

**COMPARATIVE ANALYSIS OF BANANA CONTRACT FARMING IN
THENI DISTRICT**

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TAMIL NADU AGRICULTURAL UNIVERSITY
COIMBATORE - 641 003**

2013

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*Thesis submitted in part fulfillment of the requirements for
the degree of **Master of Business Administration** to the
Tamil Nadu Agricultural University, Coimbatore*

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CERTIFICATE

This is to certify that the thesis entitled “**COMPARATIVE ANALYSIS OF BANANA CONTRACT FARMING IN THENI DISTRICT**” submitted in part fulfilment of the requirements for the degree of **MASTER OF BUSINESS ADMINISTRATION** to the Tamil Nadu Agricultural University, Coimbatore is a record of bonafide research work carried out by **Mr.T.KALIRATHINAM** under my supervision and guidance and that no part of this thesis has been submitted for the award of any other degree, diploma, fellowship or other similar titles and that the work has not been published in part or full in any scientific or popular journal or magazine.

Place: Coimbatore

Date:

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(KALIRATHINAM.T)

ABSTRACT

COMPARATIVE ANALYSIS OF BANANA CONTRACT FARMING IN THENI DISTRICT

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India is the largest producer of banana in the world and it contributes one fourth of world's production of banana. Banana is grown throughout the Tamil Nadu State. The total area under banana was 1.07 lakh hectares in the State during 2010-11. Banana is the most widely consumed available in all seasons and raised in different varieties in Tamil Nadu. In recent years, Contract farming is practiced in the study area where they grow majorly tissue culture banana G9 variety by using integrated hi-tech management practices viz., use of virus free tissue culture banana plantlets. Hence, it is essential to throw a light on economics of tissue culture banana to see its performance and profitability. In addition, it is important to make a comparison of tissue culture banana cultivation under contract and non contract farming, so as to facilitate the farmers in appropriate decision making for the participation of banana contract farming.

The objectives of the study are

- i) To study the socio economic characters of the banana growers in the study area
- ii) To evaluate the cost and returns structure of banana under contract and non contract farming.
- iii) To study the mode of operations and terms of contract in contract farming.
- iv) To analyse the farmer's perception and satisfaction towards banana contract farming.

- v) To identify factors influencing adoption and reasons for non-adoption of contract farming.

To fulfil the objectives of the study, Theni district in Tamil Nadu was purposively selected for this study where contract farming is practiced more. Totally, six villages have been selected randomly based on area under banana. From each village, 10 farmers from each contract and non- contract category were selected randomly. Thus altogether, 120 farmers were selected from the study area.

Socio-economic characteristics of the sample farmers showed that 48.34 per cent of the contract and 16.67 per cent of the non contract farmers belonged to the age group of 46 to 55 years followed by 33.33 per cent contract and 60 per cent of the non contract farmers in the age group of 36 to 45 years. Among the respondents, majority of the contract farmers were in the category of 46 to 55years.

The primary occupation of the majority of the respondents of contract (85 per cent) and non contract farmers (91.67 per cent) were involved in agriculture only, while rest of them were involved in agriculture along with other occupation.

An appreciable number of the contract and non contract farmers had more than 15 years of farming experience (46 per cent and 36.67 per cent), followed by 30 per cent of contract and 20 per cent of non contract farmers of respondents with 11 to 15 years of farming experience in farming.

In the study, 40 % of the sample contract farmers were under the categories of small and medium land holdings. But 55 % of the sample non contract farmers were under the large farmer category.

Source of irrigation had played a major role in the production of banana crop. Out of the sample farmers 60 per cent of the contract and 66.67 per cent of non contract farmers used open well as their main source of irrigation. Most of the farmers depended on open well irrigation. The major Cropping pattern among the sample farmers of contract and non contract farmers was banana cultivation only in the study area.

The results of cost and return analysis indicated the net returns realized by contract farmers were higher (Rs. 5,49,607), than that of non-contract farmers (Rs.4,93,379). In order to realize the higher levels of quality and productivity, the contract farmers had incurred an amount of Rs. 4586 as an additional cost due to the use of more manure and fertilizers than non contract farmers. As a result of this, the contract farmers realized an additional income of Rs. 56228 per hectare. The income increase was due to increase in yield and marginal increase in price.

The results of Cobb-Douglas production function indicated that 74 per cent of the variation in the banana yield was explained by the included variables. The regression coefficient for number of suckers used per acre indicated that there is a significant positive relationship between the suckers and banana yield. Inclusion of dummy variable to capture the contract and non contract farms showed positive influence on yield of the banana.

The result of the probit model indicated the possibility of increasing the participation in contract farming would be positively influenced by price received by the farmers and age. At the same time, size of land holdings, education negatively influenced the participation.

It was found that the major problems faced by contract farmers were low contract price (91.66 per cent), lack of following proper yard stick for grading the banana (86.66 per cent). Further, 33.33 per cent of the contract farmers indicated the problems relating lack of credit facilities by the firm. Similarly 25 per cent of the farmers stated delayed payments for the third and fourth stage harvested banana crop.

It observed that the reasons for adoption of contract farming were assured market for the produce followed by higher returns, advance payment, providing transportation facility and technical advice by the company.

Reason for the farmers who had not opted contract farming were non satisfaction with rigid rules was followed by lack of credit facility. High standards of expected quality produce ranked third, limited acceptance of area under contract and improper weighment ranked fourth and fifth respectively.

The results of the production constraints analysis showed that inadequate electricity supply was the most important constraint faced by the farmers. The other major constraints

identified by the farmers in the banana production were high cost of labour, non availability of labour in time, inadequate irrigation water, lack of knowledge about identifying the disease and non availability of genuine planting material.

Marketing constraint identified by the banana growers was higher price fluctuations, followed by absence of regulated markets. Lack of storage facilities ranked third in the marketing of banana. Other constraints identified were delay in payment by traders after the sale of banana.

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CHAPTER I

INTRODUCTION

India has been a predominantly agrarian economy since time immemorial. The development efforts over the last four decades have doubtlessly strengthened Indian industrial base. However, agriculture continues to be the main stay of our economy even today. Agriculture and allied activities contribute around 14 per cent to the gross domestic product (Central statistical Organisation 2012). In Indian scenario, the stagnated yield levels of agricultural and horticultural crops, post harvest losses and lack of proper marketing facilities, the availability of these commodities to consumers have emerged as serious problems. Contract farming can indeed be a vehicle for the modernization of Indian agriculture. It can be a means to bring about a market focus to Indian farming. In the recent years, contract farming system forms the most important part of the vision of the national policy on agriculture. Under the given circumstances, it is essential to understand meaning, cause and effects of the contract farming.

Contract farming can be defined as a system for the production and supply of agricultural produce under forward contracts, the commitment under such contracts guarantee to provide an agricultural commodity to buyer according to their need. Hence, it basically comprises four things viz., pre-agreed price, quality, quantity or acreage (minimum/maximum) and time. For individual farmers, it is not just contract but the relationship it represents which is crucial in establishing strong converging link between the farmer and buyer and proves to be crucial in determining the development of contract farming as an institution.

Generally, there are three types of contract in agriculture viz., i) procurement contract, under which only sale and purchase conditions are specified ii) partial contracts, wherein only the contracting firms supply some of the inputs and produce is bought at pre-agreed prices and iii) total contracts under which the contracting firm supplies and manages all the inputs on the farm and farmer is just a supplier of land and labour. The relevance and importance of each type varies from product to product and these types are not mutually exclusive. Whereas, the first type is generally referred to as marketing contracts, the other two are of production contracts. Different types of production contracts allocate production and market risks between the producer and the processor in different ways (Hill and Ingersent, 1982 and Key and Runsten, 1999).

Contracts are generally signed to prior planting and specified how much produce the company will buy at what price. Often the firm provides credit, inputs, farm machinery rentals, technical advice and retains the rights to reject the substandard produce (Glover, 1990). Benefits derived from contract farming practice are given below

To Firm

The companies know the acreage planted and is assured of the grower's output to reduce its supply risk and the company is in control of the contract provision and stipulations that can encourage quality production through the terms of agreement. The companies know their approximate cost of raw product in advance. As better growers tend to contract with the same company over several years, some stability in company-grower relationship is attained. Since, some of the crops have no/less domestic market (at present), the farmers have no option to sell their produce outside and the company is assured to get regular supply of the produce (Glover, 1990).

To Farmers

There is an assured market for their produce, which will eliminate the risk of price fall during glut. Information on market price is made available ex ante. This instils confidence among the contract farmers. It avoids the difficulties involved in timely transportation and eradicates the exploitation by the middlemen. Farmer can receive assistance from the processor in the form of technical services and input supply on credit with/without interest cost. Companies often provide credit to the farmers which reduce the burden of operational expenses to the farmer. This enables the farmers to escape from the evils of private moneylenders. Farmer is assured of better returns compared to other field crops as the companies offer relatively pre-determined prices.

Background

Banana (*Musa paradisiaca*L.) belongs to the family Musaceae. It is one of the oldest fruits known to mankind. South-East Asian countries, especially eastern Malaysia is believed to be the center of origin of banana (Anonymous, 2001). Its cultivation is distributed throughout the warmer countries and is confined to the region between 30° North and 30°C of the equator. Banana is the most delicious fruit used as subsidiary food. It is consumed as the table and

culinary fruit. Its leaves are used for serving meals in south India and chopped banana stems are used as cattle feed. Through the processing of bananas, it is possible to obtain dried bananas, also called banana “chips”, banana puree as the basis for baby food or for dairy products, banana flour and powder, banana juice or even banana alcohol. Apart from being a very important food product, banana products and by-products have other different uses and applications. Banana fiber is used for handicraft and art in baskets, carpets and so on. The fiber is also used for the manufacturing of banana paper.

1.1 Global Scenario

In order to clearly perceive the position of banana in the world, the area and production across the countries in the world is presented in Table 1.1.

Table 1.1. Area and Production of Banana in world during 2011-12

Country	Area (000'ha.)	Production (000'MT)	Percentage share in total world production
India	830.00	2,97,80.00	29.19
China	373.45	9848.90	9.65
Philippines	449.61	9101.34	8.92
Ecuador	215.65	7931.06	7.77
Brazil	486.99	6962.79	6.82
Indonesia	101.28	5755.07	5.64
Tanzania	420.00	2924.70	2.87
Guatemala	63.53	2637.57	2.59
Mexico	76.93	2103.36	2.06
Colombia	80.52	2034.34	1.99
Others	1916.11	22949.05	22.49
Total	5014.06	102028.17	100.0

(Source: FAO March 2012 and for India Data Indian Horticulture Database 2011)

From the table, it is observed that world total banana production was 102028.17(000'MT) during the year 2011. Among the major countries contributing for banana production, India occupies first position in terms of production with 29.19 per cent followed by China with a share of 9.65 per cent. Philippines third largest country with a share of 8.92 per cent to the total. India

occupies the first position due to the larger area under banana production combined with higher productivity compared to the other countries.

1.2 Indian Production of Banana

As mentioned above, India is the largest producer of banana in the world and it contributes one fourth of world's production of banana. The State wise production of banana is presented in Table 1.2 below

Table 1.2 State-wise Production of Banana in India during 2011-12

States/UTs	Production (000' MT)	Percentage to the total
Tamil Nadu	6,736.40	23.67
Maharashtra	4,315.00	15.16
Gujarat	4,047.80	14.23
Andhra Pradesh	2,899.60	10.19
Karnataka	2,351.50	8.26
Bihar	1,580.50	5.55
Madhya Pradesh	1,379.20	4.85
Uttar Pradesh	1,346.10	4.73
West Bengal	1,054.00	3.7
Assam	745.3	2.62
Others	1999.68	7.01
Total	28,455.08	100.00

(Source: National Horticulture Board)

Among the Indian States, Tamil Nadu is the largest producer followed by Maharashtra, Gujarat, Andhra Pradesh and Karnataka states. The phenomenal increase of banana production in India had been due to adoption of high density planting, use of tissue-cultured seedlings and drip irrigation which significantly improved productivity.

1.3 Banana Production Tamil Nadu Scenario

Banana is a value addition crop and is also grown throughout the state. Banana is the most widely consumed and is also available in all seasons and different varieties are raised in Tamil Nadu. The total area under banana was 1.07 lakh hectares in the State during 2010-11. Area under banana decreased by 5.5 per cent and production by 1.8 per cent. However, productivity increased by 4 per cent compared to 2009-10. The trend in banana production of Tamil Nadu is presented in Table 1.4 below

Table 1.4 Trend in Production of Banana in Tamil Nadu

S.No	Year	Area (in 000' hec)	Production (in million tonnes)	Productivity (Tonnes/hec)
1	2005-06	94.64	4.64	49.104
2	2006-07	105.20	5.15	48.964
3	2007-08	112.79	5.38	47.740
4	2008-09	115.80	5.14	44.455
5	2009-10	113.68	4.88	42.996
6	2010-11	107.39	4.80	44.699

Source: The Assistant Director of Statistics, Govt. of Tamil Nadu (2012).

The districts viz. Erode, Thoothukudi, Tirunelveli, Coimbatore, Trichirapalli, Kanyakumari, Vellore and Theni accounted for 59.50 percent of the total area under this crop during 2010-11. The District wise production of banana is presented in Table 1.5.

Table 1.5 District Wise Area and Production of Banana in Tamil Nadu 2010-11

S.No	District	Area(in ha)	Production (in 000'Tonnes)	Productivity (Tonnes/ha)
1.	Kancheepuram	275	12.29	44.70
2.	Thiruvallur	1197	53.50	44.70
3.	Cuddalore	5016	248.98	49.63
4.	Villupuram	1169	42.86	36.67
5.	Vellore	6837	280.17	40.98
6.	Thiruvannamalai	2898	129.54	44.70
7.	Salem	2591	115.81	44.70
8.	Namakkal	2002	89.48	44.70
9.	Dharmapuri	932	41.66	44.70
10.	Krishnagiri	1840	82.24	44.70
11.	Coimbatore	8118	410.36	50.55
12.	Thiruppur	2853	127.58	44.72
13.	Erode	10127	390.84	38.59
14.	Tiruchirapalli	8233	416.41	50.57
15.	Karur	4859	217.19	44.70
16.	Perambalur	185	8.26	44.70
17.	Ariyalur	120	4.40	36.74
18.	Pudukottai	2955	160.52	54.32
19.	Thanjavur	3470	171.15	49.32
20.	Thiruvarur	368	16.44	44.70
21.	Nagapattinam	637	28.47	44.70
22.	Madurai	2365	105.71	44.70
23.	Theni	5965	451.34	75.66
24.	Dindigul	4897	177.55	36.25
25.	Ramanathapuram	106	4.73	44.70
26.	Virudhunagar	888	39.69	44.70
27.	Sivagangai	939	41.97	44.70
28.	Tirunelveli	9157	233.12	25.45
29.	Thoothukudi	10016	453.29	45.25
30.	The Nilgiris	928	41.48	44.70
31.	Kanyakumari	5451	203.28	37.29
	Total for the State	107394	4800.47	44.700

Source: The Assistant Director of Statistics, Govt.of TamilNadu (2012).

