

**“BUSINESS AND FINANCIAL ANALYSIS OF
PALM OIL SECTOR IN KARNATAKA”**

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MBA 908

**DEPARTMENT OF AGRICULTURAL MARKETING CO-
OPERATION AND BUSINESS MANAGEMENT, GKVK
UNIVERSITY OF AGRICULTURAL SCIENCES
BANGALORE - 560 065**

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Project Report submitted to the

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in partial fulfillment of the requirements for the degree of

MASTER OF BUSINESS ADMINISTRATION

in

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JULY, 2011

Affectionately dedicated

To

My Beloved

Mother

&

My Chairman

**DEPARTMENT OF AGRICULTURAL MARKETING, CO-OPERATION
AND BUSINESS MANAGEMENT
UNIVERSITY OF AGRICULTURAL SCIENCES
G. K. V. K., BANGALORE- 560 065**

CERTIFICATE

This is to certify that the Project Report entitled, “**BUSINESS AND FINANCIAL ANALYSIS OF PALM OIL IN KARNATAKA**” submitted by **Mr. DAYANAND, B.P.**, ID NO. **MBA 908** in partial fulfillment of the requirement for the degree of **Master of Business Administration (Agribusiness Management)** to the University of Agricultural Sciences, Bangalore, is a record of bonafide research work done by him during the period of his study in this University under my guidance and supervision and the Project Report has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar titles.

Bangalore
July, 2011

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(Dayanand B.P)

**BUSINESS AND FINANCIAL ANALYSIS OF PALM OIL SECTOR IN
KARNATAKA**

ABSTRACT

The present research study was conducted with the major objective of business and financial analysis of palm oil industry in Mysore district of Karnataka. The Primary data was collected from 50 farmers and a processor. The Secondary data on production of oil palm and unprocessed oil was collected from Palm tech India and Oil palm development programme, Directorate of Horticulture. The Analytical tools employed include Compound growth rate analysis, Frontier production function and Capital Budgeting. The area, production of fresh fruit bunches and crude oil palm production in Mysore district was increased by 18.54 per cent, 19.90 per cent and 22.50 per cent respectively over a period of nine years. Establishment cost of oil palm plantation is accounts for rupees 1, 95, 845 per hectare. Oil palm plants require 150-200 liters of water per day. Harvesting was one of the major constraints in oil palm plantation because of thorns and height of plant. Oil palm starts yielding from fourth year onwards, as the age of the plant increases yield also increases. A fully matured plant yields up to 22 tons per hectare per annum. The peak yielding period is between 13 to 20 years. Income contribution from oil palm comparatively is high because of efficient farm management. The investment on oil palm processing unit was financially viable. The payback period accounts at eight years and suggestions to upgrade the machinery and to impart training to employees in the processing unit were made.

Dayanand B.P.

(B.M.Ramachandra Reddy)
Major advisor

ಕರ್ನಾಟಕ ತಾಳೆ ತೈಲ ವಲಯದ ವ್ಯವಹಾರಿಕ ಮತ್ತು ಆರ್ಥಿಕ ವಿಶ್ಲೇಷಣೆ

ದಯಾನಂದ್ ಬಿ. ಪಿ.

ಸಾರಾಂಶ

ಪ್ರಸ್ತುತ ಅಧ್ಯಯನ ಕರ್ನಾಟಕದ ಮೈಸೂರು ಜಿಲ್ಲೆಯ ತಾಳೆ ಎಣ್ಣೆಯ ಆರ್ಥಿಕ ಮತ್ತು ವ್ಯವಹಾರಿಕ ವಿಷಯ ಅರಿಯಲು ಮಾಡಲಾಯಿತು. ಪ್ರಾಥಮಿಕ ಮಾಹಿತಿಯನ್ನು 50 ರೈತರು ಹಾಗೂ 1 ಸಂಸ್ಕರಣ ಕೇಂದ್ರದಿಂದ ಪಡೆಯಲಾಯಿತು. ಸೆಕೆಂಡರಿ ಮಾಹಿತಿಯನ್ನು ಪಾರ್ಮಾಟೆಕ್ ಭಾರತ ಕಂಪನಿಯನ್ನು ಹಾಗೂ ತಾಳೆ ಎಣ್ಣೆ ಅಭಿವೃದ್ಧಿ ಕಾರ್ಯಕ್ರಮ, ತೋಟಗಾರಿಕೆ ಇಲಾಖೆಯಿಂದ ಪಡೆಯಲಾಯಿತು.

ವಿಶ್ಲೇಷಣಾತ್ಮಕ ಉಪಕರಣಗಳಾದ ಕಂಪೌಂಡ್ ಬೆಳವಣಿಗೆ, ದರ ವಿಶ್ಲೇಷಣೆ, ಫ್ರಾಂಟಿಯರ್ ಉತ್ಪಾದನಾ ಕಾರ್ಯ ಹಾಗೂ ಕ್ಯಾಪಿಟಲ್ ಬಜೆಟಿಂಗ್‌ನಿಂದ ಮಾಡಲಾಯಿತು. ತಾಳೆ ಮರದ ವಿಸ್ತರಣೆ, ತಾಳೆಹಣ್ಣು ಹಾಗೂ ತಾಳೆ ತೈಲವು ಶೇಕಡ 18.54, 19.90 ಹಾಗೂ 22.50 ರಷ್ಟು ಏರಿಕೆ ಪಡೆದಿರುವುದು ಅಧ್ಯಯನದಿಂದ ಸ್ಪಷ್ಟವಾಗಿದೆ. ತಾಳೆತೈಲ ತೋಟದ ಸ್ಥಾಪನೆಗೆ ವೆಚ್ಚ ಸುಮಾರು 1,95,845 ರೂ. ಆಗುತ್ತಿದ್ದು, ಒಂದು ಗಿಡಕ್ಕೆ ಸುಮಾರು 150-200 ಲೀ. ನೀರಿನ ಅವಶ್ಯಕತೆ ಇದೆ ಎಂದು ಅಧ್ಯಯನದಿಂದ ತಿಳಿಯಲ್ಪಟ್ಟಿದೆ. ರೈತರು ನೀರಿಗಾಗಿ ಮುಖ್ಯವಾಗಿ ಕೊಳವೆ ಬಾವಿ (92.37%) ಅವಲಂಬಿತರಾಗಿರುತ್ತಾರೆ. ರೈತರು ನೀರಿನ ಸಿಂಪಡಿಕೆಗೆ ಮುಖ್ಯವಾಗಿ ಹನಿ ನೀರಾವರಿ ಯೋಜನೆಯನ್ನು (57.20) ಪಾಲಿಸುತ್ತಾರೆ ಎಂದು ಅಧ್ಯಯನದಿಂದ ತಿಳಿಯಲ್ಪಟ್ಟಿದೆ. ಜೈವಿಕ ಗೊಬ್ಬರದ ಬಳಕೆ (58.57%) ಆಗಿರುತ್ತದೆ. ತಾಳೆ ಕೊಯ್ಲು ರೈತರಿಗೆ ಒಂದು ಮುಖ್ಯವಾದ ತೊಂದರೆಯಾಗಿ ಮಾರ್ಪಟ್ಟಿದೆ. ತಾಳೆ ಮರದ ಎತ್ತರ ಹಾಗೂ ಮುಳ್ಳುಗಳ ಉಪಸ್ಥಿತಿಯೇ ಇದಕ್ಕೆ ಮುಖ್ಯ ಕಾರಣ. ರೈತರು ಹಣ್ಣುಗಳ ಕೊಯ್ಲಿಗೆ ಕುಡುಗೋಲು (50%) ಅಧಿಕವಾಗಿ ಬಳಸುತ್ತಾರೆ. ತಾಳೆ ಮರವು ತನ್ನ 4ನೇ ವರ್ಷದಿಂದ ಇಳುವರಿ ಕೊಡಲು ಪ್ರಾರಂಭಿಸುತ್ತದೆ. ಇದು 22 ಟನ್‌ಗಳಷ್ಟು ಆಗಿರುತ್ತದೆ. ಮೈಸೂರಿನಲ್ಲಿ ತಾಳೆ ಬೆಳೆ ಹೆಚ್ಚಲು ಸರ್ಕಾರದಿಂದ ದೊರೆಯುವ ಸಬ್ಸಿಡಿ ಮುಖ್ಯ ಕಾರಣ ಎಂದು ತಿಳಿಯಲ್ಪಟ್ಟಿದೆ.

