624.62 and Rs.113,596.18. The net income per hectare ranged from Rs.74,975.38 to Rs.101,016.70 [10].

Karthikeyan *et al.* In their study on production and marketing of bananas in Tamil Nadu – a study on problems faced by cultivators found that labor scarcity was the most significant problem faced by farmers at their production level, followed by irrigation issues, drought, and pest attack. It was also discovered that the lack of market awareness was a major issue for banana growers in the study area, followed by a high rate

of commission, not receiving a fair price and a lack of storage facilities [11].

3. MATERIALS AND METHODS

Designing an effective approach and selecting appropriate analytical tools are critical for conducting a meaningful study of any research topic. To achieve the objectives of this study primary data as well as secondary data were collected from the hill banana farmers. Dindigul district was purposively selected for undertaking the study in Tamil Nadu, where a large number of farmers are engaged in hill banana cultivation and production takes place on a larger scale. In this regard, the Sirumalai hill banana variety was purposively selected for the study because of more popular and large-scale production in the existing hill banana varieties. Convenience and purposive sampling technique was used for the selected study. Totally 64 farmer respondents were selected from 8 villages of the Sirumalai region of Dindigul district and eight respondents from each village were selected. Primary data was collected by a personal interview with a well-structured interview schedule for the cost and return structure as well as problems incurred in hill banana production.

The cost of hill banana growing was evaluated using several cost concepts often employed in farm management studies [12]. Kumar *et al.* (1997) divided cost into three categories: Cost A, Cost B, and Cost C. Cost A accounted for all cash expenditures that were paid out. Cost B is the sum of Cost A plus the rental value of owned land and the imputed interest on owned capital, whereas Cost C is the sum of Cost B plus the imputed value of family labor [13]. The benefit-cost ratio criterion indicates the rate of return on investment in hill banana cultivation per rupee invested. It was calculated by dividing the gross returns by the total cost of production [14]. Garrett's ranking technique was used to analyze the problems associated with hill banana production [15]. Major problems faced during the production of hill banana production were identified and listed in the interview schedule. Sample farmers were asked to rank the given problems that were listed in the interview schedule.

4. RESULTS AND DISCUSSION

Costs and returns structure determine the profitability of any operation. In this study, costs are divided into three categories as Cost A, Cost B, and Cost C. Hired human labor, Suckers, fertilizers, manures, irrigation, plant protection chemicals and interest on working capital were costs that came under the type of Cost A. Adding

Table 1. Cost and returns of hill banana cultivation per hectare

S.no	Cost component	Cost in Rupees	% of Total cost
	Cost A		
1	Hired human labor	73,750	36.00
2	Suckers	39,375	19.22
3	Fertilizers and manures	14,250	6.96
4	Plant protection chemicals	4,750	2.32
5	Interest on working capital @7%	9,248.75	4.51
	Total Cost A	1,41,373.75	69.01
	Cost B		
6	Cost A	1,41,373.75	69.01
7	Rental value of land	50,000	24.41
8	Interest on fixed capital @12%	6000	2.93
	Total cost B	1,97,373.75	96.34
	Cost C		
9	Cost B	1,97,373.75	96.34
10	Imputed value of family labor	7500	3.66
	Total Cost C	2,04,873.75	100
	Returns of hill banana		
11	Yield in fingers	84000	
12	Price per finger	6	
13	Gross return	5,04,000	
14	Cost of production (per ha)	2,04,873.75	
15	Net return	2,99,126.25	
16	BC ratio	2.46	

Source: primary data

Table 2. Constraints faced while the production of hill banana by respondents

S.no	Constraints	Score	Rank
1	Non availability of labor in time	67.30	3
2	Lack of irrigation facilities	22.64	10
3	Lack of quality planting material	41.53	6
4	Lack of other input materials	36.05	9
5	Heavy wind	37.80	7
6	High rainfall	36.63	8
7	Drought	52.83	5
8	Pest attack	74.53	1
9	Disease attack	67.83	2
10	Animal attack	60.88	4

the Cost A with the Rental value of land and interest on fixed capital is Cost B. Adding Cost B to the value of the imputed family labor gives the Cost C. This is the total cost of hill banana production per hectare. Table 1 shows the details of average total costs and returns of hill banana cultivation, including the share of variable costs per hectare.

From Table 1 we come to know that the average total cost of hill banana production per hectare was Rs.2,04,873.75. In this, the labor cost was the major cost component which contributes 36 percent to the total cost followed by the rental value (24.41%), suckers cost (19.22%). The average Gross returns per hectare of the hill banana production were Rs.5,04,000 and the net return was Rs.2,99,126.25. The benefit-cost ratio for the production of hill bananas was 2.46.

Table 2. shows that pest attack was ranked first among the constraints during the production of hill bananas by the farmers with a score of 74.53. Disease attack (67.83), non-availability of labor in time (67.30), animal attack (60.88), and drought (52.83) were ranked second third fourth, and fifth respectively. Lack of quality planting material (41.53), heavy wind (37.80), high rainfall (36.63), lack of other inputs (36.05), and lack of irrigation facilities (22.64) were the constraints which are ranked sixth seventh eighth ninth and tenth, respectively.

5. CONCLUSION

The average total cost of cultivation per hectare of hill banana was Rs.2,04,873.75. The average gross return was Rs.5,04,000 and the average net return was Rs.2,99,126.25 per hectare of hill banana cultivation with respect to the Sirumalai hill banana growers. The benefit Cost Ratio was 2.46. From this study, it could be concluded that the hill banana cultivation in the selected study area was highly profitable where BC Ratio was more than unity (2.46). labor cost was the major cost component (36 percent) in this. Banana cultivation requires an increase in the labor force. Human labor was also a significant aspect of hill banana production. Because there was an insufficient supply of labor in hilly areas, farmers hired workers from the plains region to complete farm activities on time in their hill banana farms. Farmers must plan transportation and manage the costs associated with hiring human laborers. Otherwise, banana farmers will have to pay higher rates to keep local laborers avoid migrating to other areas. Because of this, human labor was the most expensive component of hill banana cultivation.

The major constraints faced by the hill banana farmers were pest attack followed by disease incidence, nonavailability of labor in time, animal attack, drought, and lack of quality planting material.

pest attack includes damages made by the insects such as borers and sap feeders. pseudostem borer and rhizome weevil are major borers. Aphids and lacewing bugs are the major sap feeders which cause some serious damages to the hill banana trees. disease incidence in the form of banana bunchy top virus (BBTV) and other Wilt diseases. animal attack in the forms of monkeys and porcupines.

Aside from money, producers perceive insect attacks and disease outbreaks to be more of a problem than managing the labor force while farming hill bananas. They lack scientific understanding as well as technological breakthroughs for pest and disease management. Furthermore, most hill banana producers were thinking about how we might grow hill bananas with less use of plant protection chemicals. Due to the above-

mentioned factors, farmers were less efficient in managing pest and disease assault, hence they rated pest attack first among the other key constraints in hill banana production, followed by disease attack. The findings will assist policymakers in developing appropriate programs and adjusting strategies for improving hill banana production in Tamil Nadu.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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