1.4 Theni District Scenario

The study district Theni is an important producer of banana in Tamil Nadu. Theni had a 5876 hectare of area under Banana in 2010-11. In Theni district the area under banana had increased year by year. Productivity of banana was highest in Theni district (76.81 tonnes/ha) due to the adoption of tissue culture banana G9 variety. The year wise production of banana in Theni district is presented in Table 1.6

Table 1.6 Year Wise Production of Banana in Theni District

S.No	Years	Area(in hec)	Production (000'Tonnes)	Productivity (Tonnes/ha)
1.	2005-06	3328	163.42	49.104
2.	2006-07	4102	219.80	53.584
3.	2007-08	4577	194.51	42.498
4.	2008-09	4846	432.85	89.321
5.	2009-10	5720	449.40	78.567
6.	2010-11	5876	451.34	76.811

Source: The Assistant Director of Statistics, Govt.of TamilNadu (2012).

1.5 Problems Focus

Contract farming is practiced in the study area where they grow majorly tissue culture banana G9 variety only. Total area under the cultivation of G9 banana was cultivated by using integrated hi-tech management practices viz., use of virus free tissue culture banana plantlets.

Tissue culture banana production technology is a superior technology over traditional method (Sucker-propagated) of banana production with respect to optimal yield, uniformity, disease free planting material. In recent years, growing of tissue culture banana became popular in this area. Under these circumstances, it is essential to throw a light on economics of tissue culture banana to assess its performance and profitability. In addition, it is important to make a comparison of tissue culture banana cultivation under contract and non contract farming, so as to

facilitate the farmers and others concerned in appropriate decision making for the participation of banana contract farming. Therefore, an attempt was made in present study to compare the performance of banana production under contract and non-contract farming. This type of study was not carried out in earlier, hence proposed with the following specific objectives.

1.6 Hypotheses

The above background has led to following hypothesis given below.

1. There is no significant difference production efficiency of contract and non contract farming in banana.
2. The cost efficiency for banana is high in contract farming when compared to non contract farming.

1.7 Objectives

The specific objectives are

- i) To study the socio economic characters of the banana growers in the study area
- ii) To evaluate the cost and returns structure of banana under contract and non contract farming.
- iii) To study the mode of operations and terms of contract in contract farming.
- iv) To analyse the farmer's perception and satisfaction towards banana contract farming.
- v) To identify factors influencing adoption and reasons for non-adoption of contract farming.

1.8 Scope of Study

The results of the study are expected to give an understanding about the farmer's perception and satisfaction towards banana contract farming. This will be of very great help identify the problems faced by the contract farmers. The study would further throw light in identifying the most important factors influencing the performance of contract farming in banana, the study of this kind would help in documenting the performance of contract farming and various implementing agencies in the State. A holistic approach will be adopted in the present study considering both quantitative and qualitative variables. Hence, the study attempts to explore the different aspects of contract farming in tissue culture Grand Naine (G9) of banana.

1.9 Limitation of the Study

Due to limited time and resources, the study was confined to a limited geographical area viz. Theni district with a sample size of 120 farmer respondents. The data was collected with a well structured and pre tested interview schedule from farmers who did not maintain any proper farm records. So the data is subjected to recall bias. However efforts have been taken to minimize the errors and make the study definite and systematic as far as possible. Hence, the findings of the study may be considered appropriate to the situation prevailing in the study area and can be generalized to Theni district alone.

1.10 Organization of the thesis

The thesis has been presented under the following chapters.

- Chapter I** : **Introduction:** Introduction, objectives, scope and limitations of the study are presented.
- Chapter II** : **Concepts and Review:** The concepts used in the study and brief reviews of past studies are given.
- Chapter III** : **Design of the study:** The research design and methodology followed and the analytical techniques used are discussed.
- Chapter IV** : **Description of the study area:** A general and agricultural characteristic features of the study area are described.
- Chapter V** : **Results and Discussion:** The findings of the analysis are presented and discussed.
- Chapter VI** : **Summary and Conclusion:** A summary of the results of the study is presented to draw inferences and make suggestions.

CHAPTER II

CONCEPTS AND REVIEWS

Review of concepts and past studies related to the present study will give a holistic picture and better understanding of the research problem in proper perspective. So in this chapter, the relevant concepts and their use in previous studies are reviewed and presented under the sub headings.

2.1. Review of Concepts

2.1.1 Market

2.1.2 Marketing

2.1.3 Cost

2.1.4 Fixed cost

2.1.5 Variable cost

2.1.6 Returns

2.1.7 Cost of Production

2.1.8 Production function

2.1.9 Adoption

2.1.10 Partial Budgeting

2.2 Review of Past Studies

2.2.1 Constraints in Production and Marketing

2.2.2 Contract Farming

2.2.3 Cost and Return analysis

2.2.4 Problems in Contract Farming

2.1.1 Market

The word market was derived from Latin word “*marcatus*” which referred to merchandise (or) place where business was conducted.

Jain (1971) referred to market as a place where people meet each other and where actual buying and selling take place. The place or area may extend to a locality, village, town, region or a country according to the demand for a commodity.

Stanton (1980) reported as people with needs to be satisfied, money to spend and willingness to spend it.

Acharya (1987) opined market as a social institution that would facilitate the free exchange of commodities between buyer and seller, usually for money, but sometimes for barter too. Market, in this case, does not refer to a specific location where goods and services were exchanged, but rather to the processes by which the exchange was done.

Myers (1988) referred market to a place where exchanges take place *i.e.*, goods and services are exchanged for other goods and services or more commonly in today’s economy for money.

According to Kotler (2000) market consisted of all the potential customers sharing a particular need or wants and might be willing and able to engage in exchange to satisfy that need or want.

Perreault *et al.*, (2002) referred to market as a group of potential customers with similar needs who are willing to exchange something of value with sellers offering various goods and or services *i.e.*, ways of satisfying those needs.

Kotler (2004) stated that market as a collection of buyers and sellers who transact over a particular product or product class.

Keller (2005) reported that market was a place for potential exchange. It consists of all the potential customers sharing a particular need or wants and might be willing and able to engage in exchange to satisfy that need or want.

For the present study, market consisted of all the potential customers sharing a particular need or wants and might be willing and able to engage in exchange to satisfy that need or want as defined by Kotler (2000).

2.1.2 Marketing

Khols (1967), defined marketing as the performance of all business activities involved in the flow of goods and services from the point of initial agricultural production until they were in the hands of the ultimate consumer.

Gill (1972) defined marketing as the one that would include all intermediaries and functions which happen to fall in the channel to move the farm produce from the farms to the consumer.

Namakumari and Ramaswamy, (2002) defined marketing as a process of creating and delivering value. The market delivers value to the customer, basically through his market effects. He takes care to see that the offer fulfils the needs of the customers.

Townsent *et al.*, (2004) conceptualized marketing as a complex set of functions that involves tactics or the act of demand stimulation and selling, culture which provides a means to implement a customer orientation and strategy, which translates the marketing concept into actions that create competitive advantage.

Peelings (2004) defined marketing as the process of anticipating and creating consumer's needs and wants and of organizing all the resources of the company to satisfy them.

In the present study, marketing of banana was defined as process of various functions performed by the market functionaries in order to transfer the banana from the producer to the ultimate consumer.

2.1.3 Cost

According to Maurya *et.al.*, (1995) the cost of production included the cost on production inputs like seeds, manures, fertilizers, irrigation, plant protection chemicals, human and bullock labour, rental value of land at the prevailing market price and overhead cost comprising of interest on working capital and fixed capital, repairs and depreciation.

Prasher *et.al.*, (1996) opined that fixed cost would include land revenue, depreciation on machineries and implements, interest on fixed capital and rental value of owned land.

Samuelson *et.al.*, (1998) referred fixed cost as those costs, which could not vary with output in the short run. They were often called overhead costs and committed for rental, maintenance, depreciation, overheads, salaries, wages etc.

In the present study, fixed cost represents land revenue and non cash adjustments for depreciation, rental value of land and interest on fixed capital. Variable costs includes cost on main field preparation, purchase value of suckers, fertilizers, plant protection chemicals, weeding, wages to labour, interest on working capital etc.

2.1.4. Fixed Cost

Rogers *et.al.*, (1968) defined fixed costs as the sum of the costs of fixed inputs like land, building, machineries, management, etc., per time period.

According to Nicholson (1972) fixed costs were those costs which do not change with the level of outputs in the short run and in many respect it would be irrelevant to the theory at short run price determination.

Mittal *et.al.*, (1974) defined fixed costs as those which were independent of the level of production.

Satish (1979) opined fixed costs to include rent, depreciation and interest on building and equipments and salaries of the staff.

Prasher *et al.*, (1996) opined that fixed cost would include land revenue, depreciation on machinery and implements, interest on fixed capital and rental value of owned land.

Samuelson (1998) referred fixed costs as those costs which do not vary with the output in the short run. They were often called overhead costs and committed for rental, maintenance, depreciation, overheads, salaries, wages, etc.

Dewett (2001) stated fixed costs were those costs which would be paid even though production had stopped temporarily and would not vary with the level of output. It included rent

for buildings, interest on capital invested in machinery and salaries of the permanently employed staff.

Grinols (2003) defined fixed cost as cost to the firm for hiring fixed factors of production, the quantities of which do not change with the quantity of output.

Madan (2005) fixed cost was defined as cost of land revenue and taxes, depreciation on implements and buildings, rent paid for leased in land, rental value of owned land and interest on fixed investment.

2.1.5. Variable Cost

According to Tandon *et al.*, (1971) variable cost would otherwise be known as prime cost and these costs were related to the variable resources and they would normally change with the level of output.

According to Nicholson (1972) variable costs were those costs which would change in response to changes in the level of output being produced by a farm.

Mittal *et al.*, (1974) defined variable cost in agriculture as those costs which would vary with the level of production.

According to Wonnacott *et al.*, (1984) variable costs were those which would increase as output increases.

Johl *et al.*, (1996) defined the variable cost as the cost of using variable inputs which would vary with the level of production.

According to Ahuja (1997) variable costs were those costs which increased on the employment of variable factors of production whose amount could be altered in the short run.

Maheswarappa *et al.*, (1998) referred variable cost in terms of human labour, bullock labour, tractor power, seed, manures, fertilizers, plant protection chemicals, irrigation, repair and maintenance cost and interest on working capital.

Madan (2005) defined variable cost as sum of cost of hired human labour, family labour, bullock labour, machine labour, seed, farmyard manure, fertilizers, insecticides, irrigation charges and interest on working capital.

In the present study, the variable cost was the sum of sucker cost, labour cost, fertilizer cost, propping material cost etc., The labour cost includes both the family as well as hired labours.

2.1.6 Returns

Madappa (1970) used the concept of average net income per acre, which was derived by subtracting the average net expenditure per acre from the average gross income per acre.

Maral *et.al.*, (1972) defined the net income as either net profit or net loss to the operator of land after deducting all expenditures such as paid out costs both in kind and cash, depreciation charges, land rent, interest on capital and imputed charges of family labour from the total income.

Chauhan *et. al* (1986) defined gross farm income as the value at prevailing prices of retailed as well as marketed crop, plus the income from allied activities such as dairying, goat farming and poultry farming.

Rajan (1992) defined gross income as the total value of output. The net income as the gross income minus the total cost which included all the cash and kind expenses incurred relating to human and bullock labour, seeds, manures and fertilizers, plant protection chemicals, electricity charges, depreciation, interest on capital, land revenue and rent or rental value of land.

Sivanatham *et. al* (1994) estimated the gross income from one hectare of forest plantations of casuarinas and eucalyptus, multiplying the yield of wood in tonnes by the prevailing price per ton of wood and net income by subtracting the total cost of production from gross income.

Sundaravaradarajan et. al,(2003) in his study used only the yield and prices realized by the growers for the nuts to calculate the gross returns, net returns and the returns per hectare of cashew plantation.

Thamban et. al (2006) stated that gross returns referred to the total returns representing the sum of main product viz coconut and its by products. Net return was the difference between the gross returns and gross cost.

For the present study, the net income was conceptualized as the gross income minus total cost incurred in banana production. The total cost included both variable and fixed costs.

2.1.7 Cost of Production

Shukla (1966) classified the costs into Cost A₁, Cost A₂, Cost B and Cost C. Cost A₁ included costs and hired expenses actually incurred. Cost A₂ covered Cost A₁ plus rent paid for leased in land. Cost B included Cost A₂ plus rental value of owned plus interest on fixed capital minus land revenue on owned land. Cost C covered Cost B plus imputed value of family labour.

Raju et.al., (1990) classified the cost as Cost A₁, Cost A₂, Cost B₁, Cost B₂, Cost C₁ and Cost C₂. Cost A₁ included all actual expenses in cash and kind incurred in production while Cost A₂ comprised Cost A₁ and rent paid for leased in land. Cost B₁ included Cost A₁ and interest on value of owned capital assets excluding land. Cost B₂ was nothing but Cost B₁ and rental value of owned land and rent paid for leased in land (net of land revenue) while cost C₁ included Cost B₁ and imputed value of family labour.

Patel et.al., (1997) classified cost as Cost A, Cost A₁, Cost B and Cost C. Cost A included all paid out cost in cash expenditure. Cost A₁ consisted of Cost A plus rent paid by the tenant. Cost B included Cost A plus rental value of owned land and imputed interest on owned capital, and Cost C was the Cost B plus imputed value of family labour.

Rajur et al., (2008) used cost concepts defined by CACP while calculating cost and returns in production of chillies in Karnataka. Cost concepts defined by Commission for Agricultural Costs and Prices (CACP) were followed.

Cost A_1 = All actual expenses in cash and kind incurred in production by the producer.

The items covered in cost A_1 are costs on:

- i) Hired human labour
- ii) Hired bullock labour
- iii) Owned bullock labour
- iv) Home produced/purchased seed
- v) Plant protection chemicals
- vi) Home produced/purchased manure
- vii) Fertilizers
- viii) Depreciation on farm machinery, equipment and farm building
- ix) Irrigation
- x) Land revenue, land development tax and other taxes
- xi) Interest on working capital
- xii) Interest on crop loan
- xiii) Miscellaneous expenses.