ತೈಲ ಹಸ್ತದ ಸಂಸ್ಕರಣ ಘಟಕದಲ್ಲಿ ಬಂಡವಾಳ ಆರ್ಥಿಕವಾಗಿ ಸಮರ್ಥ ಹಾಗೂ ಅನುಕೂಲವೆಂದು ಅಧ್ಯಯನದಿಂದ ದೃಢೀಕರಿಸಲಾಗಿದೆ. ನವೀಕರಿಸಿದ ಉನ್ನತ ಯಂತ್ರೋಪಕರಣಗಳು ಹಾಗೂ ಸಂಸ್ಕರಣ ಘಟಕದಲ್ಲಿ ತರಬೇತಿ ಪಡೆದ ವ್ಯಕ್ತಿಗಳ ಅನುಪಸ್ಥಿತಿಯನ್ನು ಪೂರೈಸಬೇಕು ಎಂಬುದು ಅಧ್ಯಯನದಿಂದ ತಿಳಿಯಲ್ಪಟ್ಟ ಸಲಹೆಯಾಗಿದೆ.

ಕೃಷಿ ಮಾರುಕಟ್ಟೆ, ಸಹಕಾರ ಹಾಗೂ ವ್ಯವಹಾರಿಕ

ಪ್ರಧಾನ ಸಲಹೆಗಾರರು
ಬಿ. ಎಂ. ರಾಮಚಂದ್ರ ರೆಡ್ಡಿ

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INTRODUCTION

CHAPTER I

INTRODUCTION

The Indian economy greatly depends upon the agricultural sector specially horticulture. The outlay in different plan periods for horticulture sector has also increased significantly. The commercial banks have given priority to horticultural sector in lending loans in view of higher returns per unit area. The globalization and commercialization of horticulture trade has also enabled farmers to go for horticultural crops. There is a continuous shift over the years from field crops to horticultural crops. This clearly indicates that the farmers are keen to take up profitable commercial horticultural crops than the traditional and conventionally less remunerative field crops.

India is endowed with rich natural wealth of plant genetic resource, which are of great horticultural importance. Horticultural crops cover large varieties of fruits and vegetables, flowers, plantation crops, spices, medicinal and aromatic plants, roots and tuber, etc. With its diverse agro-climatic conditions, enormous bio-diversity, fertile soil, large cultivable area and above all, long history of crop husbandry, India can boast of being one of the few countries in the World which can grow different varieties of fruits and vegetables round the year. Horticultural crops occupy roughly around 11 per cent of the gross cropped area, yet contribute more than 28 per cent of the gross value of agricultural output of the country.

Source: www.dopr.gov.in

Scenario in Karnataka

Karnataka is one of the progressive States with vast potential for horticultural development. The State is blessed with ten agro-climatic regions suitable for growing variety of fruits and vegetables all round the

year. The horticultural crops grown in Karnataka can be grouped into four broad categories, *viz.*, (1) fruits (2) vegetables (3) spices or plantation crops and (4) commercial flowers. Apart from these, cultivation of potential high value crops like medicinal and aromatic herbs has also been taken high in certain areas.

The total area and production of horticultural crops in the State during 2007-2008 was 119.91 lakh hectares and 327.51 lakh tons respectively. Karnataka has shown an impressive growth during the last two decades with respect to area and production. The land area under horticultural crops increased remarkably from 12 per cent of net area sown in 1997-98 to 18 per cent in 2007-2008. The area under oil palm increased from 1.41 lakh hectares in 1993-1994 to 2.50 lakh hectares in 2009-2010. Production of oil palm fresh fruit bunches has also gone up from 237.28 metric tons during 1993-1994 to 6386 metric tons in 2009-2010 showing an increase of 12.08 per cent. Production of crude oil palm has also gone up from 28.92 metric tons during 1993 1994 to 1165.45 metric tons in 2009-2010 showing an increase of 14.73 per cent.

Source: www.dopr.gov.in

The major districts growing horticultural crops in the State are Bijapur, Bagalkot, Dharwad, Kolar, Chikkaballapur, Belgaum, Coorg, Bangalore rural, Ramanagar, Shimoga, Hassan, Chitradurga, Dakshina Kannada, Mysore and Tumkur. The major horticultural crops grown in these districts are, mango, banana, citrus, guava, sapota, papaya, pomegranate, jack, ber, aonla, potato, tomato, onion, okra, green leafy vegetables, beans, radish, carrot and others. The factors influencing the horticultural growth in the state are wide variety of soil and climatic conditions, booming urban purchasing power, proactive government policies, consumer awareness towards nutrition are setting in the State can be a boon for planned horticultural development.

Oil palm

Oil palm consumption is growing significantly in south East Asian countries, more specifically in Indian sub-continent. Worldwide, oil palm is cultivated in more than 22 countries and globally oil palm is grown in 69 lakh hectares, yielding 700 lakh tonnes of fruits and annual yield of 218 lakh tons of crude palm oil. Malaysia and Indonesia produce 108 and 69 lakh tons of oil palm respectively and are first and second highest producers of palm oil in the world.

In India, traditional edible oil seeds play an important role both in the Indian house hold and Indian economy. India is the third largest producer of oil seeds in the world with an area and production of 27.60 million ha. and 26.70 million MT (2005-06). While the area and production of oil seeds have increased significantly, increase in population and income levels has resulted in increase in the per capita annual demand and consumption of vegetable oils. This has resulted in a gap of 8 million MT in the requirement of edible oils in the country. Import value of edible oils has rose from Rs.6, 465 crores in 2001-02 to Rs.25, 000 crores in 2008-09. Oil consumption being income elastic is further projected to grow at 6 per cent per annum.

While there are several oil seed crops cultivated globally, oil palm has come to play an important role in the consumption pattern of vegetable oils with its consumption being the highest among all the edible oils. Crude oil palm and related products constitute 60 to 70 per cent of the total import of edible oil. Oil Palm presents definite advantages in comparison with other traditional oil seed crops, as they are perennial, yield more oil per unit area and oil palm is rich in Vitamin-A, Vitamin-E and Beta-Carotene. The Government of India is encouraging oil palm cultivation, as it yields more oil per unit area when

compared to any other edible oil seed crop. In India, the survey has identified about 8.01 lakh ha. of land is fit for oil palm cultivation.

Karnataka oil palm area and production

In Karnataka, about 2.50 lakh ha. in the five irrigation command areas have been identified as potential for oil palm cultivation. Cultivation of oil palm is being encouraged in areas where irrigation is assured round the year, such as Cauvery Command area, Bhadra Command area, Thunga Bhadra Command area, Malaprabha and Ghattaprabha Command and Upper Krishna Project Command area.

Oil palm cultivation as commercial proposition

The cultivation of oil palm when compared to other perennial horticultural fruits is more complicated and risky. The heavy initial investment on the supporting structure, coupled with low maintenance cost makes its cultivation is the exclusive domain of affluent few. Nevertheless, the oil palm growers are always found to suffer from the fluctuations in the price of oil palm in the global market. To overcome this problem, there is need for increase in productivity, value addition of oil palm and promotion of oil palm products in both the local and International markets.

In Karnataka, there are plenty of opportunities for production of oil palm plantations. The climatic conditions in the State are best suited for the production of oil palm plantations suited for crude oil palm making. There is a very good demand for crude oil palm, both in local and International markets. Given the assured financial support for both grower and oil processing industries, together with good managerial efficiency, oil palm growing can be one of the most profitable and highly sought after enterprise.

Important oil palm varieties

- 1) Imported varieties: Taneera, Guinia, Cameroon, Golden oak, No.36, No.39.
- 2) Indigenous: Taraka.

Oil palm development programme

The Oil Palm Development Programme was started in the State during the year 1990 in collaboration with Govt. of India (Ministry of Agriculture) and Govt. of Karnataka (Dept. of Horticulture) with the following objectives.

To increase the area under oil palm cultivation and increase the edible oil production in the country.

To achieve self sustainability in edible oil production and save Foreign exchange involved in import of edible oil from other countries.

To bring about Crop Diversity in the region.

To improve the economic status of farmers in the region.

The Oil Palm Development Programme is a plan programme under Centrally Sponsored Scheme (CSS). The Scheme is jointly sponsored by Government of India under Integrated Scheme for Oil Seeds, Pulses, Oil Palm and Maize (ISOPOM) and Government of Karnataka, Department of Horticulture. The financial sharing pattern between Government of India and Government of Karnataka is in the ratio of 75:25 respectively.

Existing Processing Facility in the State

For over-all development of oil palm, the responsibility of raising seedlings, distribution of seedlings to the farmers (area expansion), Procurement of Fresh Fruit Bunches (FFBs) from farmers, and establishment of processing facility for processing of FFBs has been entrusted to the private entrepreneurs. At present, five entrepreneurs are operating in the State. (Table 1.1)

Table 1.1 : Entrepreneur operation in Karnataka State

Company/entrepreneur	Areas allotted
M/s Bhadravati Balaji Oil palm Ltd.	Entire Shimoga district Chickmagalur, Tarikere, Kadur, Mudigere, Shringeri taluks of Chickmagalur district Shahapur, Surpur and Jeevarigi taluks of Gulbarga district Sindhgi, Indi, Basavanabagevadi, Mudebehal taluks of Bijapur district. Entire Bagalkote district
M/s Simhapuri Agri tech	Honalli, Chanagiri, Davangere, Harpanahalli Harihara taluks of Davangere district Rannebennur, Haveri, Hanagal Byadgi Hirekerur taluks of Haveri district. Hospet, Siraguppa, Sandur, Hagaribommanahalli, Bellary, Kudligi and Hoovinahadagali taluks in Bellary district.
M/s Palm Tech India Company	Mandya, Mysore, Chamarajnar and Kodagu district Sakleshpur, Holenarasipur, Bellur, Arasikere and Arkalgud taluks of Hassan district
M/s Food Fats and Fertilizers ltd.	Koppal, Gangavathi Kustagi, Yellaburga and Sindhanoor taluks of Koppal district Raichur, Devdurga, Lingasagur & Manvi taluks in Raichur district. Shiratti, Ron, Mundargi taluk in Gadag district
M/S Godrej Agro vet Ltd.	Belgaum District and Joida, Karwar, Yellapur taluks of Uttara Kannada District

Source: www.horticulture.kar.nic.in

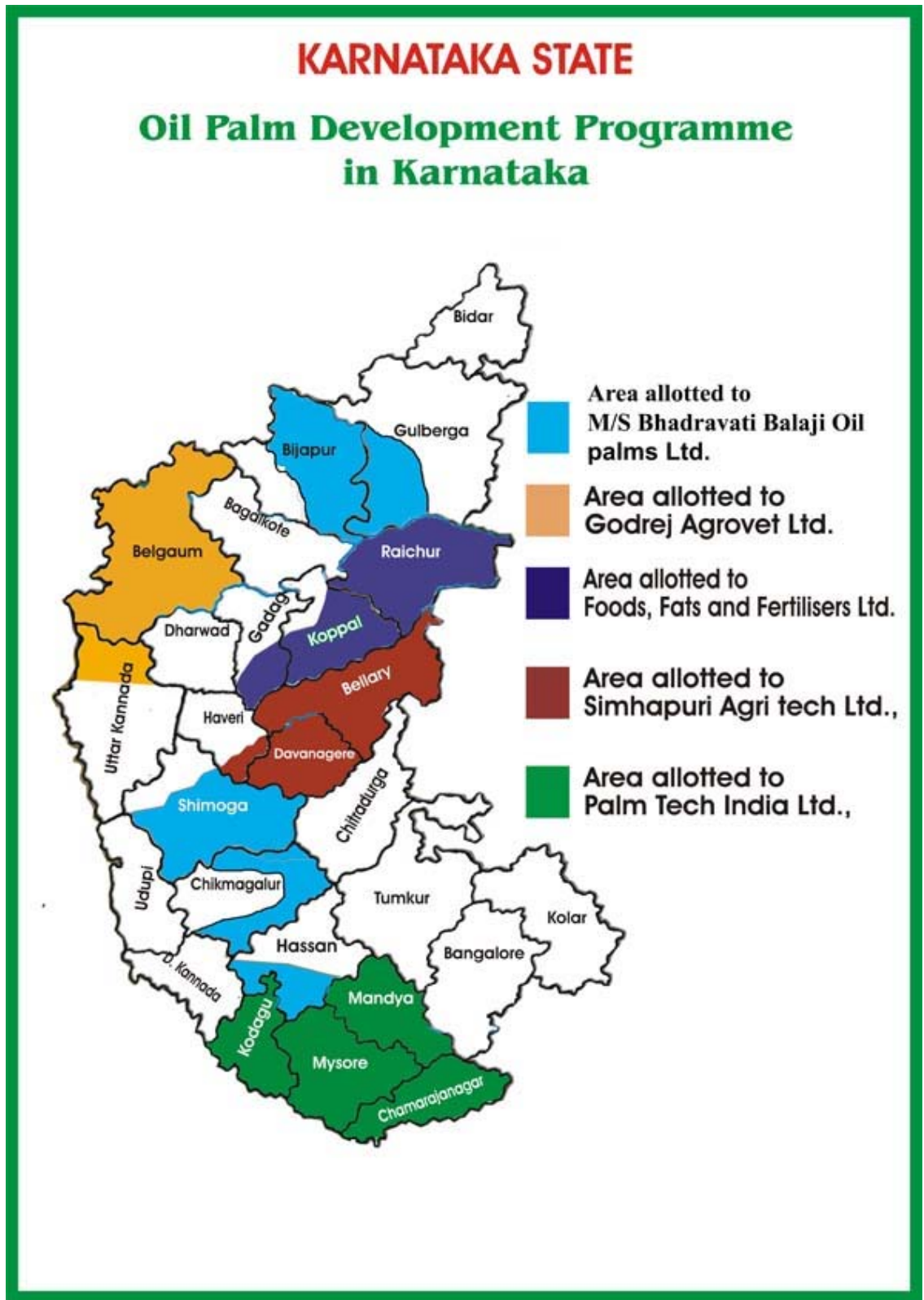


Fig. 1.2 : Existing Processing Facility of oil palm in Karnataka

Source: www.dopr.gov.in

- 1) Ten tonne per hour capacity mill in Karehalli, Bhadravathi taluk of Shimoga district. This processing unit belongs to M/S Bhadravati Balaji Oil Palms Ltd. To run a 10 MT/hr. capacity mill to its full capacity about 45,000 MT of FFBS is required per annum. Currently, the FFBS collected in Shimoga, Chickmagalur, Davangere, Haveri, Bellary, Raichur, Koppal and Gadag districts is processed in this mill.
- 2) One ton per hour capacity mill at Kabini, H.D.Kote taluk, Mysore district established under FAO assistance. This mill has been leased to M/s Palm Tech India limited who are operating in Cauvery Command area. The FFBS collected from Mysore, Chamarajnagar, Mandya, Hassan and Kodagu district is processed in this mill. The FFBS collected in Belgaum and Uttar Kannada district is transported to 2.50 tonne per hour capacity mill established by Godrej Agro vet limited in Goa.

Benefits extended to the farmers under Oil Palm Development Programme

Assistance for Planting Material

The oil palm seedlings are distributed at a subsidized rate.

The planting material subsidy is 75 per cent of cost of the seedling with a ceiling of Rs. 7,500 per ha. for the entire land holding of the farmer.

The cost of exotic seedling has been fixed at Rs.70 per seedling and the cost of indigenous seedling is Rs.60 per seedling.

At the rate of 150 seedlings per ha. The subsidy works out to Rs.50 per seedling.

The subsidy is released to the entrepreneurs for raising the seedlings the balance 25 per cent of the cost of the seedling has to be borne by the farmers.

Assistance for Establishment Cost

The ceiling limit is Rs.15, 500 per ha. admissible up to 15 ha. per individual farmer.

An illustrative phasing of cultivation assistance during pre-bearing period is indicated below.

Table 1.2 : Establishment assistance during pre-bearing period

YEAR	Maximum cultivation Subsidy per ha. in Rs.
1Year	4600
II Year	3300
III Year	3500
IV Year	4100
TOTAL:	15500

Source: www.horticulture.kar.nic.in

Assistance for Drip Irrigation

Assistance to the extent of 75 per cent of the cost for all categories with a ceiling of Rs.13950 per ha. upto 2 ha.

Assistance to the extent of 50per cent of the cost for all categories with a ceiling of Rs.9300 per ha. from 2 ha. 4 ha.

Assistance will be provided for a maximum of 4 ha. per beneficiary.

Training

A sum of Rs.15, 000 has been allocated for per unit for training 50 farmers. The training tour will be conducted in joint collaboration with the oil palm entrepreneurs and the Department officials.

Demonstrations:

As per the stipulations of Government of India, new demonstrations to demonstrate cultivation practices of oil palm and pest & disease management in oil palm will be taken up in districts which come under Upper Krishna Command area only. In other districts, 2nd, 3rd and 4th year maintenance only will be taken up. Under oil palm demonstrations entire expenditure subject to the maximum of Rs. 10,000 per ha. for planting material and maximum of Rs. 30,950 per ha. for cultivation during gestation period of 4-5 years will be provided.