Cost A_2 = Cost A_1 + Rent paid for leased-in land

Cost B_1 = Cost A_1 + Interest on value of owned capital assets (excluding land)

Cost B_2 = Cost B_1 + Rental value of owned land (net of land revenue) and rent paid for leased-in land

Cost C_1 = Cost B_1 + Imputed value of family labour

Cost C_2 = Cost B_2 + Imputed value of family labour

Cost C_2^* = Cost C_2 + estimated by taking into account statutory or actual wage rate whichever was higher

Cost C_3 = Cost C_2^* + 10 per cent Cost C_2^* to (on account of managerial functions performed by farmers)

In the present study, cost A_1 included the value of human labour, value of manures and fertilizers, cost of suckers, cost of plant protection chemicals, cost involved in land revenue. Cost A_2 included cost A_1 plus rent paid for leased in lands. Cost B_1 included Cost A_2 plus interest on the value of owned capital asset (excluding land) Cost B_2 included cost B_1 plus rental value at owned land. Cost C_1 included cost B_1 plus imputed value of family labour. Cost C_2 included cost B_2 plus imputed value of family labour.

2.1.8 Production Function

Bishop *et.al* (1958) defined production function as a mathematical relationship describing the way in which the quantity of particular produce would depend upon the quantities of inputs used.

Bilas (1971) defined production function as a physical relationship between a firm's inputs of resources and its output of goods and services per unit of time.

According to Samuelson (1998) production function would indicate the maximum amount of output capable of being produced by each and every set of specified input.

Grinols (2003) summarizes production function as the relationship between inputs and output, given the technical capabilities of the firm.

According to Koutsoyiannis (2003) production function was purely a technical relationship between the factor inputs and outputs. It would describe the transformation of factor inputs into products at any particular time period.

In the present study, the production function was defined as the mathematical relationship between the inputs used in production of banana to the output produced.

2.1.9 Adoption

Rogers (1983) defined adoption as a decision to make full use of an innovation as the best course of action available.

William *et. al* (1987) defined adoption process as the decision making activities of an individual through which the new product - the innovation - is accepted.

Ray (1999) defined adoption was a decision to make full use of an innovation as the best course of action available.

2.1.10 Partial Budgeting

William *et al.* (2002) carried out a partial budget analysis to determine the incremental benefits from costs of adopting the green manure technology in managing noxious weeds such as *Striga* in the Eastern Zone of Tanzania. The partial budget analysis showed that green manure would give a net incremental benefit of Tsh. 478654 per acre compared to the chemical fertilizers used by farmers. These additional benefits were realized from increased marketable yields and savings from reduced chemical fertilizers and labour costs.

Okewole (2012) analyzed using a partial budgeting approach for calculating cost per day for own raising on Dairy A and custom raising based on existing contracts for Dairy B. During the 135-day period examination, custom raising was less costly than own-raising: own-raising costs were \$2.45 per calf per day compared to \$2.23 per calf per day under current custom raising contracts. The total cost difference between own and custom raising for the period examined was more than \$15,000, or more than \$40,000 on an annual basis. This suggests that the owner of the dairies may find it advantageous to contract with the current custom raiser for the calves on Dairy A. However, the period of time for which data were available was limited, so cost data for a longer time period should be examined to reach a more definitive conclusion about the best management choice for this dairy owner.

2.2.1 Constraints in Production and Marketing

Sivaharini (1990) used Garrett's ranking technique to rank the criteria regarding credit standards and collection procedures followed by dealers in selling products and to rank the different firms in the order of dealer in selling products and to rank the different firms in the order of dealer's preference based on credit policy of different firms.

Sudalaimani (1991) adopted Garrett's ranking technique to rank the promotional activities on a marketing project in tissue culture cardamom plantlets and problems faced by the planters in the cultivation of cardamom.

Sundar et al., (2005) in their study “Production and Marketing constraints in Gloriosa superb in Tamil Nadu” used Garrett’s ranking technique to rank constraints in gloriosa cultivation. The study found price fluctuation and shortage of labour as the first two major constraints followed by skill requirement, crop care requirement, investment need on panthal creation and seed material, allergic problems to human beings and wastage of tubers at planting.

Tawale et al., (2009) used frequency and percentage method to find out constraints in cultivation of jowar in Maharashtra. The study revealed that irregular supply of electricity (84.25 per cent), high rate of fertilizers (79.17 per cent), difficulties in weed control (79.14 per cent), lack of rainfall (72.92 per cent), non-availability of labour in time (70.08 per cent) and low rate of jowar in market (60.42 per cent) were the major constraints faced by *rabi* jowar growers. The study suggested the provision of training with regard to disease control (79.17 per cent) and provision of low rate of fertilizers with availability at village level (75.00 per cent).

2.2.2 Contract Farming

Kulkarni (2000) conducted study on to compare the contract and non-contract farmers in the potato growing pocket of Pune region of the Maharashtra State of India. That the farmers who are willing to participate are those who lack access to various resources and information, and contract farming can be an intermediate institution in order to offer necessary services to them. Through the comparison of costs and returns it was found that farmers who joined the contract had higher yields and returns. Another important factor was marketing channel. The involvement of many actors was the cause behind the complication of the marketing channels used by non-contract farmers where the farmers didn’t have bargaining power in price determination and had to give large share of returns to the commission agent and middleman.

Kiresur et al. (2001) highlighted advantages of contract farming like reduced capital investment, no risk of price fluctuations and guaranteed income to the farmers. On the other hand, the reduced capital investment, improved efficiency and efficient marketing were the benefits realised by the company through contract farming. He quoted several examples of contract farming of different crops in India and also mentioned the active involvement of the Government of Karnataka to bring some of the agricultural crops such as maize, cotton,

bengalgram, barley and chillies under contract farming system to extend the benefits of the contract farmers to both the farmers and the industry.

2.2.3 Cost and Return Analysis

Mahalakshimi (2009) calculated cost and return in vanilla cultivation in Coimbatore district. The benefit-cost ratio was found to be much greater even after discounting, showing a ratio of 19.89, indicating that for every one rupee of investment, a farmer will receive Rs. 20 (approx) as return. The study concluded vanilla cultivation as much profitable.

Anwarul *et al.*, (2010) calculated cost and returns in chili production. The study showed that, on an average, total variable cost of production and total cost of production per hectare of land was Tk 71,950/- and Tk 78,950 respectively (Tk=Taka: unit of money in Bangladesh). The net return was Tk 73,164 and the undiscounted Benefit-Cost Ratio was 1.93. The study concluded that chilli cultivation was profitable, as BC ratio was greater than unity.

Baba *et al.*, (2010) analyzed the cost, returns and break-even point in mushroom production on different categories of farms. The study has suggested that a) mushroom cultivation being capital intensive, the financial assistance through institutional agencies at cheaper interest rate would be desirable.

Anjani *et al.*, (2010) calculated cost and returns in processing and marketing of milk in Assam. While calculating gross income, the total value of different processed products was taken into account. On the cost side, apart from the cost of milk, expenditure on labour, the added material, fuel, electricity, etc., were taken into consideration. The study found that, on an average, the traditional milk processor earned a net return of Rs 15 per litre from milk processing.

2.2.4 Problems in Contract Farming

Srivastava et al., (1989) while providing an overview of agro processing industries suggested backward linkages as the key element for success of fruit processing units. They observed that larger processing units often faced the problems of severe under utilization of capacity due to inadequate and unsustainable supply of raw materials. They concluded that the uncertainty in supply was the major reason for private processing units to forge backward with the farmers for ensuring supplies.

Rangi (2000) while studying contract farming practiced by Hindustan Lever Ltd. (HLL) and Nijjar Agro Limited in tomato for processing venture at Punjab found that, tomato was mainly infested by tomato fruit borer, some extent by leaf minor, aphid, cutworm and fruit fly also. To have a check on these attacks, the expenses on pesticides/insecticides were high and this also pushed up the labour cost. Continuous cultivation of tomato crop on the same field has also adversely affected yield. Nijjar Agro Limited rejected the poor quality produce brought by the farmers. The HLL did not indulge in such practice. Farmers of both the firms expressed opinion regarding the low contract prices.

Singh (2000) identified the faults of contracting system both at company and at farmer's level. About two-thirds of Hindustan lever Limited growers and more than 50 per cent of the Nijjar growers did not face any major problem in contracting. The other reported problems were poor coordination of activities, poor technical assistance, delayed payments, outright cheating in dealings and manipulation of norms by the firm. Some of the Pepsi potato farmers had a few problems with the company system, but a large number of them (60%) were happy. The study also highlighted the implications of contract farming on cropping pattern, land lease market, sustainability, farm income and employment. Despite, various problems and conflicts between companies and growers, 62 per cent of Hindustan lever Limited, 80 per cent of Nijjar and 68 and 73 per cent of Pepsi (potato and chilli, respectively) farmers wanted to continue contract farming.

Gnanaprakasam (2006) used Garrett's ranking technique to rank the problems in contract farming in coleus and found that the delay in input supply as the major problem faced followed by insufficient input supply, seasonal labour scarcity and high cost of labour, forced to insure, yield loss due to climate and lack of fixed price policy.

Sudha (2009) studied the Farmer perceptions of contract farming schemes in southern India. The evidence from the study affirms that contract farming does mitigate some risks but potentially increases others, a feature not adequately acknowledged in existing contract farming research. Implicitly, the empirical evidence highlights the need for more careful consideration of farmer perceptions of the risks and benefits associated with contract farming when studying participation in contract farming arrangements.

CHAPTER III

DESIGN OF THE STUDY

The design of research was one of the most important factors, deciding its success and applicability. It would help the researcher in drawing meaningful and logical inferences. The procedure followed in the selection of the study area, sampling, selection of the respondents, collection of data and the various tools of analysis used are presented in this chapter.

3.1 Selection of the Study Area

3.2 Sampling Design

3.3 Selection of Sample Farmers

3.4 Method of Data collection

3.5 Study Period

3.6 Tools of Analysis

3.1 Selection of the Study Area

Theni district was purposively selected for the present study in the first stage since it is one among the major tissue culture banana growing districts in the State which has highest productivity and also practicing contract farming to a larger extent.

3.1.1 Sample Population

To evaluate the objectives of the study, all farmers who cultivating banana were considered as a population for the study. The sample respondents comprised of both contract and non contract farmers.

3.1.2 Selection of Taluks

In the second stage, three taluks viz., Bodinayakanur, Uthamapalayam and Theni were purposively selected because more than 50 percent of banana area of the district is concentrated in these three taluks. The list of major banana growing villages from each taluk was collected.

3.2 Sampling Design

Three taluks from Theni district were selected and from each taluk two villages were selected based on the maximum area under Banana. Six villages from three taluks were selected purposively as shown in Table 3.1.

Table 3.1. List of Sampling Villages and Number of Samples from the Village

District	Taluk	Villages	No. of contract Farmers	No. of Non-contract Farmers
Theni	Bodinaickanur	Koolayanur	10	10
		Maduraburi	10	10
	Theni	Seelayampatti	10	10
		Chinnamanur	10	10
	Uthamapalayam	Earisaianayakkanur	10	10
		Seeppalakottai	10	10
Total			60	60

3.3 Selection of Sample Farmers

From each village ten contract farmers and ten non-contract farmers were selected using simple random technique. Thus, altogether sample size constituted 120 Banana farmers comprising of 60 contract farming and 60 non contract farming farmers.

3.4 Method of Data Collection

A well structured interview schedule was designed for the farm level survey and the same was pretested in the field and modified accordingly. Personal interview method of data collection was used. Since most of the information needed was recalled from the memory of the sample

respondents, sufficient care was taken to minimize the recall bias through repeated enquires and cross checks.

Information regarding type of family, land holding details, experience in banana cultivation, source of income, cost of cultivation, problems faced by the farmers in adoption of contract farming and reasons for non adoption of contract farming were collected.

Secondary information on land use pattern, rainfall, cropping pattern, source of irrigation, area under banana etc., were collected with reference to the study area and also for the State from the Directorate of Economics and Statistics,Theni and from various published sources.

3.5 Study Period

The reference year for the study was the agricultural year 2012 - 13 and the collection of data from the sample respondents was taken up during the month of February 2013.

3.6 Tools of Analysis

3.6.1 Percentage Analysis

Percentages were worked out to study the sample characteristics like age, education, family size etc. to make simple comparisons.

$$\text{Percentage analysis} = \frac{\text{Number of respondents}}{\text{Total sample size}} \times 100$$

3.6.2 Garret's Ranking Technique

In Garrett's scoring technique, the respondents were asked to rank the factors or problems and the order of merit given by the respondents was transformed into scores. For converting the ranks assigned by the farmer, per cent position was worked out for each rank using the formula

$$\text{Percent position of each rank} = \frac{100(R_{ij} - 0.5)}{N_j}$$

R_{ij} = Rank given for i^{th} constraints by j^{th} individual

N_j = Number of constraint ranked by j^{th} individual

The per cent position was converted into scores by referring to the Garrett table. Thus for each factor, the scores of the various respondents were added and mean value was estimated. The means thus obtained for each of the attributes were arranged in descending order. The attributes with the highest mean value was considered as the most important one and the others followed in that order.

3.6.3 Partial Budgeting

The net incremental benefit due to adoption of contract farming was calculated using the following method. Partial budgeting analysis was done to measure the economic aspects of adopting the contract farming in banana. This was done to find out whether adopting contract farming in banana is economically feasible to a farmer or otherwise. Partial budgeting analysis, a rough form of “marginal analysis”, looks at the changes that will occur in cost and receipts as a result of a (marginal) change in the cultivation practices. The net increment in the adoption of contract farming in banana was calculated by using the following method.

Proposed change

Change in method of Plant Protection i.e. adopting IPM or otherwise

Debit (A)	Credit (B)
Added cost	Added returns
----- Rs -----	----- Rs -----
----- Rs -----	----- Rs -----
Reduced revenue	Reduced cost
----- Rs -----	----- Rs -----
----- Rs -----	----- Rs -----

Total added cost and reduced return (A) Rs -----	Total added returns and reduced cost (B) Rs -----
Net gain=B – A	

The above partial budgeting technique was used to estimate the changes in cost reduction and income, for contract and non contract banana farmers.

3.6.4 Functional Analysis

Cobb-Douglas type of production function was fitted to study resource productivity and allocative efficiency in contract and non-contract farmers. This was done with a view to determine the extent to which the important resources that have been quantified, explain the variability in the gross returns of the contract and non-contract farmers and to determine whether the resources were optimally used in these farmers category.

Heady and Dillon (1963) indicated that the Cobb-Douglas type of function was the most popular of all possible algebraic forms in the farm firm analysis as it provides comparison, adequate fit, computational feasibility and sufficient degrees of freedom. They further indicated that Cobb-Douglas type of function has the greatest use in diagnostic analysis, reflecting the marginal productivities at mean levels of returns.

The general form of the function is $y = ax_i^{b_i}$ where, ' x_i ' is the variable resource measure, ' y ' is the output, ' a ' is a constant and ' b_i ' estimates the extent of relationship between x_i and y and when x_i is at different magnitudes. The ' b ' coefficient also represents the elasticity of production in Cobb-Douglas production function analysis.