Table 1.3 : Subsidy for one hectore of oil palm plantation

Year	Subsidy
First year	Rs.9,285
Second year	Rs.6,500
Third year	Rs.7,118
Fourth year	Rs.8,047
Total:	Rs.30,950

Source: www.horticulture.kar.nic.in

Assistance for Diesel Pump Sets

Fifty per cent of the cost of Diesel pumpset to a maximum limit of Rs. 10000 per set, at least to those farmers who take up 2 ha. And more of oil palm plantation.

Assistance for oil palm growers to purchase Harvesting tools

The financial assistance to the extent of 50 per cent of the cost of harvesting tool is extended to such farmers who are cultivating oil palm in an area of atleast 0.40 ha. The cost of harvesting tools is estimated to

be Rs.6,000. Therefore, at the rate of 50 per cent, assistance can be given with a maximum limit of Rs.3, 000 per beneficiary.

The oil palm entrepreneurs who are operating in the State should identify the number of harvesting tools that is required and take measure for procurement and distribution of harvesting tools to the farmers. 50 per cent of the subsidy may be claimed from the department and the remaining 50 per cent may be adjusted against the FFBs sale proceeds of the farmers. The implementing officer has to submit the beneficiary list to whom the harvesting tools have been distributed.

Assistance to the oil palm growers for purchase of light weight alluminium ladder

In Oil palm plantations which are > 14 to 16 years old and which have grown up to 30-35 ft height, and where harvesting of FFBs is a problem, it is proposed to give assistance for purchase of light weight alluminium ladder to such farmers who are cultivating oil palm in an area of atleast one acre. Considering, that the price of the alluminium ladder is Rs.6, 000, at the rate of 50 per cent already given to extend subsidy up to Rs.3, 000 per ladder.

Assistance for oil palm growers to purchase Leaf chopping machine

In order to encourage the oil palm farmers to utilize his farm waste and convert it into good manure financial assistance is provided for the purchase of Leaf Chopping Machine at the rate of 50 per cent of the cost of the chopping machine. Considering that the price of Leaf chopping machine is Rs. 26, 000 to Rs.28, 000 at the rate of 50 per cent, a financial assistance with a maximum limit of Rs.14, 000 is extended to those farmers who are cultivating oil palm with area of atleast 1.00 ha.

Assistance for Bore-well

Fifty per cent of the price as assistance for Casing, G.I. pipe, Submersible pump and Panel board upto maximum extent of Rs.25, 000 per beneficiary. The farmers should be cultivating oil palm in a minimum of one acre.

Assistance for purchase of Grass cutter.

The assistance is extended upto of 50 per cent of the price to a maximum limit up to Rs.16, 000 per farmer. The farmer should be cultivating oil palm in an area of atleast one ha.

Assistance for purchase of Diesel Genset.

The assistance will be extended up to of 50 per cent of the cost to a maximum limit up to Rs.25, 000 per farmer. The farmer should be cultivating oil palm in an area of at least one ha.

Assistance for Open wells

The assistance will be extended upto 50 per cent of the cost to a maximum limit up to Rs.20, 000 per farmer in Maenad districts only. The farmer should be cultivating oil palm in an area of at least acre.

Assistance for Open Tanks

The assistance will be extended upto of 50per cent of the cost to a maximum limit up to Rs.20, 000 per farmer in Maenad districts only. The farmer should be cultivating oil palm in an area of atleast acre.

Future trends

The Oil Palm development programme was started to make the country self sufficient in edible oil production. The programme had over whelming response in the initial years. But, owing to various reasons

the programme faced serious set backs in the middle. However, due to changed policy by Government of India and changed horticulture scenario, more and more farmers are coming forward to take up oil palm.

Marketing, which is the most important factor for the entire crop is inbuilt into the programme. Further, oil palm has bright prospects for conversion of crude oil palm into bio-diesel, which may gain popularity in the coming years. Therefore, the farmers are now realizing the economic potential of this crop, in the long run. It is expected that in future years, more and more area can be brought under oil palm.

Importance of the present study

Mysore is the leading Oil palm cultivating district in Karnataka. Oil palm production is mainly concentrated in Mysore taluk and there is an emerging trend in other taluks of Mysore district. The district is known for cultivation of horticultural crops in general and fruit crops in particular. The fruits grown in the district are known for their quality.

The present study can guide the producer in readjustment and proper management of resources to bring down the cost of production at farm level without affecting the output and also guide the investor in allocation of resources for establishment of oil palm industry.

Majority of the farmers in the study area are growing Sugarcane, Sauvignon, Tobacco and Paddy. The high returns realised in growing oil palm plants has attracted the farmers. Accordingly, there is considerable increase in oil palm plantation area as well as quantum of crude oil palm produced during the recent past.

As oil palm production involves heavy initial establishment cost and subsequent high maintenance expenses, its economic analysis is of great importance. But studies on financial analysis of oil palm

production are very few. The present study is an effort in this direction of having an integrated study of all business aspects of oil palm cultivation, supply chain of oil palm, constraints faced by the oil palm planters and oil palm unit with an overall objective of exploring the possibilities for bringing about the required improvements in oil palm sector.

Objectives of investigation

1. To document the growth of oil palm farms in the state.
2. To analyze business and financial performance of oil palm farms in the state.
3. To assess the perception of oil palm farmers in production, processing and marketing of oil palm in the state.
4. To study the financial viability of investments in oil palm processing units in Karnataka.

The hypotheses outlined for the study objectives were

1. The demand for oil palm cultivation is increasing exponentially in the state as well as in the country.
2. The oil palm farming is not remunerative to the farmers.
3. Marketing of palm fruits is the biggest constraint faced by farmers.
4. Oil palm farms are not financially viable in Karnataka.

Limitations of the study

1. The study was carried out in Mysore district of Karnataka. Hence, the results might not be extendable to the national level. The results may have limited application for other areas.
2. The personal interview method of data collection requires the respondents to recall from their memory about cultural operations of

oil palm cultivation. Hence, the findings may be subject to memory lapses of the respondents.

3. Grower's and oil palm industry officials' responses are assumed to be true. However, biased opinions cannot be averted. Hence, it is possible that there may be some unforeseen errors might have crept in the research work.
4. The average price realized during the study year was considered and used in calculating costs and returns of oil palm production, although the prices realized differ from farmer to farmer.



**REVIEW OF
LITERATURE**

CHAPTER II

REVIEW OF LITERATURE

A review of the research work done in the past relating to the present study has been presented in this chapter. The numbers of studies conducted on oil palm are very few and hence the studies on economic analysis of other oil yielding and perennial crops have been reviewed. The review of literature is presented under the following sub-headings.

- 2.1 To document the growth of palm oil farms in the state.
- 2.2 To analyze business and financial performance of palm oil farms in the state.
- 2.3 To assess the perception of palm oil farmers in production, processing and marketing of palm oil in the state.
- 2.4 To study the financial viability of investments in palm oil processing units in Karnataka.

2.1 Growth of palm oil farms in the state

Liyanage and Mathes (1989) in their study found that the effects of 8 irrigation treatments on coconut plant height, girth at the collar, leaf production, crown size, palm vigor, and leaflet production and the leaf area in the 3rd leaf were assessed over 30 months for seedlings planted when 9 months old. The best results were obtained by applying 40 liters water twice a week, burying 2 porous earthenware pots on either side the seedlings and filling them twice a week to supply 27 liters water/week and applying 20 liters twice a week.

Jatosti and Spina (1992) reported that citrus fruit production world-wide rose by 12.4 per cent between 1976 and 1981. Oranges made up 71 per cent of total harvest, followed by lemon and lime with nine per

cent. The greatest expansion of production occurred in Brazil, while US production had stagnated. There was a marked trend towards processing which accounted for one third of production.

KiangKee *et al.* (1995) studied that the Oil palm requires high nutrient inputs for sustained high yields. He conducted to determine changes in soil pH and K status in an oil palm plantation after 7 years of NK application and the effects of oil palm roots and sites of fertilizer placement on K mobility. The conventional practice of applying NK fertilizers in a clean weeded oil palm circle resulted in a significant decline in soil pH and a build-up of soil exchangeable K. After 7 years these changes were evident to 60 cm. Roots reduced the movement of exchangeable K down the soil profile. Significant K uptake occurred when fertilizers were applied in the inter rows. Broadcasting was recommended to improve fertilizer efficiency.

Saraswat (1996) worked out the compound growth rates for area and production of citrus fruits in Himachal Pradesh during the triennium period from 1975-78 to 1989-92. The area under citrus had been increasing at an annual compound growth rate of 11.09 per cent. Growth rate higher than that of State average was observed in the districts of Una (16.46 %), Hamirpur (12.87 %), Bilaspur (12.81 %) and Kangra (12.08 %). The production of citrus fruits in the State has increased at an annual growth rate of 4.74 per cent. The highest growth rate was observed in Una district (31.98%) followed by that in Hamirpur (16.72 %) and Sirmour (5.77 %)

Colin Barlow (1997) studied the effects of advancing economic growth on plantations are classed in five stages, starting with conditions in a backward subsistence economy and ending under circumstances where manufacturing is dominant and planting tree crops no longer economic. Changes in relative resource prices and other factors and

consequent adjustments of estates and smallholdings are taken into account, doing this in light of international experiences with such crops... The key elements in plantation adjustments of market conditions, technology, institutional arrangements and government interventions are finally addressed, with policies likely to facilitate appropriate modifications being indicated.

Viswanathan (2001) reported the emerging contradictions that may have serious implications for the sustainable growth and performance of China's rubber industry in the era of internal restructuring and global market integration. . The contradictions arise from the growing Mismatch between shortage of resources (natural rubber and synthetic rubber) against the ever expanding rubber industry with thin regional spread of manufacturing base. While the dynamic growth of rubber industry in the pre-reforms era was achieved under a heavy import oriented trade policy regime, the sustenance of the same is fraught with serious challenges in the emerging global context affecting the economic performance of the rubber industry.

Chapman *et al.* (2003) reported that Cold tolerant or altitude adapted oil palm hybrid Ten era seed, bred in Costa Rica, have been successfully adapted to higher, cooler areas of Africa, including Cameroon, Zambia, Kenya, Malawi, and Ethiopia. The plants can tolerate temperatures lower than those suitable for classic oil palm hybrids and still produce more oil in cooler conditions than with less adapted cultivars.

Mukherjee (2007) reported that, mango delicious tropical fruit has been under cultivation for about 4,000 years and today it is grown on about two million acres in India, its original home. Nearly 1,000 cultivated varieties are known throughout the tropics of the world. The

fruits are rich in vitamins A and C, and have better food value than apple.

Prasad *et al.* (2009) studied that the palm oil is potential crop to meet the vegetable oil requirements in India, because of its highest productivity with more returns to the farmers than any other edible oil yielding crop.

2.2 Business and financial performance of palm oil farms in the state

Santhiapillai (1988) studied that the various oils and fats can be substituted by palm oil in most uses, particularly as a result of recent technological advances. Developments in marketing of palm oil are initially looked at in terms of world production, world exports and world price development in relation to other oils and fats.

Varghese (1988) analyzed the Investments and expected returns from oil palm cultivation. A detailed account is given of the costs involved, from starting the oil palm nursery to the 10th year of its planting in the main field (when the crop attains yield stability). The cost of raising about 150 seedlings in the nursery to meet the requirement for planting 1 ha is around Rs 920, which includes the combined expenditure for both primary and secondary nurseries. Once the crop attains stabilized bearing, the cost of maintenance of 1 ha of oil palm plantation is around Rs 3600 under rainfed conditions with a labour requirement of 150 man days. Annual net profit will be around Rs 48 700, the cost of cultivation being Rs 4200 per ha. During the productive stage, the major share of labour is utilized for three operations, viz., harvesting, and weeding and fertilizer application. It is illustrated that if a processing unit with a capacity of 3 t of fresh fruit bunches (FFB) per

hour is installed (as available at present in the country) production from an area of 150-200 ha is required to keep the unit fully operational.

Bhat (1990) studied that the Palm stearin is a by-product of the fractionation of edible palm oil which could be utilized for obtaining oleic acid by splitting and fractionation of the mixed fatty acids, either by distillation under vacuum or by solvent fractionation. In order to obtain higher oleic acid content from the second fraction, the technique of urea-adduct fractionation could be adopted. Another approach to upgrade oleic acid from palm stearin could be to esterify palm stearin with isopropyl alcohol, followed by distillation of the isopropyl esters to obtain 2 fractions, one rich in isopropyl palmitate (used in cosmetics and toilet preparations). Similarly, methyl esters of palm stearin could be prepared and fractionated to obtain methyl stearate (used as an additive for cutting oils, after sulphurization) and methyl palmitate (used as Ester-Sulphonate in detergents). In all the esterification reactions, glycerin separates out and could be recovered economically.

Rao *et al.* (1997) conducted a study on profitability of Mango cultivation in drought prone areas of Anantpur district of Andhra Pradesh. The results of economic analysis indicated that the investment on mango garden in the region was a profitable proposition. The establishment cost per hectare of mango garden during the first four years were Rs.3,748, Rs.2,029, Rs.2,012, Rs.2,452 respectively. The annual maintenance cost, i.e., from fourth years onwards worked out to be Rs.5, 169 per hectare. The cost of production per hectare of a mango garden was Rs.17, 828 and the gross returns realized from the output of mango worked out to Rs.22, 083 per hectare. The net returns obtained from the output were Rs.16, 194 per hectare.

Ahmad *et al.* (1998) studied the Integration of cattle rearing and oil palm cultivation in Malaysia is proposed as a means of increasing the

profitability of plantations while simultaneously helping to reduce the country's dependence on imported beef. The potential for integration of cattle in oil palm plantations is explained and its economic viability is assessed. The potential economic viability of rearing cattle in a 1000 ha oil palm plantation was calculated to be good, with a minimum return period of 3 years. A small saving in labour (4 workers over 1000 ha) due to reduced weeding operations is also expected.

Wheeler (1998) reported that Problems associated with analyzing the state of a farm business include a lack of meaningful farm records, unclear business goals, conflicting measures of success and a lack of understanding of the linkages between 'financial' and 'physical' performance. In order to accurately comment on the state of a farm business, a comprehensive diagnostic procedure that accurately evaluates farm business performance is needed.

Sunitha and Varghese (1999) reported the palm byproducts available in an oil palm plantation were composted. Of the five methods of composting studied, chemical digestion was the most economic and efficient. A good quality compost of known nutrient composition can substitute a major share of fertilizer requirement. This integrated approach of nutrient management helps to improve the soil fertility and oil palm productivity in the long run.

Harangus (2007) conducted a study on access of agricultural farms to bank credit offer is determined by a series of factors having a negative or positive influence, i.e., the financial performance of farms and the efficient management of risks by commercial banks. The flow of credit during years from 2004-May to 2007 and their percentage in the total bank crediting is unsatisfactory and extremely low for the development of a performing agriculture. Thus, it is suggested that banks should rethink and implement a flexible crediting system.

Muhammad Khush *et al.* (2008) in their study on assess financial viability in establishing guava (*Psidium guajava*) orchards in Sindh province of Pakistan reported that guava production starts from third year after planting of tree and it reaches a maximum level during 12th year and remains constant up to 25th years. Return on investment (IRR) in guava orchards was determined as 26 percent against current rate of interest on agricultural loans. The pay-back period of guava orchards starts from three years and further indicate that 40 years is the optimum economic life of guava orchards, after that there is a declining trend of guava production.

2.3 Perception of palm oil farmers in production, processing and marketing of palm oil in the state

Ibrahim and Muhamad (1996) expressed that a plantation-based company, started planting rattan under rubber in a 20.2 ha plot of plantation in Peninsular Malaysia in 1986. company's experience with a mixed crop of rattan and rubber in the 9-year period since then, together with an economic evaluation based on this plot. The results are so promising that the company has decided to embark on a large-scale planting of rattan under rubber and is also considering doing likewise for its oil palm plantation.

Solomon and Okolo (2008) examined opinion about the farmers in Imo state, Nigeria with a specific objective of determining personal characteristics of farmers, assess their level of practice and preferences for organic farming. A multi-stage sampling technique was used to select 120 farmers while a pre-tested questionnaire was used for data collection. A five point Likert-type scale was used to assess farmers' perception and the obtained pooled means, used to determine farmers' preferences for organic farming. Findings showed that oil palm production was male dominated (97.2 %). Most of the lands used in

cultivation of the oil palm plantations were acquired through inheritance (47.9 %) and self-acquisition (44.4 %). The results further showed that the farmers strongly agree with the statements that organic farming is more adaptive to farming practice in Nigeria ($X=4.76$; $s=0.74$), preservation of natural environment ($X=4.68$; $s=0.86$), and in agreement with the social and cultural practice of the people ($X=4.53$; $s=0.69$). The farmers however disagreed that organic farming saves time ($X=1.68$; $s=0.84$). The farmers' suggested that proven organic farming technologies be developed, taking into consideration existing indigenous knowledge, specifically in weed control (76.2 %) and soil nutrient replenishment (72.4 %) of palm plantations. Age ($c^2=29.22$; $p<0.05$), type of oil palm plantation ($c^2=18.10$; $p<0.05$) and farm size ($c^2=20.26$; $p<0.05$) had significant associations with farmer perception of organic farming. The study recommends improved collaboration among stakeholders to enhance appropriate environmentally friendly technology development and extension delivery as well as improvement in socio economic status of the farmers.