This type of function allows for either constant or increasing or decreasing returns to scale. It does not allow for total product curve embracing all the three phases simultaneously. Test was conducted to see if the sum of regression coefficients were significantly different from unity. Functions of the following form were fitted for contract and non-contract farmers separately.'

$$Y = a x_1^{b_1} a x_2^{b_2} a x_3^{b_3} \dots \dots \dots a x_n^{b_n}$$

On linearization, it becomes

$$\log Y = \log a + b_1 \log x_1 + b_2 \log x_2 + b_3 \log x_3 + \dots \dots \dots b_n \log x_n$$

Production function employed for contract and non-contract farmers as a whole is given below.

$$\log(Y) = \log(a) + b_1 \log(x_1) + b_2 \log(x_2) + b_3 \log(x_3) + b_4 \log(x_4) + b_4 \log(x_4) + b_5 \log(x_5) + b_6 \log(x_6) + b_7 \log(x_7) + e_i$$

Where,

Where, Y = Yield (kg/ac)

a = Intercept

x₁ = Family size

x₂ = FYM (Tonnes/ac)

x₃ = Suckers (Numbers/ac)

x₄ = Chemical fertilizers (Kg/ac)

x₅ = PP chemicals (Rs./ac)

x₆ = Human labour (Mandays/ac)

x₇ = Participation in contract farming (members =1, non members =0)

e_i = Error term

b_i = Elasticities

3.6.5 Allocative Efficiency

The ratios of the MVP to MFC of individual resources were computed to judge the allocative efficiencies (AE). The computed Marginal Value Product (MVP) was compared with the Marginal Factor Cost (MFC) or opportunity cost of the resource to draw inferences. A resource is said to be optimally allocated when its MVP = MFC.

$$AE = MVP / MFC$$

$$MVP_i = MPP_i \times P_y$$

Where,

MVP = Marginal value product

MPP_i = Marginal physical product of the ith input

P_y = Price of output

$$MPP_i = b_i \frac{\bar{y}}{x_i}$$

Where,

b_i = Regression coefficient or elasticity of production of ith independent variable.

\bar{y} = Geometric mean of gross returns between contract/ non contract farmers.

X_i = Geometric mean of the ith input.

This analysis was carried out in order to identify the possibilities of increasing gross returns under contract and non-contract farmers.

3.6.6 Probit Analysis

Probit analysis was used to find out the factors which are influencing the farmers to participate in the contract farming. Theoretical framework of the probit model can be explained by the threshold concept. Assuming that each farmer has well defined utility function over the participation in contract farming.

'U₁' - Utility of farmer participating in contract farming.

'U₀' - Utility of farmer not participating in contract farming.

$$U_{i0} = X_i \gamma_0 + e_{i0}$$

$$U_{i1} = X_i \gamma_1 + e_{i1}$$

Mathematically,

$$I = \gamma_0 + \gamma_1 X_1 + \dots + \gamma_n X_n \dots \dots \dots (1)$$

and $Y = g(I)$

Where, $Y = 1$ if $I > I^*$

$Y = 0$ if $I < I^*$

'I' is the index reflecting the combined effect of 'X' factors, whether the farmers participating in contract farming ($Y = 1$), when 'I' exceeds the threshold level I^* otherwise the farmers are not participating in contract farming, ($Y = 0$) when 'I' falls short of I^* . Now probability of getting a positive response ($Y = 1$) is given by

$$Y = F(I/\sigma) = F(Z); Z = I/\sigma$$

Where,

I = is as defined in (1)

σ = is the standard error of estimate and $F(Z)$ is the area under cumulative normal distribution function.

The choice probability must lie between zero and one. However, the index 'I' is in the range $(-\infty$ to $+\infty)$. Size $F(Z)$ gives only the probability of participation, the elasticity gives the percentage change in the choice probability in response to a percentage change in the explanatory variable.

$$\eta = \frac{f F(Z)}{f X_i} \times \frac{X_i}{F(Z)}$$

$$\frac{\partial F(Z)}{\partial X_i} = f(Z) \times \frac{\gamma_i}{\sigma}$$

Where,

$f(Z)$ = Value of the 'Y' ordinate of the cumulative normal density function at 'Z'.

γ_i = Probit coefficient of the i^{th} variable for which the elasticity is to be worked out

The Probit equation was fitted to find out the factors influencing the participation of farmers in contract farming.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + U_1$$

where, Y = Participation (Participation = 1, Non Participation = 0)

X_1 = Age of the respondents (years)

X_2 = Number of years of education of the respondents (years)

X_3 = Size of land holding (Acrea)

X_4 = Family size

X_5 = Price received by the farmers (Rs/kg)

X_6 = Net returns (Rs)

β_0 = Intercept

β_1 to β_6 = Slope

U_1 = Error terms

3.6.7 Price Spread Analysis

Price spread in general is referred to as difference between the price paid by the ultimate consumer and that received by the growers per unit of the commodity. Price spread analysis would estimate the share of different market functionaries in the consumer's rupee and this would often facilitate the understanding of the relative efficiencies and otherwise of alternate marketing channels. For the present study, concurrent margin method is used to analyze the price spread.

Information on prices prevailed and the cost involved in marketing of banana at different stages of all identified marketing channel were collected from the farmers and market functionaries. The cost of marketing included cost spent on transport, loading and unloading, storage and other incidental expenses incurred for marketing the produce. In the study of marketing of banana, the difference between price paid by the consumer and the price received by the producer for an equivalent quantity of the produce was defined as “price spread”. Data on profits of the various market functionaries involved in moving the produce from the initial point of production till it reached the ultimate consumer were collected. In the present study, the price spread analysis involved computation of marketing cost and profit margin and their expression as a percentage to the consumers’ rupee. Moreover, farmer’s share in consumer’s rupee was also worked out in the estimation of price spread.

3.6.8 Likert Scale

Different attributes were drawn considering the satisfaction towards Jain Irrigation Systems and their scale values are given below.

S. No	Performance level	Score
1.	Highly satisfied	5
2.	Satisfied	4
3.	Neutral	3
4.	Dissatisfied	2
5.	Highly Dissatisfied	1

The scores were summed up and the mean of each attribute is calculated and satisfaction levels are ranked based on it.

The mean score is calculated by using the following formulae.

$$\text{Mean score} = \frac{\sum W_i x_i}{\sum x_i}$$

W_i - Weight of the variable.

X_i - Variable.

CHAPTER IV

DESCRIPTION OF THE STUDY AREA

An understanding of the physical, social, economical and other related aspects of the region is necessary for analyzing the problem prevailing in it. These chapter profiles out some of the general features of the study area namely geographic location, demography, climate, rainfall irrigation, land use pattern, cropping pattern, financial, institutional and infrastructural facilities, etc.,

4.1 Location and Topography

Theni District is situated in between latitude $9^{\circ}30'$ and $10^{\circ}30'$ and longitude $77^{\circ}00'$ and $78^{\circ}30'$ with an area of 3242.30 sqkm. It is an inland district. It is encompassed on the west by Kerala State, on the east by Madurai District, on the north by Dindigul District and on the south partly by Kerala and Virudhunagar. Agriculture is the primary occupation of the district and 67 per cent of its population lives in rural areas. The total geographical area of the district is 288923 Ha. The details of taluks, blocks, village panchayats and town panchayats are illustrated below:

Table 4.1 Details of Divisions, Taluks and Panchayat Unions of Theni district

i)	Taluks	5 (Andipatti, Bodinayakanur, Periyakulam, Theni and Uthamapalayam)
ii)	Blocks	8 (Andipatti, Kadamalaigundu, Mayiladumparai, Periyakulam, Theni, Uthamapalayam, Chinnamanur, Cumbum, and Bodinayakanur)
iii)	Revenue Villages	113
iv)	Village Panchayats	130
v)	Town Panchayats	22

(Source: www.theni.tn.nic.in)

4.2 Climate and Rainfall

Theni enjoys salubrious climate. Its maximum temperature is 38.5 °C and the minimum is 26.3 °C. The climate is conducive for agricultural and horticultural crops. Based on the rainfall distribution, irrigation pattern, soil characteristics, cropping pattern and physical, ecological and social characteristics, 90 per cent of the district falls under Southern Zone and the areas adjoining to Western ghat falls under Western Zone accounting for 10 per cent of the areas. The amount of rainfall received in Theni district during different seasons is given in the table 4.2.

Table 4.2 Rainfall Distribution in Theni district (in mm)

Year	South West	North East	Winter	Hot Summer	Total (mm)
1999-00	168.8	556.5	-	-	725.3
2000-01	200.0	202.4	-	-	402.4
2001-02	229.2	198.5	-	-	427.7
2002- 03	55.4	464.5	0.0	389.8	909.7
2003-04	82.8	237.7	0.0	92.4	412.9
2004-05	169.0	314.3	40.5	296.6	820.4
2005-06	147.8	637.6	12.5	194.3	992.2
2006-07	117.3	416.4	0.0	60.1	593.8
2007-08	237.3	576.7	36.3	324.5	1174.8
2008-09	345	325.2	3.7	157.2	831.1
2009-10	270.6	382.5	4.8	163.5	821.4
Total	2023.2	4312.3	97.8	1678.4	8111.7

(Source: Statistical Hand Book, Directorate of Economics and Statistics,Theni)

4.3 Population

The population of the Theni district, as per 2011 census was 12.43 lakhs, of which 62.49 lakhs were males and 61.87 lakhs were females. The population density was 433 people per square kilometer. The male population was marginally higher than the female population. The demographic details of Theni are presented in table 4.3

Table 4.3 Demographic Details of Theni District (2011 census) (in numbers)

Sl.No	Particulars	No of persons	Male	Female
1	Total population	1243684 (100.00)	624922 (50.24)	618762 (49.75)
2	Rural population	574196 (100.00)	290287 (50.55)	283909 (49.44)
3	Urban population	669488 (100.00)	334635 (49.98)	334853 (50.01)
4	Literate population	879259 (100.00)	485247 (55.18)	394012 (44.81)
5	Density of population (Number per sq.km)	433		
6	Population Growth	13.69%		
7	Proportion to Tamil Nadu Population	1.72%		

(Source: <http://www.census.tn.nic.in>)

4.4 Land Use Pattern

Studying the land use pattern of the study was very important to know the usage of land for various management purposes. It is very useful to plan the use of land resources. Land use pattern in Theni district is presented in table 4.4. It could be seen from the table that the net area sown accounted for 14.69 percent. Land area put to non agricultural uses was considerable at 3.06 percent. The area under current fallows and other fallows together constituted 4.12 percent.

Area sowed more than once accounted for 1.36 percent. The details of land use pattern in Theni district is given below in table 4.4

Table 4.4. Land Use Pattern in Theni District (Area in Hectares)

Sl.No.	Classification	Area	% to total
1.	Forests	134813	17.16
2.	Barren and Uncultivable Land	12225	1.55
3.	Land put to Non Agricultural Use	24058	3.06
4..	Cultivable Waste	2864	0.36
5.	Permanent Pasture and other Grazing Lands	315	0.04
6.	Land under Miscellaneous Tree crops and Groves (not included in Net Area Sown)	1326	0.16
7.	Current Fallows	3481	0.44
8.	Other Fallow Lands	29745	3.78
9.	Net Area Sown	115403	14.69
10.	Geographical area according to village papers	324230	41.28
11.	Total Cropped Area	126148	16.02
12	Area Sown More than Once	10745	1.36
	Total geographical area	785353	100

(Source: Statistical Hand Book, Directorate of Economics and Statistics, Theni)

4.5 Source of Irrigation

The major source of irrigation in the district are Dug wells and canals which cover around 84 per cent of the total irrigated area and canal irrigation covers 17.32 per cent of the total irrigated area. The other sources are Tube/Bore wells. The details of sources of irrigation in Theni district were presented below in Table 4.5

Table 4.5 Sources of Irrigation in Theni district (2010-11) (Area in Hectare)

S.No	Sources of Irrigation	Area Irrigated	% to total irrigated Area
1	Canals	10863	17.32
2	Large Tanks	826	1.31
3	Small Tanks	536	0.85
4	Tube/Bore wells	8391	13.38
5	Dug wells	42068	67.11
	Total	62684	100.00

(Source: Statistical Hand Book, Directorate of Economics and Statistics,Theni)

4.6 Cropping Pattern

The principal crops grown in this district are groundnut, paddy, cholam, sugarcane,etc. Coconut has occupied the major cropping area (14.8 per cent) followed by paddy with 12.17 per cent. In fruits category, banana and mango are the major fruit crops cultivated in the district. Paddy is widely cultivated in Theni, Uthamampalayam, Cumbum, Chinnamanur blocks whereas sugarcane is cultivated in Theni and Periyakulam blocks in large area. The details of cropping pattern followed in Theni district are furnished in Table.4.6

Table 4.6 Cropping Pattern in Theni district 2010-11**(Area in Hectare)**

Sl.No	Crops	Area (ha.)	Per cent of Total Area
1.	Rice(Paddy)	15355	12.17
2.	Cholam	10092	8.00
3.	Cumbu	3203	2.53
4.	Redgram	1560	1.23
5.	Greengram	673	0.53
6.	Blackgram	289	0.22
7.	Groundnut	2616	2.07
8.	Gingily	808	0.64
9.	Sunflower	100	0.07
10.	Cotton	1456	1.15
11.	Sugarcane	6000	4.75
12.	Chillies	427	0.33
13.	Onion	523	0.41
14.	Maize	9006	7.13
15.	Banana	5965	4.72
16.	Mango	9298	7.37
17.	Grapes	1960	1.55
18.	Coconut	18715	14.8
19.	others	38102	30.20
	Total	126148	100

(Source: Statistical Hand Book, Directorate of Economics and Statistics, Theni 2010-2011)

4.7 Infrastructure Facilities

Theni district has a total road length of 2021.4 kilometers of which 56.04 per cent of road was panchayat union and panchayat roads. National Highways roads contributed only 8.04 per cent of total road length. Hence, the roads in the town panchayat have to be improved for better connection with the nearby towns. This will help the people in the village to have a better access to market thus high price can be achieved for their produce and also the workers will be able to

move to different work place, than suffering from unemployment during off-seasons in the villages. The details about name and distance of road were given below in table 4.7

Table 4.7 Name and Length of important Roads of Theni District (2010-11) (in Km's)

Sl.No	Name of the Road	Distance in Kms.	Percent to Total
1.	National Highways	162.70	8.04
2.	State Highways	725.77	35.90
3.	Panchayat Union Roads	1132.93	56.04
	Total	2021.4	100.00

(Source: Statistical Hand Book, Theni)

The main rivers that flow across district are Vaigai, Suruliyar River, Varaganathi River, Manjalar River and Varattaru River. The important reservoirs in the district are Vaigai Dam, Manjalaru Dam, Sothuparai Dam, Periyar Dam, Manalaru Dam and Melmanalaru Dam. The details of Dams, tanks, wells and borewells presented below the table 4.8

Table 4.8 Details of Dams in Theni District (2010-11)

Sl.No	Name of the Dam	Dams				
		Catchments area (in Sq.km)	Water spread area M.Sq.m	Height (Ft)	Capacity (M.cft)	Length of canals In Km.
1	Vaigai dam	2253.3	24.21	71	6091	51.30
2	ManjalarDam	119.19	1.96	57	487.35	7.2
3	Periyar Dam	603.00	26.44	136/152	11210/ 15662	---
4	Sothuparai Dam	46.64	14.46	126	100	7.23

(Source: Statistical Hand Book, Theni)

4.8 Marketing Facilities

Theni district is an important whole sale market for Mango and grapes. Vadugapatti is famous for Garlic market. Bodinayakanur is a major market place for cardamom, Periyakulam

taluk is famous for the growing and marketing of Mango. Cumbum is an important market center for grapes.