Acciaioli (2008) describes the effects of palm oil on human health. It presents compelling evidence to counter the claims of scientists and advocates from the palm oil industry that palm oil is healthful, compared to hydrogenated vegetable oils containing trans-fatty acids, or at least neutral in regard to promoting heart disease.

2.4 Financial viability of investments in palm oil processing units in Karnataka

Brooks (1990) studied that the various methods used by the industry to measure oil retention of spent bleaching earths. These methods utilize one of the two general techniques: solvent extraction or ashing. The advantages and shortcomings of each technique are addressed utilizing laboratory generated data. Samples evaluated include

3 bleaching earths (two acid activated and one natural non-acid activated) and diatomaceous earth. In general, significant differences were observed between results generated with either technique in conjunction with the acid activated bleaching earths.

Sundaresan *et al.* (1990) studied that a commercially viable small scale palm oil extraction unit to suit the requirements of Indian planters has been designed. The unit, which could process 1 MT fresh fruit bunches (FFB) per ha, consisted of a waste fired boiler, horizontal sterilizer, rotary drum stripper, bucket elevator, digester, hydraulic press, overflow clarifier, high speed centrifuge and other accessories. All the equipment and accessories were either fabricated or procured from indigenous sources as per the design requirements. Based on the performance and yield data of oil palm plantations in India, this unit could cater for a 200-ha oil palm plantation. The unit has been in operation since it was commissioned in Dec. 1988. Data from 20 batches showed a mean value of 20% palm oil extract on FFB. It further demonstrated the feasibility of extracting high grade palm oil with less than 2% free fatty acids in the small sector. The techno-economic feasibility and design considerations of small scale palm oil extraction units in the Indian.

Weng-ChanKook and Basiron (1999) analyzed the major challenges for the Malaysian oil palm industry between 1905 and 1995 is reviewed in three phases. Current challenges for plantations are discussed with regard to technological challenges, economic challenges, social challenges and environmental challenges. It is concluded that the oil palm industry is well placed to meet these challenges.

Summugam (2000) discussed the key problems and factors determining the success of mechanization in the Malaysian oil palm industry as well as some of the agronomic and estate practices which

emphasize mechanization. It is concluded that the lack of full commitment from personnel at all levels is the main factor affecting the progress of mechanization in the oil palm industry. To ensure successful implementation, it is therefore important that management personnel be fully convinced of the economic benefits and other advantages.

Schumacher and Boland (2005) studied the source of the variance in profitability among firms is an important issue in the field of food and agribusiness economics. Data for this study were obtained from the Standard and Poor Compustat Business-Segment Reports for business segments in the US food and agribusiness sector for the period 1980-2001. The results indicate that firm effects account for the largest variance in business-segment performance within the food economy. Firm specific factors are less important for the vast majority of firms that are not the industry high or low performers. These results provide support that industry structure matters more for firms that are not high or low performers, which is characteristic of the majority of firms in an industry.

Owolarafe and Arumughan (2007) studied that the palm oil industry in Malaysia demonstrates that with a proper mix of public regulation and investment a state may achieve national control over an industry and promote the interests of poorer farmers while promoting overall growth and international competitiveness of the industry.



METHODOLOGY

CHAPTER III

METHODOLOGY

This chapter deals with the characteristic features of the area selected for the study, the methods adopted in the selection of the sample, the nature and sources of data, and the various statistical tools and techniques employed in analyzing the data.

The methodology is presented under the following headings.

3.1 Description of the study area

3.2 Sampling procedure

3.3 Nature and sources of data

3.4 Analysis of data

3.1 Description of the study area

The present study was conducted in Mysore district of Karnataka during the agricultural year 2010-2011. Prior to 2000-2001, Mysore District is subdivided into seven taluks namely Piriapatna, Hunsur, Krishnarajanagara, Mysore, Heggadadevanakote, Nanjangud and Tirumakudalu Narasipura. The present study was taken up in Mysore district.

3.1.1 Location

Karnataka State is in the south western part of India. It is mainly a tableland and an extension of Deccan plateau. It is rhomboid in shape. The state extends to 805 km from north to south and to about 283 km from east to west. The total area of the state is 192,493 sq. km.

Mysore district lies in the Southern Maiden (Southern Plateau) and it is in the southernmost part of Karnataka State. Mysore district forms a

distinct land unit, besides being a cultural entity lying between 11°30' N to 12°50' N latitudes and 75°45' E to 77°45' E longitudes. It covers an area of 6854 sq. km. that is, 3.57 per cent of the state's total geographical area. It holds the sixth place in the state in terms of the area with a population of 2.641 million in 2001.

3.1.2 Area

The Mysore district covers a total geographical area of 6, 76,382 hectares of which 62,851 hectares constitutes the forest land. The net cultivable land is 4, 86,410 hectares and of this 1, 14,010 hectares of land is irrigated. The prominent river of the district is the Cauvery. Mysore district is considered as one of the prosperous district of the state based on the development and utilization of irrigation facilities, abundance of forest wealth and silk products.

3.1.3 Agro-Climatic Conditions

The climatic conditions of the district are favourable to crops like paddy, jowar, ragi, pulses, sugarcane and tobacco. The district can be divided into two major agro-climatic zones: the Southern Dry Zone comprising of four taluks namely, Nanjangud, T. Narasipur, Mysore and K. R. Nagar and the Southern transition Zone consisting of H. D. Kote, Hunsur, and Periyapatna taluks. Soil is red sandy loam in most of the areas of the district. The annual rainfall ranges from 670 mm to 888 mm in dry zones and from about 612 mm to 1054 mm in the transition zone. The average annual rainfall of the district is 782 mm. The temperature ranges from 11°C to 38°C. Thus the climate of Mysore district is temperate with moderate variations in temperature in different seasons.

3.1.4 Temperature

Temperature influences considerably the socio-economic activities of the people in a region. The district in general enjoys cool and equable

temperatures. In the period from March to May, there is a continuous rise in temperature. April is the hottest month with the mean daily maximum temperature at 34.5°C and the daily minimum at 21.1°C. On normal days, the day temperatures during summer may exceed 38°C.

3.1.5 Natural Vegetation

The area covered by forest is 4,126.45 sq. km, 34.52 per cent of the total area, of which 3,875.6 sq. km, are reserved forest, and 250.9 sq. km. are classified as forests. Mysore has two types of forests and they are moist deciduous where the rainfall is 612 -1054 mm and dry deciduous where the rainfall is 670 – 888 mm.

3.2 Sampling procedure

3.2.1 Selection of the study area

Mysore district in Karnataka has favourable conditions for the successful cultivation of oil palm. Among the oil palm growing districts of the State, Mysore ranked third with respect to area under the crop (159 hectares) accounting for 37.06 per cent of the total area under oil palm in the State. Hence, Mysore district was selected for the study. This forms the first stage of sampling procedure.

The area under oil palm cultivation in Mysore district is around 159 ha. However, the large scale cultivation of oil palm is concentrated in Mysore taluk. Hence, Mysore district is selected purposively for the study.

In order to study the Business and Financial performance in production of oil palm, oil palm producing farmers in Mysore district were selected. In addition, to study the different procurement methods followed by oil palm processing units, case study approach was followed by selecting the Palm tech India Company existing in Mysore town.

3.2.2 Selection of the sample respondents

Oil palm cultivation is an emerging trend and practiced throughout the district. Oil palm growers were selected purposively spread over in the district. The total size of the sample selected for the study was 50 growers.

One oil palm processing unit namely Palm tech India Company operating in the study area was selected to study the financial analysis, due to non-availability of financial data viz., Income statements and Balance sheets, the analysis was confined to capital budgeting techniques of the firm.

3.3 Nature and sources of data

3.3.1 Primary data

The data required for the study was collected from the respondents by personal interview method using a pre-tested schedule. Majority of the respondents did not maintain farm records covering income and expenditure and the statement of assets and liabilities of oil palm plantation. Hence, data collected was based on the memory recall of the respondents. At the time of interview, personal bias of the sample farmers was minimized by convincing them about the genuineness of the purpose for which the data was collected. The data collected from the selected respondents were to fulfil the objectives of the study. Data was based on the entire operations of palm oil cultivation covering establishment and maintenance of oil palm plantation and the consequent costs and returns.

Similarly, the data in procurement of oil palm by the Palm tech India Company was collected by personal interview method with the help of structured schedule.

To study the growth rate of oil palm production, time series data on area and production of crude oil palm was collected for the period 1993-94 to 2009-10 from the Oil palm development project, Government of Karnataka and Palm tech India Company Mysore.