4.9 Storage Facilities

More number of agricultural Godowns present in the district. The details of various Agricultural Godowns in the district are presented in Table 4.9.

Table 4.9 Name and Address of Agricultural Godowns in Theni District (2010-11)

Sl.No	Name and address of Agricultural Godowns
1.	Tamil Nadu Ware Housing Corporation Ltd. Godown Vaigaidam Road. Andipatti
2.	Tamil Nadu Ware Housing Corporation Ltd. Godown Kurangani Road. Bodi
3.	Tamil Nadu Ware Housing Corporation Ltd. Godown Nallakarupanpatti. Periyakulam
4.	Tamil Nadu Ware Housing Corporation Ltd. Godown Kombai Road. Uthamapalayam
5.	Tamil Nadu Ware Housing Corporation Ltd. Godown Bodi Road. Theni
	Total

4.10 Description of Commercial Banana Varieties

The varietal characteristics of commercially grown banana varieties in the state are Grand naine, Robusta. The details of various commercial banana varieties are presented in Table 4.10.

Table 4.10 Name and Characteristics of Commercial Banana Varieties in Tamil Nadu

S.No	Variety	Characteristics
1	Grand Naine	It is most accepted international variety. It is a tall statured plant and a heavy yielder with long cylindrical bunch. On an average it produces a bunch weighing 25 kg and may go up to 32-35 kg, with 8-10 hands with 200-220 fruits/bunch. The length of the fruit is 15-21 cm and girth is 12-13 cm.
2	Robusta	It is normal statured with black brown blotches on the stem, bunches weigh around 20 kg having 8-10 hands/bunch. The length of the fruit is 15-20 cm and girth is 12 cm with thick fruit skin
3	Dwarf Cavendish	The plant stature is dwarf. Dark black brown blotches appear all along the stem. Bunches are large with compactly arranged 8-10 hands weighing about 20kg. Length of fruit is 13-14 cm and girth 8-10 cm. Skin is thick and the fruit tapers gradually towards the tip. It is not fit for export.
4	Red Banana	The plant is tall and robust statured. The colour of the fruit, pseudostem, petiole and midrib is purplish red. The bunch weight is 20-25 kg with 6-7 hands and 80 fruits/bunch. The length of the fruit is 16-18 cm
5	Nendran	There is considerable diversity in plant stature. Bunch has 5-6 hands weighing about 6-12 kg. Fruits have a distinct neck with thick green skin turning buff yellow on ripening. Fruits remain starchy even on ripening

4.11 District map of Theni

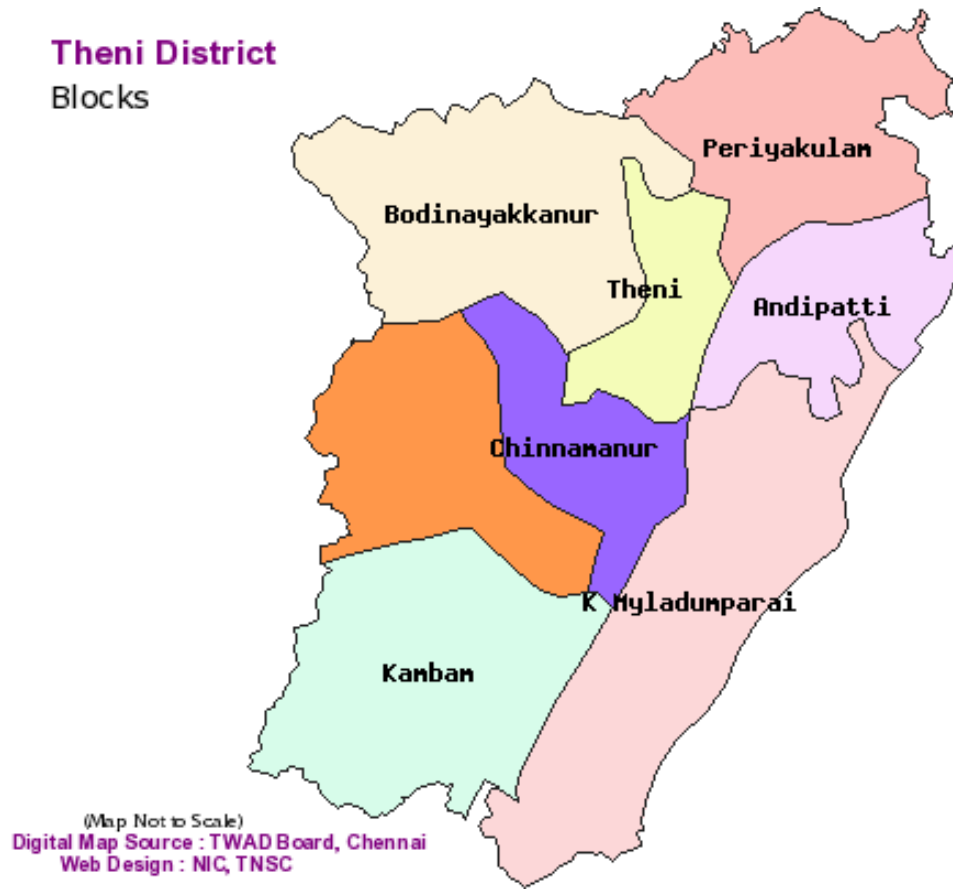


Figure 4.1 City map of Theni

CHAPTER-V

RESULTS AND DISCUSSION

In earlier chapters, a brief review of the past studies, relevant methodology adopted and the general description of the study area were presented. With that background, the data collected during the survey were tabulated and analyzed in relation to each of the specific objective of the study. The findings of the study are presented and discussed under the following headings,

- 5.1 Socio economic characteristics of the sample farmers
- 5.2 Comparative analysis of cost and returns structure of banana production
- 5.3 Production function analysis of banana for contract and non contract farmers
- 5.4 Factors influencing the participation of farmers in contract farming
- 5.5 Marketing of banana for contract and non contract farmers
- 5.6 Terms of contract and mode of operation in banana contract farming
- 5.7 Farmers perception level towards banana contract farming
- 5.8 Satisfaction level of farmers towards banana contract farming
- 5.9 Reasons for adoption of banana contract farming
- 5.10 Reasons for non adoption of banana contract farming
- 5.11 Problems faced by contract farmers
- 5.12 Production and marketing problems in banana contract and non contract Farmers

5.1 Socio Economic Characteristics of Sample Farmers

Analyzing the general characteristics of the farmers of Theni district with respect to age, educational status, occupational status, farming experience, land holding pattern and cropping pattern will be helpful to the case firm in accomplishing the needs of the farmers.

5.1.1 Age of the Respondents

Age is an important factor which influence the way of thinking, decision making, attitude, risk bearing etc., of the farmers significantly. The details on the age of sample farmers are presented in Table 5.1.

Table 5.1 Age Distribution of Sample Farmers (n=120)

Sl. No	Age (years)	Contract		Non-contract	
		Number of Farmers	Percentage to Total	Number of Farmers	Percentage to Total
1.	25-35	5	8.33	8	13.33
2.	36-45	20	33.33	36	60.00
3.	46-55	29	48.34	10	16.67
4.	> 55	6	10.00	6	10.00
Total		60	100.00	60	100.00
Calculated χ^2 value= 14.5 ; Table χ^2 value= 7.81; d(f)= 3					

From the Table 5.1, it could be inferred that 48 per cent of the contract farmers belonged to the age group of 45 years and above, followed by 33.33 per cent in the age group of 36 to 45 years and 8.33 per cent were in the age group of 25 to 35 years. In case of the non contract farmers, about 60 per cent of the respondents fall under the age group of 36 to 45 years, followed by 13.33 per cent under young aged and 10 per cent of the respondents belonged to old age group. From the results, it is obvious that majority of the contract farmers were in the category of 46 to 55 years old. The calculated chi-square value was more than the table value implying that age of contract farmers had significantly differs from non-contract farmers.

5.1.2 Educational Status of the Sample Farmers

Education plays a major role by influencing farmers on their approach and attitude towards farming. The sample farmers were classified into five categories based on educational status such as illiterate, primary level, high school level, higher secondary level and graduate. The details on the educational status of sample farmers are presented in Table 5.2.

Table 5.2 Educational Status of the Sample Farmers (n=120)

Sl. No	Education level	Contract		Non-contract	
		Number of Farmers	Percentage to Total	Number of Farmers	Percentage to Total
1.	Illiterate	7	11.67	5	8.33
2.	Primary	13	21.66	18	30.00
3.	High school	19	31.67	21	35.00
4.	Higher secondary	10	16.67	12	20.00
5.	Graduate	11	18.33	4	6.67
Total		60	100.00	60	100.00
Calculated χ^2 value= 5.03 ; Table χ^2 value= 9.48; d(f)= 4					

From the Table 5.2, it could be understood that 21.67 per cent of contract farmers had primary education whereas in case of non members, it was 30 per cent. Around 16.67 per cent of the contract farmers and 20 per cent of the non contract farmers had higher secondary education. 11.67 per cent of the contract farmers and 8.33 per cent of the non contract farmers were illiterate. 18.33 per cent of the contract and 6.67 per cent of the non contract farmers were graduate. The calculated chi-square value was less than table value implying that there was no significant difference between contract and non contract farmers in educational status.

5.1.3 Occupational Status

The occupations of respondents were classified into two categories and results were explained in the following Table. 5.3

Table 5.3 Occupational Status of the Sample Farmers

(n=120)

Sl. No	Occupation	Contract		Non-contract	
		Number of Farmers	Percentage to Total	Number of Farmers	Percentage to Total
1.	Agriculture only	51	85.00	55	91.67
2.	Agriculture +others	9	15.00	5	8.33
Total		60	100.00	60.00	100.00
Calculated χ^2 value= 1.29 ; Table χ^2 value= 3.84; d(f)= 1					

From the table 5.3, it is seen that, majority of the respondents of contract and non contract farmers were doing agriculture only. It could be seen from the table that 9 per cent (contract) and 5 per cent (non contract) were doing agriculture with other occupations. The calculated chi-square value was less than the table value implying that occupational status had no significant difference between contract and non contract farmers.

5.1.4 Farming Experience of Sample Farmers

Experience of farmers in farming would have significant role in allocation of area under crops, selection and adoption of contract farming in agriculture and also in the success of farm business. Hence details of farming experience were gathered, analysed and the results are presented in Table 5.4.

Table 5.4 Farming Experience of Sample Farmers**(n=120)**

Sl. No	Experience (years)	Contract		Non-contract	
		Number of Farmers	Percentage to Total	Number of Farmers	Percentage to Total
1.	<5	6	10.00	15	25.00
2.	5-10	8	13.33	11	18.33
3.	11-15	18	30.00	12	20.00
4.	>15	28	46.00	22	36.67
Total		60	100.00	60	100.00
Calculated χ^2 value= 6.25 ; Table χ^2 value= 7.81; d(f)= 3					

From the above table it could be observed that 46 per cent (contract) and 36.67 per cent (non contract) of respondents had more than 15 years of farming experience. 30 per cent of contract and 20 per cent of non contract respondents had 11 to 15 years of experience in farming. Farmers who had 5 to 10 years of experience in farming were 13.33 per cent under contract and 18.33 per cent under non contract farming. Only 10 per cent and 25 per cent were under less than 5 years of farming experience in contract and non contract farming respectively. Thus majority of the respondents had experience in farming. Chi-square test implied that there was no significant difference between contract and non contract farmers in farming experience.

5.1.5 Size of Land Holding

The size of land holding of sample farmers in general would influence their cropping pattern, method of irrigation etc. Hence the details of size of holding of the farmers were collected and the results are presented in Table 5.5.

Table.5.5 Size of Land Holding of the Sample Farmers**(n=120)**

Sl. No	Size of Land Holding (in ac)	Contract		Non-contract	
		Number of Farmers	Percentage to Total	Number of Farmers	Percentage to Total
1.	Up to 2.50 (marginal)	10	16.67	3	5.00
2.	2.50-5.00 (small)	14	23.33	10	16.66
3.	5.01-10.00 (medium)	30	50.00	14	23.34
4.	More than 10.00 (large)	6	10.00	33	55.00
Total		60	100.00	60	100.00
Calculated χ^2 value= 28.90 ; Table χ^2 value= 7.81; d(f)= 3					

It is clear from the table that, majority of respondents were medium farmers (50.00 per cent) in contract farmers' category. Contract farming category farmers holding large size farm showed only 6 per cent. But 33.33 per cent of non contract farmers belonged to the large farmer group. The chi square test also confirmed that size of land holdings of contract farmers was significantly different from non contract farmers.

5.1.6 Source of Irrigation

Source of irrigation plays a critical role in the selection of the crop and also the number of crops cultivated in a year and method of irrigation. Therefore source of irrigation in sample farms were analysed and presented in Table 5.6

Table 5.6 Source of Irrigation**(n=120)**

Sl. No	Source of Irrigation	Contract		Non-contract	
		Number of Farmers	Percentage to Total	Number of Farmers	Percentage to Total
1.	Open Well	36	60.00	40	66.67
2.	Bore Well	15	25.00	12	20.00
3.	Both	9	15.00	8	13.33
Total		60	100.00	60	100.00
Calculated χ^2 value= 0.603 ; Table χ^2 value= 5.99; d(f)= 2					

From the above table it could be observed that 60 per cent of the contract farmers and 66.67 per cent of the non contract farmers had open well as their main source of irrigation followed by bore well irrigation.15.00 per cent of contract and 13.33 per cent of non contract farmers used both bore wells and open wells. Hence it could be inferred that open well was the main source of irrigation in the study area. The calculated chi-square showed that there was no significant difference between contract and non contract farmers in source of irrigation.

5.1.7 Cropping Pattern Followed and Area under Crops Cultivated by the Sample Farmers

The details regarding the cropping pattern followed by the sample farmers were analyzed and presented in Table 5.7.

Table 5.7 Cropping Pattern Followed by the Sample Farmers**(n=120)**

S. No	Source of Irrigation	Contract farmers		Non-contract Farmers	
		Number of Farmers	Percentage to Total	Number of Farmers	Percentage to Total
1.	Only Banana	45	75	39	65
2.	Banana- Vegetables	06	10	8	13
3.	Banana- Paddy	09	15	13	22
Total		60	100	60	100
Calculated χ^2 value= 1.44 ; Table χ^2 value= 5.99; d(f)= 2					

It could be inferred from Table 5.7 that among the sample contract farmers, banana (75 per cent) alone occupied substantial share in cropping pattern followed by banana - paddy (15 per cent). In non contract farmers, banana (65 per cent) occupied higher share in cropping pattern followed by banana-paddy (22 per cent) and banana- vegetables (13 per cent). The calculated chi-square value showed no significant difference in cropping pattern.

The details regarding the area under different crops grown by the sample farmers were analyzed and presented in Table 5.7.a

Table 5.7.a Area under Different Crops Cultivated by the Sample Farmers

S. No.	Crops	Area in hectares	Percentage to Total
1	Paddy	237	29.77
2	Maize	64	8.04
3	Onion	25	3.14
4	Banana	398	50.01
6	Coconut	72	9.04
	Total	750	100.00

It could be observed from the table 5.7a. that banana accounted for 50.01 per cent of the total cropped area. Paddy was the next main crop and occupied 29.77 per cent of total cropped area.

5.1.8 Banana Varieties Grown by the Sample Farmers

The details regarding the banana varieties cultivated by the sample farmers were analyzed and presented in Table 5.8.

Table 5.8 Banana Varieties Grown by the Sample Farmers (n=120)

S. No	Varieties	Contract		Non-contract	
		Number of Farmers	Percentage to Total	Number of Farmers	Percentage to Total
1.	Grand naine	51	85	60	100
2.	Red banana	05	8.3	00	00
3.	Poovan	04	6.7	00	00
Total		60	100	60	100
Calculated χ^2 value= 9.73 ; Table χ^2 value= 5.99; d(f)= 2					

It could be inferred from Table 5.8 that among the sample contract farmers, Grand naine variety was cultivated by 85 per cent of farmers followed by Red banana (8.3 per cent). In case of sample non contract farmers, Grand naine variety was cultivated by 100 per cent of farmers. The chi-square test implies that the contract farmers were found to be significantly different from non contract farmers in varietal selection.

5.2 Analysis of Cost and Returns Structure of Banana Production

5.2.1 Cost and Returns Structure of Contract and Non-Contract farmers

Costs

The cost of cultivation was estimated by using cost concepts like Cost A, Cost B, and Cost C. In present study, components of Cost A include cost of suckers, labour, organic manures, inorganic fertilizers, plant protection chemicals, interest on working capital, depreciation and

land revenues.etc. The details on the cost of cultivation for contract and non contract farmers are presented in Table 5.9.

Human labour cost

Human labour was measured in man days. Human labour cost was calculated from the actual wages paid for labours by the farmer. The average wage rate was Rs.200 for men and Rs. 150 for female per day of six hours. The family labour cost was imputed at the market wage rate prevailing in the locality. The managerial functions performed by the family members were evaluated on the basis of time spent in the farm.

Machine power

Machine power was charged at the prevailing rates in the respective villages. In the study area, the average charge paid for hiring of tractor was Rs.400 per hour.

Sucker cost

The sucker cost was arrived by multiplying the number of suckers used by the sample farmer and the prevailing market price. In the present study, the average sucker cost was found to be Rs 13 per sucker.

Propping material

The propping material cost was arrived by multiplying the number of sticks used by the sample farmer and the prevailing market price. In the present study, the average cost was found to be Rs 15 per stick.

Annualised cost for drip system

In the present study, the annualised cost for drip system cost was estimated to be Rs.7900 per hectare for contract farmers and non contract farmers of banana cultivation Both the contract and non contract farmers used drip irrigation only.

Interest on fixed capital

The interest on fixed capital was evaluated at the prevailing interest rate of 12 per cent per annum on the current value of fixed assets and the cost of capital was calculated for the

cropping period. In the present study, the interest on fixed capital was estimated to be Rs.1566 per hectare for contract farmers and non contract farmers of banana cultivation.

Table 5.9 Cost and Returns Structure of Contract and Non-Contract Farmers

(Rs/ha)

S.No	Particulars	Contract	% to the total	Non-Contract	% to the total
I	Costs				
a	Cost 'A'				
	Hired human labour	48595	20.75	48864	21.28
	Machine labour	6520	2.78	6685	2.91
	Suckers	36094	15.00	37826	16.47
	FYM	35259	15.05	34518	15.03
	Inorganic fertilizers	26497	11.30	22358	9.72
	Micro nutrients	8151	3.48	8237	3.58
	Plant protection chemicals	7633	3.20	7642	3.32
	Propping material	23187	9.90	21353	9.30
	Annualised cost for drip system	7900	3.37	7900	3.44
	Interest on working capital @ 7 %	13988	5.90	13676	5.95
	Total cost A	2,13,824	90.73	2,09,059	91.00
b	Cost 'B'				
	Cost A	2,13,824	-	2,09,059	-
	Rental value of land	13050	5.57	13050	5.68
	Interest on fixed capital @12%	1566	0.66	1566	0.68
	Total cost B	2,28,440	96.96	2,23,675	97.36
c	Cost 'C'				
	Cost B	2,28,440	-	2,23,675	-
	Family labour	5691	2.43	5870	2.55
	Total cost C	2,34,131	100.00	2,29,545	100.00
II	Returns				
	Yield(tonnes/hac)	131.89		102.97	
	Average price/bunch	315.00		292.00	
	Gross returns	7,83,739		7,22,925	
	Net returns	5,49,607		4,93,379	

Interest on working capital

In banana cultivation, the inputs were not used at one time but at different points of time according to the requirements of the crop. Hence, the interest calculated on working capital was reduced to half of the crop period. In this study, interest on working capital was Rs. 13988 in case of contract farmers and Rs. 13676 per hectare for non contract farmers.

Rental value of owned land

The imputed value of land rents prevailing in the study area was considered as the rental value of owned lands. The contribution of land towards the crop enterprise was accounted based on the rental value of the land prevalent in the area. The annual rent paid for land use in study area was Rs. 13,050 per hectare.

Manures, fertilizers and plant protection chemicals

Cost of manure was calculated based on the prevailing market rate in the area. The cost per ton for farm yard manure was found to vary between Rs.1500 to Rs.2000 per tractor load. Chemical fertilizers and plant protection chemicals were valued at the actual payment made by the farmer.

The costs and returns in contract and non-contract farmer's category were influenced by both endogenous and exogenous factors. In banana cultivation the cost and returns of contract and non-contract farmers play an important role in determining the profitability.

Among the two categories of the farmers, the higher amount of Rs. 2,13,824 was incurred as cost 'A' by the contract farmers while it was observed to be Rs. 2,09,059 for contract farmers. The difference was found to be Rs.4,765 indicating the higher level use of various inputs by contract farmers including plant protection measures. The gross returns for contract farmers were observed to be higher (Rs 7,83,739) as compared to non-contract farmers (Rs. 7,22,925) as a result of the price received by the farmers and also the technical advices adopted by the farmers. Similarly the net returns realized by contract farmers were also higher (Rs. 5, 49,607), than that of non-contract farmers (Rs. 4, 93,379).

5.2.2 Partial Budget showing the Change from Contract to Non-Contract Farming

For taking a specific farm management decision, the help of partial budgets are essential. Partial budgeting was a statement of added cost and added returns as a result of a change in one or a few activities of the farm such as increase or decrease in the level of enterprise, introduction of a new enterprise etc. Here the change would be in the method of contract farming adoption. The details of the partial budgeting are presented in the Table 5.10

Table 5.10 Partial Budget showing the Change from Contract to Non-Contract Farming

(Rupees per Hectare)

Debit (A)			Credit (B)	
	Added cost		Added return	
I	FYM	741	Gross return	60814
III	Inorganic manure	4139	(Difference between the gross return of contract and non-contract of Banana per ha)	
III	Propping material	1834		
IV	Interest on working capital	312		
	Total	7026		
	Reduced revenue		Reduced cost	
I	-	-	Hired human labour	269
II	-	-	Machine labour	165
			Suckers	1732
			Micro nutrients	86
			PP Chemicals	9
			Family labour	179
	Reduced revenue		Total	2440
	A. Total added cost and reduced return	7026	B. Total added return and reduced cost	63254

$$\begin{aligned}
 \text{Net change in income} &= B-A \\
 &= 63254 - 7026 \\
 &= \text{Rs.}56,228
 \end{aligned}$$

Since the cultivation of banana with contract farming had given an additional income of Rs.56,228 per hectare compared to non contract farming banana, the farmers could definitely be recommended to adopt the contract farming to increase their farm income.

5.3 Resource Use Efficiency in the Production of Banana by Sample Farmers

Production functions were fitted to the contract and non-contract farmer's data to assess the degree of influence of the inputs on the output. It was noticed that suckers, human labour, FYM, fertilizers and plant protection chemicals were the significant variables while studying the economics of banana cultivation for contract and non- contract farmers. In addition to these variables, a dummy variable (1=for contract farmers and 0=for non contract farmers) which was also included to capture the impact of the technology namely contract was also found to be significant. The details of production function estimates are presented in Table 5.11.

Table 5.11 Resource use Efficiency in the Production of Banana by Sample Farmers

S.No	Variables	Mean value	Regression coefficients	t-ratio
1	Family size	4.03	0.0120	0.2321
2	FYM (Tonnes/ac)	9.41	0.4401***	3.3401
3	Suckers (Numbers/ac)	1238.46	1.4410***	6.8318
4	Fertilizers (Kg/ac)	422.00	0.3373***	5.6356
5	Plant protection chemicals (Rs/ac)	39.00	0.2142	1.5176
6	Labour (Man days/ac)	116.27	-0.0356 ^{NS}	-0.4909
7	Dummy		0.3442***	3.0275
8	R ²		0.742	

*** Significant at one per cent level, ** Significant at five per cent level, * Significant at ten per cent level

It could be observed from the table that the R² value is 0.74 indicating that 74 per cent of the variation in the banana yield was explained by the included variables. The regression coefficient for suckers used per acre had indicated that there was a strong positive relationship between the suckers and banana yield. One per cent increase in suckers usage, organic manures would increase the per acre banana yield by 1.4 and 0.3 per cent respectively from their mean

levels. The regression coefficient for labour used per acre had indicated that there was a negative relationship between the labour and yield due to the more use of labours. In production function, dummy variable was included to capture the difference between contract and non contract farms which was showing significant influence.

5.3.1 Estimation of Allocative Efficiency of Input for Banana Contract and Non Contract Farmers

The ratios of the MVP to MFC of individual resources were computed to judge the allocative efficiencies (AE). The computed Marginal Value Product (MVP) was compared with the Marginal Factor Cost (MFC) or opportunity cost of the resource to draw inferences. A resource was said to be optimally allocated when its' MVP = MFC. The details are presented in Table 5.12. The ratios of MVP to MFC indicate that most of the inputs were either over utilized or under utilized by both the categories of farmers. For the non-contract farmers, ratio for human labour (0.08) was less than one which indicates that they should not increase the usage of these input.

Table 5.12 Allocative Efficiency for Contract and Non Contract Farmers of Banana

MVP/ MFC	Contract	Non contract
Suckers	38.71	14.67
Organic manures	4.88	9.01
Human labour	0.32	-0.35
Chemical fertilizers	2.95	6.42
Plant protection chemicals	-6.81	10.19

In case of contract farmers the MVP to MFC ratio was observed to be more than one for suckers, organic manure, chemical fertilizers which indicate that these inputs are underutilized. As a result of this, there still existed a scope to increase the banana yields by the use of increased level of these inputs among contract farmers.

5.4 Factors Influencing the Participation of Farmers in Contract Farming

The primary data was used to estimate the probit model that explained the factors influencing the participation of farmers in contract farming. The independent variables used were age, educational status, size of land holding, family size, price received and net returns.

The marginal effects of change in one of the independent variables on the probability of participation were calculated at the mean of each variable and presented in Table.5.13. The corresponding probabilities (the percentage change in the probability of participation level given a 1% change in the value of the variable) were given for the continuous variables, as is the difference in the probabilities as the discrete variables changes from zero to one.

Table 5.13 Factors Influencing the Participation of Farmers in Contract Farming

Variables	Estimated Coefficient	Standard Error	T-Ratio
Age (Years)	0.034	0.017	2.001**
Education (Years)	-0.017	0.038	-0.449
Size of land holding (Acres)	-0.218	0.053	-4.110***
Family size	-0.011	0.151	-0.072
Price received(Rs/kg)	0.391	0.084	4.670***
Net Returns (Rs)	0.000	0.000	1.369
R ²	0.63		

Note: *** - 1%, ** - 5% and * - 10% level of significance

It could be inferred from Table 5.13 that among the various factors age, price received by farmers and net returns, were the positively influencing factors for the participation in contract farming. Size of land holding negatively influenced factor for the participation in contract farming.

Farmers decided to participate in contract farming to avoid price risk that they were facing during marketing. Hence price was included in probit function to find its influences in the

decision of participation in contract farming. The coefficient of price indicates that, for each one rupee increase in price, the probability of participation in contract farming would increase by 0.319 per cent on an average for the entire sample. Similarly, one year increase in age of farmers, the probability of participation would increase by 0.034 per cent. This indicates that young age farmers did not prefer to go for contract farming.

If size of land holding increases by one acre, the probability of participation would decrease by 0.218 per cent. This implies that large farmers were not willing to participate in contract farming. For each year increase in education, the probability of participation in contract farming would decrease by 0.017 per cent on an average for the entire sample.

It is inferred from result of this model that more experienced small and medium farmers participation was more to be benefitted from better price received for the produce from the company. Company might concentrate on these factors to increase area under contract farming.

5.5 Marketing of Banana for Contract and Non Contract Farmers

Studying marketing practices followed by banana farmers helped to understand price margin received by all stakeholders and to find out the percentage of margin that farmers were getting from consumers' rupee. This also helped to know whether contract farming increases share of consumers' rupee to farmers.

5.5.1 Marketing of Banana for Contract Farmers

The marketing of banana contract farming shows that there were two intermediaries, namely company and retailers that existed in channel as given below.