3.4 Analytical tools and techniques employed

To fulfil the specific objectives of the study, based on the nature and extent of data, the following analytical tools and techniques were adopted.

1. Cumulative Growth Rate (CGR)
2. Trend analysis
3. Capital budgeting
4. Frontier production function

3.4.1 Cumulative Growth Rate (CGR)

Cumulative growth is the total growth from the beginning to the end of the observation interval, expressed in percent. That is,

$$\text{Cumulative growth} = [(Y_t - Y_0)/Y_0]*100$$

(OR)

$$\text{Cumulative growth} = \text{LOGEST}(X1:K20)-1$$

where,

$$Y_t = \text{area} / \text{production} / \text{productivity in the year 't'}$$

3.4.2 Trend Analysis.

An aspect of technical analysis that tries to predict the future movement of a stock based on past data. Trend analysis is based on the idea that what has happened in the past gives trends an idea of what will happen in the future.

To evaluate the trend in area, production and productivity of oil palm in Mysore district of Karnataka State, the trend analysis was used.

The LINEST function returns an array of values so that it must be entered as an array formula. Rather than use the entire array, the user can return individual LINEST parameters to a cell by using the Index function, as shown in this formula to return the F value.

$$\mathbf{Trend} = \text{INDEX}(\text{LINEST}(y,x,1,1),r,c)$$

Where:

r = row of LINEST array (4 for F value)

c = column of LINEST array (1 for F value)

3.4.3 Capital budgeting

The techniques used for the financial analysis were:

1. Net Present Value (NPV)
2. Benefit-Cost Ratio (B: C Ratio)
3. Internal Rate of Return (IRR) and
4. Pay Back Period (PBP)

3.4.3.1 Net Present Value (NPV)

NPV represents the discounted value of the net cash inflows to the project. In the present study, a discount factor of 15 per cent was used to discount the net cash inflows representing the opportunity cost of capital. It can be represented by

$$\mathbf{NPV} = \sum_{n=1}^T \frac{(B_n - C_n)}{(1+d)^n} - I$$

Where,

B_n = Gross returns in years n

C_n = Costs increased in year n

T = Economic life of the project

d = Discount rate

I = Initial investment

3.4.3.2 Benefit Cost Ratio

This ratio measures the returns to a rupee of investment. It is calculated by dividing the present value of all benefits by the present value of all costs.

$$\text{BCR} = \frac{\sum_{n=1}^T (B_n - C_n) (1+d)^{-n}}{I}$$

Where,

B_n = Gross returns in years n

C_n = Costs increased in year n

T = Economic life of the project

d = Discount rate

I = Initial investment

3.4.3.3 Internal Rate of Return (IRR)

The rate of discount at which the NPV of the project is equal to zero is IRR of the project. The net cash inflows were discounted to determine the present worth following the interpolation technique.

The method of interpolation followed is as under:

$$\text{IRR} = \sum_{n=1}^T (B_n - C_n) (1+d)^{-n} - I = 0$$

Where,

B_n = Gross returns in years n

C_n = Costs increased in year n

T = Economic life of the project

d = Discount rate

I = Initial investment

3.4.3.4 Pay Back Period (PBP)

PBP represents the length of time required for the stream of cash proceeds produced by the investment to be equal to the original cash outlay, i.e., the time required for the project to pay for itself. In the present study, PBP was calculated by successively deducting the initial investment from the net returns until the initial investment is fully recovered.

$$\text{PBP} = \frac{\sum_{n=1}^T (B_n - C_n)}{I}$$

Where,

B_n = Gross returns in years n

C_n = Costs increased in year n

T = Economic life of the project

I = Initial investment

3.4.4 Economic efficiency

Frontier production function analysis

To analyse the ability of farmers to achieve the maximum realizable oil palm output (efficiency) with current level of input use under the

existing situation and given technologies, a careful examination of farm specific technical efficiency of the farmers is necessary.

Technical efficiency evaluates the farm's ability to obtain the maximum possible output from a given set of resources, while allocative efficiency explores the needed adjustments in equating the marginal revenue with the marginal cost for maximizing the profitability.

The Cobb-Douglas production function does not discriminate between technical and allocative efficiency. It ignores the problem of technical inefficiency by assuming that all the techniques of production are identical across farms and every producer is technically efficient which may not be true always.

Farrel (1957) introduced the concept of efficiency, on which the frontier production function is based and this function distinguishes technical and allocative efficiencies. Farrel proposed that efficiency should be measured in a relative sense, as a deviation from the best performance in a representative peer group.

Timmer (1971) modified the procedure in a number of ways and imposed a Cobb-Douglas type of specification on the frontier and evolved an output based measure of efficiency.

The function in log form will be

$$\ln Y = a + \sum_{i=1}^n \beta_i \ln x_i + U \quad U \leq 0 \quad \dots\dots\dots (1)$$

The above model was estimated using corrected ordinary least squares (COLS) regression. As a first step, ordinary least square (OLS) was applied to the regression equation to yield best linear unbiased

estimates of β_i coefficient. The functional form estimated in the present study was,

$$\ln(y) = \ln(a) + b_1\ln(x_1) + b_2\ln(x_2) + b_3\ln(x_3) + b_4\ln(x_4) + b_5\ln(x_5) + b_6\ln(x_6) + b_7\ln(x_7) + e \dots\dots\dots (2)$$

Where,

- Y = Gross returns
- a = Intercept
- x₁ = Area under oil palm (Ha)
- x₂ = Seedlings (Rs)
- x₃ = Fertilizer (Rs)
- x₄ = FYM ((Rs)
- x₅ = PPC (Rs)
- x₆ = Labour (Rs)
- x₇ = Others (Rs)
- b_i = Elasticities of production (i = 1 to n)
- e = Error term

Equation (2) was estimated in log form using ordinary least square. The Frontier production function was derived from the Cobb-Douglas type of production function fitted to the gross income from oil palm cultivation. The technical efficiency was worked out using potential output that can be realized from a set of inputs. The potential output is given by

$$Y^* = Y + e_m \dots\dots\dots (3)$$

Where,

- Y* = Potential gross returns that could be derived from oil palm cultivation
- Y = Estimated gross returns from oil palm cultivation.
- e_m = Highest positive error term.

The intercept estimate 'a' was then corrected by shifting the function until no residual is positive and one observation becomes zero. This was done by adding the largest error term of the fitted model to the intercept.

The new production function with a shift in the intercept in the frontier production function gives the maximum output obtainable for given level of input and it would be of the form.

$$\ln Y^* = A + \sum_{i=1}^n \beta_i \ln X_i + U \quad U \leq 0 \quad \dots\dots\dots (4)$$

(If the value of β_i is negative, then the geometric mean of i^{th} input X_i is taken instead of β_i in X_i .)



RESULTS

CHAPTER IV

RESULTS

The data were collected from the sample farmers and Palm Tech India Ltd. industry in Mysore district. The data were subjected to various statistical tools to analyze and draw meaningful conclusions. The main results of the study are presented in this chapter under the following heads.

- 4.1 Profile of sample farmers.
- 4.2 Growth of oil palm production in the State.
- 4.3 Growth of oil palm production in Mysore district.
- 4.4 Establishment cost of oil palm plantation.
- 4.5 Source and Method of irrigation.
- 4.6 Agricultural operation carried out in oil palm plantation.
- 4.7 Application of fertilizer in oil palm plantation.
- 4.8 Type of harvesting tools used by farmers.
- 4.9 Annual yield and return structure in oil palm plantation.
- 4.10 Transportation cost incurred in selling of oil palm fruits.
- 4.11 Business performance of farmers in Mysore district.
- 4.12 Perception of farmers regarding Production, Marketing and Processing of oil palm.
- 4.13 Financial viability of investment in oil palm processing industry.

4.1 Profile of sample farmers

An understanding of general characteristics of the sample farmers is expected to provide a bird's eye view of the general features prevailing in the study area. Therefore, an attempt has been made in the study to

analyze some of the important characteristics and traits of the sample farmers. The general characteristics of the respondents are presented in Table 4.1

From the table, it could can be seen that the average size of the family was about five members and the average land holding was 2-3 ha (small area holders) and four members and the average land holding was 4-5 ha (large area holders).

The oil palm varieties grown by the sample farmers are Taneera, Guinia, Cameroon, Golden oak, No.36, No.39 etc...

4.2 Growth of oil palm production in the State

Table 4.2 presents the growth of Fresh Fruit Bunches (FFB) production, crude oil production and its percentage in the State. It can be observed that both FFB, crude oil production and percentage had a positive growth rate of 12.08 per cent, 14.73 per cent and 1.71 per cent respectively for the period from 1993-94 to 2009-10.