Producer → Company → Retailer → Consumer

Table 5.14 Marketing of Banana for Contract Farmers

S.No	Particulars	Amount (Rs/bunch)	Per cent to the consumer Price
1	Producer		
	Net price received by the producer	280.00	32.14
2	Company		
	Price paid by the company	280.00	32.14
	Harvesting &transport	25.00	2.87
	Processing	62.00	7.11
	Profit margin	260.00	29.85
	Marketing margin	325.00	37.31
	Price received by the company	605.00	69.46
4	Retailer		
	Price paid by the retailer	605.00	69.46
	Cost incurred	46.00	5.28
	Profit margin	220.00	25.25
5	Consumer	871.00	100.00

Price spread in marketing channel is shown in Table 5.14. It could be observed from the table that in marketing channel, the net price received by the farmers was Rs.280.00/bunch which constituted about 32.14 per cent of the consumer price.

5.5.2 Marketing of Banana for Non-Contract Farmers

The banana growers sold their produce to the trader. It was observed that the marketing channel passed through three intermediaries namely trader, wholesalers and retailers to reach consumer.

Marketing Channel

Producer → Trader → Wholesaler → Retailer → Consumer

Table 5.15 Marketing of Banana for Non Contract Farmers

S.No	Particulars	Amount (Rs/bunch)	Per cent to the consumer Price
1	Producer		
	Net price received by the producer	263.00	29.41
2	Trader		
	Price paid by the village trader	263.00	29.41
	Cost incurred		
	i) Harvesting charges	5.00	0.55
	ii) Packing and transport	38.00	4.25
	iii) Commission charges	59.00	6.59
	Total cost incurred	102.00	11.40
	Market margin	102.00	
3	Wholesaler		
	Price paid by the wholesaler	365.00	40.82
	Cost incurred	163.00	18.23
	Profit margin	60.00	6.71
	Marketing margin	233.00	26.06
4	Retailer		
	Price paid by the retailer	598.00	66.89
	Cost incurred	62.00	6.93
	Profit margin	234.00	26.17
	Marketing margin	296.00	33.18
5	Consumer	894.00	100.00

Price spread in marketing channel was shown in Table 5.15. It could be observed from the table that in marketing channel, the net price received by the farmers was Rs.263.00/bunch, which constituted about 29.41 per cent of the consumer price. The marketing margin for the village trader constituted about 11.40 per cent of the consumers' price. The cost incurred by the trader worked out to Rs.102.00/bunch of banana. The cost incurred by the wholesaler was Rs.163.00 constituting 18.23 percent of the consumers' price.

5.6 Terms of Contract and Mode of Operation in Banana Contract Farming

5.6.1 Terms and Condition Followed in different Models of Contract Farming

The contracting firm had different types/systems of terms and conditions while entering into contract with farmers. Hence the details of different models of contract farming were collected and the results are presented in Table 5.16.

Table 5.16 Terms and Condition Prevailing in different Types of Contract Farming

S.No	Particulars	Production contract	Pre harvest contract
1.	Time of fixing price	At the time of harvest	At the time of harvest
2.	Transportation cost	Borne by company	Borne by company
3.	Loading and unloading charges	Borne by company	Borne by company
4.	Technical advice	Yes	Nil
5.	Compensation to crop failure	Nil	Nil
6.	Benefit to farmers	Involvement of the contracting company in production is high	Low
7.	Type of Agreement between farmers & firm	Oral	Oral
8.	Record maintenance for advance payments	Yes	Nil
9.	Decision regarding time of harvest	By the company	By the company
10.	Payment of price for the produce	At procurement time	At procurement time

In production contract type, involvement of the contracting company in production was high and also paid advance to farmers to purchase inputs. Decision regarding time of harvest was taken by company and also type of agreement between farmers and firm was oral in both types of contract farming. The company was not collecting any charges for technical advice and also paid no compensation for crop loss. Transportation cost was paid by company along with loading and unloading charges in both type of contracts.

5.6.2 Mode of Operation Prevailing in Contract Farming

Mode of operation of contract farming was studied to understand how contract farming practiced, services provided and schedule of payment etc. The company gave advice about the technical aspect and other different aspects.

Table 5.17 Mode of Operation Prevailing in Contract Farming (n=60)

S.No	Particulars.	No. of farmers	Percentage to the total
1	Source of information for taking up banana contract		
	a) Firm staff	45	75
	b) Fellow farmers	15	25
	c) Friends and relatives	0	0
2	Types of services provided by the firms		
	Technical advice	60	100
	Enough field visits	60	100
	Input supply	0	0
	Transportation of the produce	60	100
3	Payment schedule		
	i) Spot payment	40	65
	ii) 15-30 days	8	23
	iii) >30 days	12	11

From the above Table 5.17 that, among the sample farmers, majority of the farmers (75 per cent) took up banana contract due to persuasion of the company staff. The influence of fellow farmers was the second major force (25 per cent). The staff of the company would be responsible for field visits, technical guidance and arranging camps. The field officer was visiting the fields once in a month. In case of more field visits, farmers had better contact with the officer. On an average, the farmers received settlement in one installment. 65 per cent of farmers realized full payment within a fortnight. About 23 per cent and 11 per cent of farmers received within 15-30 days and more than 30 days from the date of harvest respectively.

5.7 Perception about Contract Farming

Perception plays an important role in the preference of farmers towards contract farming. Hence farmers' attitude towards contract farming was assessed based on five parameters, using five point scales and results are presented in Table 5.18

Table 5.18 Perception about Contract Farming (n =60)

S.No	Statements	Mean score
1.	Contract farming gives better access to capital and modern inputs to farmers	3.97
2.	Contract farming improves and encourages quality production	3.95
3.	Contract farming reduces marketing risk	3.23
4.	Contract farming is the best way of increasing the income and economic conditions of the farmers	3.25
5.	Small farmers cannot be benefited by contract farming	1.58

From the table 5.18 it could be inferred that, respondents agree with the statements such as contract farming gives better access to capital and modern inputs to farmers (3.97) and it improves and encourages quality production (3.95) and also respondents agree that it reduces marketing risk (3.25) and it is the best way of increasing the income and economic conditions of the farmers (3.23). Respondents disagree with the view that small farmers cannot be benefited by contract farming (1.58). So it could be concluded that respondents had positive attitude towards contract farming.

5.8 Satisfaction Level of the Farmers towards Contract Farming in Banana

The satisfaction level of contract farming is an important factor to know whether they would continue in the future or not. The details regarding the satisfaction level of the sample farmers were analysed and the results are presented in Table 5.19

Table 5.19 Satisfaction Level of the Farmers towards Contract Farming (n=60)

SL. No	Particulars	Mean score
1.	Supply of planting material	4.12
2.	Provide technical assistance	4.35
3.	Regular field visits	3.77
4.	Provision of drip irrigation	3.40
5.	Financial support	3.23
6.	Price received	3.25
7.	Time of payment	3.12
8.	Transportation assistance	4.69

It was evident from the above table that farmers in the study area were highly satisfied with the supply of transportation assistance followed by technical assistance and planting material. The mean score for regular field visits by the farmers was 3.77 reflecting that the farmers were neutrally satisfied with reference to regular field visits. The mean score for provision of drip irrigation from the company was 3.40 and indicated that farmers were satisfied with provision of drip irrigation and the mean score for price received was 3.25 reflecting that the farmers were neutrally satisfied with reference to the price received given by the company.

5.9 Reasons for Adoption of Contract Farming

The major reasons for the adoption of contract farming in the study area were collected, analysed and the results are furnished in Table 5.20

Table 5.20 Reason for Adoption of Contract Farming (n=60)

S. No	Reasons	Score	Rank
1	Assured market for the produce	72.29	I
2	Advance payment	63.58	II
3	Higher returns	48.04	III
4	Transportation facility	46.56	IV
5	Technical advice	45.46	V

Among the various factors identified, assured market for the produce was the most important reason for the adoption of contract farming with a mean score of 72.29 followed by advance payment with a mean score of 63.58, followed by observing higher returns and transportation facility with the mean score of 48.04 and 46.56 respectively. Technical advice was a moderate influencing reason with the mean score of 45.46.

5.10 Reasons for Non - Adoption of Contract Farming

The major reasons for the non - adoption of contract farming in the study area were collected, analysed and the results are furnished in Table 5.21.

Table 5.21 Reason for Non - Adoption of Contract Farming**(n=60)**

S. No	Reasons	Score	Rank
1	Not satisfied with rigid rules	65.62	I
2	Inadequacy of advance paid by company	57.99	II
3	High standards of expected quality produce	57.13	III
4	Limited acceptance of area	51.08	IV
5	Improper weighment	40.41	V

Among the various factors identified, not satisfied with rigid rules was the most important reason for the non-adoption of contract farming followed by inadequacy of advance paid by company with a mean score of 57.99. High technical standards followed by the company and limited acceptance of area with the mean score of 57.13 and 51.08, respectively. Improper weighment was a moderate influencing reason with the mean score of 40.41.

5.11 Problems faced by Contract Farmers

Opinions of the farmers regarding the problems faced under banana contract farming mode are presented in Table 5.22

Table 5.22 Problems faced by Contract Farmers**(n=60)**

S. No	Particulars	No of farmers	Percentage
1	Low contract price	55	91.66
2	No proper method to measure quality of the product	52	86.66
3	Irregular payment	24	40.00
4	Delayed procurement	15	25.00
5	Lack of technical assistance	12	20.00

The problems experienced by farmers under banana contract farming and their opinion are presented in Table 5.22. From the table it was observed that, the sample contract farmers concerned to low contract price 91.66 per cent and did not follow proper yard stick for grading the banana and to the extent of 86.66 per cent and irregular payment 40 per cent for the produce. Similarly 25 per cent of the farmers stated delayed payments for the third and fourth stage harvested banana crop. Small number of banana growers indicated problems concerned to lack of technical assistance from the contracting firm 20 per cent.

5.12. Production Constraints in Banana

The study of production constraints in general by banana growers helps to identify the areas that has been taken care of by contractors, thereby they could modify mode of operation of contract farming in order to increase number of farmers participating contract farming practices.

The farmers in the study area were facing several problems in the production of banana. Hence it was decided to study the major constraints in banana production in the study area. The constraints were ranked using Garrett's ranking technique and the details are furnished in table 5.23.

Table 5.23 Production Constraints in Banana**(n=120)**

S.No	Constraints	Mean score	Rank
1.	Inadequate electricity supply	74.8	I
2.	High cost labour	72.7	II
3.	Non availability of labour in time	63.9	III
4.	Inadequate irrigation water	59.4	IV
5.	Non availability of fertilizers	58.3	V
6.	Non availability of genuine planting material	54.0	VI
7.	Lodging due to high wind	47.5	VII
8.	Lack of knowledge about identifying the disease.	32.5	VIII
9.	Lack of knowledge about fertilizer application.	30.8	IX

The inadequate electricity supply was the most important constraint in the study area. The second major constraint in the banana production was the high cost of labour. Followed by non availability of labour in time is the third constraint. Inadequate irrigation water, lack of knowledge about identifying the disease and non availability of genuine planting material were some other constraints identified by the farmers in the banana cultivation.

It is inferred from the table that company might be able to attract more number of farmers to adopt contract farming by providing plant protection advice, good quality planting materials along with drip irrigation. Appropriate Strategies might be taken up to include these services in production contract type.

5.12.1 Marketing Constraints in Banana

Constraints in marketing of banana was the major reason for the farmers that influenced them to participate in contract farming. This is an area that has been analysed by the contractors to increase their volume of business. Hence, marketing constraints were analysed and given in table 5.24

Table 5.24 Constraints in Banana Marketing (n=120)

S.No	Constraints	Mean score	Rank
1.	Fluctuation in market prices	65.44	I
2.	Absence of regulated markets	59.25	II
3.	Lack of storage facilities	51.52	III
4.	Delayed payment after sale of produce	47.65	IV

The banana growers in the study area were facing certain marketing constraints. Four major marketing constraints were identified and ranked using Garretts' ranking technique. The most important constraint identified by the banana growers was higher price fluctuations. The second major constraint ranked was absence of regulated markets. Lack of storage facilities was ranked as the third major constraint in the marketing of banana. Other constraints were identified as delay in payment after the sale of the produce.

CHAPTER VI

SUMMARY AND CONCLUSION

An empirical study on comparative analysis of banana contract farming in Theni district was attempted. The research conducted has been summarized and conclusions are presented in this chapter. The study was undertaken with the following objectives

- i) To study the socio economic characters of the banana growers in the study area
- ii) To evaluate the cost and returns structure of banana under contract and non contract farming.
- iii) To study the mode of operations and terms of contract in contract farming.
- iv) To analyse the farmer's perception and satisfaction towards banana contract farming.
- v) To identify factors influencing adoption and reasons for non-adoption of contract farming.

The study was conducted in Theni district since the banana cultivation is more in this district. Totally, six villages had been selected randomly which are major banana growing villages and from each village, 10 contract and non contract farmers each were selected randomly. Totally, 120 sample respondents were selected for the research purpose. The primary data regarding characteristics of sample respondents, cost and returns of banana, constraints in production and marketing and suggestions from the respondents were collected with the help of interview schedule. Analytical tools like percentage analysis, Garrette ranking technique, cost and return analysis, partial budgeting and probit model were used.

6.1 Summary of the results

6.1.1 General Characteristics of Respondents

In the study area, 48.34 per cent of the contract and 16.67 per cent of the non contract farmers belonged to the age group of 46 to 55 years followed by 33.33 per cent contract and 60 per cent of the non contract farmers in the age group of 36 to 45 years. 8.33 per cent contract and 13.33 per cent of the non contract farmers in the age group of 25 to 35 years.

Among the respondents, 21.67 per cent contract farmers and 30 per cent non contract farmers had primary education. Around 31.67 percent of the contract and 35 per cent of the non contract farmers had high school education. 18.33 per cent of the non contract and 6.67 per cent of the non contract farmers were collegiates.

The primary occupation of majority of the respondents was agriculture only with 85 per cent of contract and 91.67 per cent of non contract farmers respectively, while 15 per cent of contract and 8.33 per cent non contract farmers were involved in agriculture along with other occupation.

An appreciable number of the contract and non contract farmers had more than 15 years of farming experience (46 per cent and 36.67 per cent), followed by 30 per cent of contract and 20 per cent of non contract farmers with 11 to 15 years of farming experience. 13.33 per cent of contract and 18.33 per cent of non contract farmers 5 to 10 years of experience in farming. Thus majority of the respondents had vast experience in farming.

In this study, majority of the sample contract farmers were under the categories of small and medium land holdings. But majority of the sample non contract farmers were under the large farmer category. 50 per cent of contract farmers and 23.34 per cent of non contract farmers were medium farmers, followed by 23.33 per cent of the contract farmers and 16.66 per cent of non contract farmers under small farmers category.

Source of irrigation had played a major role in the production of banana crop. Among the sample farmers, 60 per cent of the contract and 66.67 per cent of non contract farmers used open well as their main source of irrigation. Most of the farmers depended on open well irrigation. Cropping pattern followed among the sample farmers was cultivating banana in the study area. Among banana growers of the sample farmers, majority of them used only G9 variety.

6.1.2 Cost and Returns Structures of Contract and Non Contract Farmers of Banana

Among the two categories of the farmers, the higher amount of Rs. 2,13,824 was incurred as cost 'A' by the contract farmers while it was observed to be Rs. 2,09,059 for non contract farmers. The difference was found to be Rs.4765 indicating the higher use levels of various inputs by contract farmers. The net returns realized by contract farmers were higher (Rs.

5,49,607), than that of non-contract farmers (Rs.4,93,379) as a result of price received by the contract farmers. In order to realize the higher levels of quality and productivity, the contract farmers had incurred an amount of Rs. 4586 as an additional cost due to the use of more manure and fertilizers than non contract farmers. This was obtained due to the increased yield and quality levels of banana over non- contract farmer practices. As a result of this, contract farming has been considered as economically acceptable particularly in banana cultivation.

6.1.3 Partial Budget showing the Change from Contract to Non-Contract Banana Farming

The total additional cost incurred by the contract farmers was Rs. 4586 and the additional returns obtained by contract farmers were Rs. 56,228 than the non contract farmers. The farmers can definitely recommended to adopt the contract farming in increase their farm income.

6.1.4 Production Function Analysis

The Cobb-Douglas Production function Analysis observed from the table that the R^2 value is 0.74 indicating 74 per cent of the variation in the banana yield was explained by the included variables. The regression coefficient for suckers used per acre has indicated that there was a strong positive relationship between the suckers and banana yield. A one per cent increase in sucker usage, FYM and fertilizers would increase the per acre banana yield by 1.4, 0.44 and 0.33 per cent respectively from their mean levels. Inclusion of dummy variable to capture the contract and non contract farms showed positive influence but significant impact on yield of the banana.

6.1.5 Factors Influencing the Adoption of Contract Farming

Various factors like age of the respondents, number of years of education, size of land holding, family size, price received and net returns from contract farming were considered to find out which factors mainly influences the participation in contract farming. The most important factor which positively influenced the participation was price received and age of farmers, the size of the land holding was the factor which negatively influenced the participation of the farmers in contract farming. It was inferred that, an increase in procurement price of the contracting firm by one unit from the mean level, the probability of participation in contract

farming would go up by 0.39 per cent. An increase in size of land by one unit from the mean level, the probability of participation in contract farming would go down by 0.21 per cent.

6.1.6 Mode of Operation prevailing in Contract Farming

The study revealed that among the sample farmers, majority of the farmers (75 per cent) took up banana contract due to persuasion of the company staff. On an average, the farmers of banana farmers received settlement in one installment. Types of services provided by the firms were technical advice, field visits, input supply and transportation facility for the produce.

6.1.7 Satisfaction Level of the Farmers towards Contract Farming in Banana

The study revealed that the major share of farmers in the study area was satisfied with the planting material, technical assistance, input supply and financial support. At the same time, the farmers were not satisfied with the field visits.

6.1.8 Reasons for Adoption of Contract Farming

Among the various factors identified, assured market for the produce was the most important reason for the adoption of contract farming followed by advance payment with a mean score of 63.58, followed by higher returns and transportation facility with the mean score of 48.04 and 46.56, respectively. Technical advice was a moderate influencing reason with the mean score of 45.46.

6.1.9 Reasons for Non- adoption of Contract Farming

It was concluded that majority of the farmers had not opted contract farming because of non satisfaction with rigid rules by the company followed by lack of credit facility, high technical standards, limited acceptance of area and Improper weighment ranking second to fifth respectively. As the rules were not made properly during agreement which are of technical standards required by firm, farmers could not cope up with this as the farmers were not ready to have any such standards. Other reasons were scarcity of owned fund and the produce not procured on time by the firm.

6.1.10 Problems Faced by Contract Farmers

Among the sample contract farmers concerned, the major problem cited were low contact price (91.66 per cent), not following proper yard stick for grading the banana(86.66 per cent) and irregular payment (40.00 per cent). Further, 33.33 per cent of the contract farmers indicated the problems relating lack of credit facilities by the firm. Similarly 25 per cent of the farmers stated delayed payments for the third and fourth stage harvested banana crop. Hence of banana growers indicated problems concerned to lack of technical assistance (20 per cent).

6.1.11 Production Constraints in Banana

The Inadequate electricity supply was the most important constraint in banana production. The second major constraint was the high cost labour, followed by non availability of labour in time. Inadequate irrigation water, lack of knowledge about identifying the disease and non availability of genuine planting material were the other constraints identified by the farmers in the banana cultivation.

6.1.12 Marketing Constraints in Banana

The banana growers in the study area were facing certain marketing constraints. The most important constraint identified by the banana growers was higher price fluctuations .The second major constraint ranked by the sample farmers was absence of regulated markets while lack of storage facilities was ranked third. Other constraints were identified as delay in payment after the sale of produce.

6.2 Conclusions

- The majority of the contract farmers are in the category of 46 to 55. Age of contract farmers significant difference compared to non-contract farmers.
- 93 to 97 per cent of farmers of both categories were educated.
- Majority of farmers were doing agriculture alone as a main occupation.
- Comparatively, more experienced farmers were in contract farming category than non contract.

- Size of land holdings of contract farmers significantly differed from non contract farmers. Nearly 50 per cent of contract farmers had medium size land holding whereas non-contract farmers owned larger size of land.
- Open well was the main source of irrigation for banana growers in the study area.
- Majority of sample farmers grew banana alone as a major crop in the study area
- Among the sample farmers, G9 variety was cultivated by 85 per cent of contract farmers and 100 per cent by non contract farmers.
- 'Cost A' incurred by contract farmers were found to be higher amounting to Rs. 4765 compared to non-contract farmers because of their high level of input use. Yield, gross return and net return realized by contract farmers were found to be higher indicating that contract farming helped in increasing productivity besides receiving higher price.
- Since the cultivation of banana with contract farming had given an additional income of Rs.56228 per hectare compared to non contract farming banana, the farmers can be definitely recommended to adopt the contract farming to increase their farm income.
- Significance of variables on production function implies that still inputs like number of suckers, fertilizers and manures were under utilized. Labour usage negatively influenced yield indicated over use of family labour. The above result of production function was confirmed by the calculated allocative efficiency of farmers. In case of contract farmers, the MVP to MFC ratio was observed to be more than one for suckers, organic manure, chemical fertilizers which indicate that these inputs are underutilized. As a result of this, there existed a scope to increase the banana yields by the use of increased level of these inputs for contract farmers.
- Among the various factors age, price received and net returns positively influenced the participation in contract farming, whereas size of land holding negatively influenced factor for the participation. This implies that large farmers were not willing to participate in contract farming.

- There is no significant increase in price received by farmer which revealed that contract farming helped farmers to get only marginal increase in price. Increase in net return of contract farmers was due to higher productivity.

6.3 Recommendations

1. Well experienced small and medium farmers found to be participated more in contract farming. Hence steps might be taken to increase participation by other category farmers also.
2. Significant difference in input use was observed among contract farmers. Hence there is scope to increase productivity further by applying more of inputs.
3. Price received by contract farmers was not significantly higher than non contract farmers since price is fixed only during pre harvest period. Contract farming in banana might be advocated to fix price before planting by written agreement thereby it might strengthen relationship and confidence among farmers thereby reducing constraints in marketing.
4. Banana contract farming helped farmers more in increasing productivity as well as high quality banana. Since the decision making on harvesting time was decided by company, it helped farmers to harvest produce in proper time so as to reduce post harvest losses and also harvesting at right maturing alone will increase shelf life and quality of banana. This type of technology was not aware/adopted by farmers. Linkage of company with farmers further strengthened to provide state of art of technology.
5. Variety chosen is another important that decides productivity which was advocated by contract farming. Drip irrigation played a very vital role in study area that helped in increase in area under banana especially G9. This could also be promoted in other parts of Tamil Nadu to increase banana productivity and production.
6. Production constraints study concluded that company might be able attract more number of farmers to adopt contract farming by providing plant protection advice, good quality planting materials along with drip irrigation. Strategies might be framed to include these services in production contract type.

7. Marketing constraints study concludes that the most important constraint identified by the banana growers was higher price fluctuations. So the company might be able attract more number of farmers to adopt contract farming by providing a reasonable price for the produce.

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ANNEXURE

Interview schedule

Project title: “Comparative Analysis of Banana Contract Farming in Theni District”

I. General Information:

1. Name of the respondent:
2. Age:
3. Education:
4. Village:
5. Taluka:
6. District:
7. Main occupation:
8. Subsidiary occupation:

B. Family information:

SN.	NAME	Sex	Age	education	Occupation.

C. Land holdings (Ha/ac)

SN.	Particulars	Irrigated	Unirrigated	Land revenue	Land rent
1	Leased in				
2	Own				
3	Area under banana				
	Total				

D. Sources of Irrigation.

SN.	Particulars	No	Area covered	Crop/s
1	Well			
2	Tube well			
3	Others			

E. Cropping Pattern:

S.No	Crops	Area under Crop (in ha)	Rain fed	Well Irrigation	Drip Irrigation
1					
2					
3					
4					

10. How long have you been cultivating Banana?

11. Do you follow any intercropping in Banana?

13. Do you get any price & market information related to Banana from any source?

Yes/No

If Yes, Name the Source : -----

II. Costs and returns in production of Banana: (Per acre/ per ha)

S.No	Particulars.	Quantity.	Price per unit (Rs.)	Total cost (Rs)
1	Suckers/Plantlets			
2	Treatment chemicals.			
	Manures.			
3	Fertilizers. i. Basal ii. Top 1 iii. Top 2 iv. Top 3			

4	Mulching material.			
5	PP Chemicals. i. Pest 1 ii. Pest 2 iii. Pest 3			
6	Irrigation charges.			
7	Propping material.			
8	Any other costs.			

B. Labour use pattern:

S.No	Operations	Human Labour (man days)				Bullock Labour (Pair days)	Machine Labour (Hrs)
		Family		Hired			
		Men	Women	Men	Women		
1	Land preparation. i. Ploughing ii. Harrowing iii. Leveling iv. Pit formation.						
2	Manure application i. Transportation ii. Pit filling						
3	Planting i. Sucker/Plantlet						

	treatment ii. Planting. iii. spacing						
4	Fertilizer application						
5	Mulching						
6	Earthing up						
7	Weeding						
8	De suckering & leaf removing.						
9	Propping						
10	Bunch covering						
11	Irrigation. i. ii. iii. iv.						
12	PPC application						
13	Harvesting. i. Bunch harvesting. ii. Mottoking						

Men Rs. ____ /man day. Women Rs. ____ /man-day.

Bullock labour. Rs.____ /day. Machine Rs.____ /hour.

C. Gross Returns:

S.No	Product	Quantity	Price (Rs)	Value (Rs)
1.	Main Product (tons)			
2.	Bi-product: 1) Suckers. 2) Leaves.			
	Total			

III) Modus operandi prevailing in contract farming:

S.No	Particulars.	
1	Introduced to the crop by	
	a) Firm staff b) Fellow farmers c) Friends and relatives	
2	Type of agreement	
3	Types of services provided by the firms	
	Technical advice	
	Field visits	
	Input supply	
	Transportation of the produce	
4	Payment schedule	

IV) How satisfied are you with regarding the following items of contract farming:

	Very unsatisfied	Unsatisfied	Neutral	Satisfied	Very satisfied
Planting material					
Technical services					
Regular field visits					
Input supply					
Financial support					

V) Factors favouring contract farming by the farmers:

S.No	Particulars	Rank
1	Assured market for the produce	
2	Technical advice	
3	Higher returns	
4	Transportation facility	
5	Input supply	
6	Advance payment	

VI) Reasons for not adopting contract farming by the farmers:

S.No	Particulars	Rank
1	Rigid rules	
2	Lack of credit facility	
3	High technical standards	
4	Limited acceptance of area	
5	Improper weighment	
6	Scarcity of owned funds	

VII) Farmers perception towards contract farming:

	SA	A	UD	DA	SDA
Contract farming is the best way of increasing the income and economic conditions of the farmers					
Contract farming improves and encourages quality production					
Contract farming reduces marketing risk					
Contract farming gives farmers better access to capital and modern inputs					
Contract farming helps reduce cost of production and marketing					
Contract farming is the best way to join farmers with markets					

SA – Strongly agree; A — Agree; UD— Undecided; DA—Disagree; SDA: Strongly disagree.

VIII) Problems faced by the contract farmers

S.No	Particulars	
1	Delayed procurement	
2	High rejection wastage through grading	
3	Lack of technical assistance	
4	No proper method to measure quality of the product	
5	Low contract price	
6	Lack of credit facilities	
7	Non release of funds to purchase inputs	
8	Irregular payment	

IX) Post Harvest Operations

a) Do you follow any preliminary processing operation (Y/N)?

If yes, indicate what and how:

b) Do you follow grading practices at farm level (Y/N)? If yes, based on

a) Size b) Colour c) Freshness d) Size, Colour, Freshness e) Others

If No, What is the reason? -----

c). Did you store your produce before marketing (Y/N)?

If yes, i) (Qty) ----- and chemical used -----

ii) Where did you store?

If No, What is the reason? -----

d) Disposal:

To whom sold*	Thro' whom sold **	Quantity sold	Rate/Qtl

* To whom: Wholesaler, Processor, Village merchant, Exporter, Retail chain

** Through whom: Cooperative Marketing Society, Commission Agent, Farmers market directly

e) Market place- Where do you sell -----

Why are you preferring the particular market -----?

f) Problems faced in Banana marketing

i) Price fluctuation

a) Peak price during -----

b) Lean price during -----

ii) Late payment by processors / wholesalers / village merchants

iii) Perishability of the banana

iv) Low prices

g) Any processing industries located in your village/ near by place (Y /N)?

If yes, did you sell your produce directly to the processing industry?

h). Any Storage facility, located near by your village? (Y /N)

X.. Did you attend any farmer- buyer meet?

j). Were there any suggestions to change any practice in the meet?

XI.. Did you undergo training for any improved technologies about cultivation & marketing aspects from agricultural department / other organization? Yes/ No

If yes mention:

When?

- Name of the Organization:

XII. Did you change any cultivation practice after training? Specify

i)

ii)

13. Was there any change in buying behavior by intermediary after the meet?

14. Did you change intermediary in recent years: Yes/ No

If yes, When? ----- Why? -----

30. What is your opinion about the intermediary?

15.. Did you negotiate price?

16. Did you have knowledge of market price when selling?

17. Are you a member in any association Y/N If yes:

Name of the association

- Position if any held

- Did the association help in any ways in

1. Sale:

2. Improving cultivation practice