From the table, it could also be seen that the trends of Fresh Fruit Bunches (FFB) production, crude oil production and its percentage had a positive trend of 313.6 units, 60.13 units and .026 units respectively for the period from 1993-94 to 2009-10.

Table 4.1 : Profile of sample farmers

Category	No. of Adults/ Family	No. of children/Family	Average size of family
Small	3.06	1.91	5.09
Large	2.67	1.47	4.33
Total	2.94	1.78	4.86

Source: www.dopr.gov.in

Table 4.2 : Growth of oil palm production in the State

Sl. No.	Year	Fresh Fruits Bunches harvested (Metric Tonnes)	Crude oil palm (Metric Tonnes)	Oil extraction ratio (%)
1	1993-94	237.38	28.92	12.18
2	1994-95	1197	163.85	13.68
3	1995-96	2143.68	347.91	16.23
4	1996-97	2664.9	432.35	16.22
5	1997-98	3438.86	567.21	16.49
6	1998-99	3346.95	535.51	16.0
7	1999-00	4588.54	738.76	16.1
8	2000-01	3998.13	643.7	16.1
9	2001-02	3562.59	573.58	16.1
10	2002-03	3676.65	606.65	16.5
11	2003-04	3843.09	645.64	16.8
12	2004-05	4127.34	681.01	16.5
13	2005-06	4528.259	792.44	17.5
14	2006-07	5414.908	974.68	18.0
15	2007-08	5763.683	1051.87	18.25
16	2008-09	6685.00	1220.01	18.25
17	2009-10	6386.00	1165.445	18.25

CGR	12.80 %	14.73 %	1.71 %
Trend	313.63	60.13	0.27
S.E	32.57	5.70	0.04
R- square	0.86	0.88	0.73
F-value	92.75	111.29	40.21

Source: www.dopr.gov.in

4.3 Growth of oil palm production in Mysore district

Table 4.3 presents the growth rates of Area, Fresh Fruit Bunches (FFB) production, FFB value and crude oil production in the Mysore district. It can be observed that both Area, Fresh Fruit Bunches (FFB) production, FFB value and crude oil production had a positive growth rate of 18.54 per cent, 19.90 per cent, 8.20 per cent and 22.50 per cent respectively for the period from 2001-02 to 2009-10.

From the table, it could also be seen that the trend of Area, Fresh Fruit Bunches (FFB) production, FFB value and crude oil production had a positive trend of 13.81 ha, 56.38 tonnes, 382.16 Rupees and 11.31 units of oil respectively for the period from 2001-02 to 2009-10. These trends were significant.

4.4 Establishment cost of Oil palm plantation

The establishment cost per hector of oil palm plantation was estimated, considering the quantity of inputs like fertilizers, micronutrients and labour used along with their respective market prices and wages paid by the farmers.

The details regarding the establishment cost are presented in Table 4.4. The establishment costs in oil palm plantation are classified into initial investment and maintenance cost up to bearing period. The investment cost includes cost of Land preparation; bore well, pump set, drip irrigation, fence and bunds. The per hectare total cost of establishment oil palm plantation was about Rs. 1, 95, 845.

Table 4.3 : Growth of oil palm production in Mysore district

Sl No.	Year	Area under palm (Ha.)	Quantity of FFB traded (MT)	Value of FFB (Rs in lakhs)	Crude oil extracted (MT)
1	2001-02	31.15	88	3500	14.4
2	2002-03	52.0	267	3750	44.0
3	2003-04	59.1	317	4000	54.3
4	2004-05	98.14	468	4400	78.7
5	2005-06	90.0	412	4280	68.0
6	2006-07	183.56	689	6000	120.5
7	2007-08	105.89	573	5500	103.1
8	2008-09	97.11	449	6100	93.6
9	2009-10	159.78	614	6320	112

CGR	18.54 %	19.90 %	8.20 %	22.50 %
Trend	13.81	56.38	382.16	11.31
S.E	4.33	14.56	48.38	2.184
R- square	0.59	0.68	0.89	0.79
F-value	10.13	14.99	62.38	26.81

Source: www.dopr.gov.in

It can be observed from the table that the share of investment cost in the total establishment cost was about Rs. 1, 41,500 (72.25 %). The land preparation was the major item of establishment cost (Rs. 53,000) accounting for 21.06 per cent. The next major items contributing for investment cost were bore well and pump set (Rs. 47,000) accounting for 24 per cent, fence (Rs. 31,000 accounting for 15.82 %), drip irrigation (Rs. 22,000 accounting for 11.23 %) and bund preparation (Rs. 9,000 accounting for 4.6 %), etc.

The oil palm requires three years for bearing the fruits. The average per ha maintenance cost incurred by oil palm growers during pre-bearing period was about Rs. 33,845 of which the variable cost component was Rs. 20,500 (60.57 %) and fixed cost was Rs. 13,345 (39.43 %).

The total variable cost consisted of material cost and labour cost. Material cost (Rs. 17,500) accounted for 51.70 per cent while labour cost (Rs. 3000) accounted for 8.86 per cent of the total cost of maintenance during the pre-bearing period.

Out of the total material cost of Rs. 17500, fertilizers (Rs. 10500) accounted for 31.02 per cent, followed by FYM (Rs. 6000) accounting for 17.72 per cent, micro nutrients (Rs. 1000) accounting for 2.95 per cent.

With regard to fixed costs, the major item was rental value of land (Rs.10,000) which formed 9.88 per cent followed by depreciation (2.15%), interest on fixed capital (1.14 %) and land revenue (0.02 %).

4.5 Source and Method of irrigation

The details regarding the source of irrigation are presented in Table 4.5. The irrigation source includes rainfall, Tube well, open well, canal irrigation, Tank irrigation, PVC's and Drip irrigation.

Table 4.4 : Establishment cost of Oil palm plantation

Fixed cost (Items)	Cost (Rs)/Ha	variable cost (Items)	Cost (Rs)/Ha
Land rental (depreciation, interest, revenue)	13,345	Material cost	
Land preparation	53000	Fertilizer	10500
Fence	31000	FYM	6000
Bunding	9000	Labour charges	3000
Borewell and pumpset	47000	Micro nutrients	1000
Drip irrigation	22000		
TOTAL	175345	TOTAL	20500

Table 4.5 : Source and Method of irrigation

Source of Irrigation	Small holdings (1-3 Ha) per cent	Large holdings (3-5 Ha) per cent	Per cent Share
Rain fed (ha)	0	0	0
Tube well	91.18	93.56	92.37
Open well	7.11	4.44	5.77
Canal Irrigated	1.71	2.00	1.85
Method of Irrigation	Small holdings (1-3 Ha) per cent	Large holdings (3-5 Ha) per cent	Per cent Share
Canal Irrigated	14.71	20.00	17.35
Through PVC	38.23	13.33	25.38
Drip irrigation	47.06	66.67	57.26

It can be observed from the table that the area covered by rainfall is zero per cent and most of the farmers are highly depend on Tube well (92.37 %) and open well (5.77 %).

From the above table it can also be observed that the farmers likely prefer drip irrigation (57.26 %) for the method of irrigating palm are less depend on PVC's (25.38 %) and some of the farmers are very less depend on canal irrigation(17.35 %).

4.6 Agricultural operation carried out in oil palm plantation

The details of maintenance during the bearing period of oil palm plantation are presented in Table 4.6. It can be observed from the table that the basin preparation and weeding is done both by small and large area holding farmers it accounted for 100 per cent but none of the farmers have applied weedicide.

4.7 Application of fertilizer in oil palm plantation

The details of fertilizer application for oil palm plantation are presented in Table 4.7. It can be observed from the table that the farmers who have applied FYM accounts for 58.57 per cent followed by inorganic fertilizers and chemicals (8.59%), Neem cake (3.16 %), Boron (0.09 %) and other-nutrients (0.43 %), etc.

4.8 Type of harvesting tools used by farmers

Harvesting tool used by the farmers in oil palm plantation is shown in the table 4.8. It can be observed that farmers use both chisel (49.95 %) and sickle (50.05 %) for harvesting of fruits. But large area holding farmers use only chisel (93.33 %) for harvesting.

Table 4.6 : Agricultural operation carried out in oil palm plantation

Operations carried out in field	Small holdings (%)	Large holdings (%)	Per cent Adopted
Basin preparation	100.00	100.00	100.00
Weeding of basins	100.00	100.00	100.00
Application of Weedicides	0	0	0

Table 4.7 : Application of fertilizer in oil palm plantation

Types	Small holdings (Kgs/palm)	Large holdings (Kgs/palm)	Grand Total (Kgs/palm)
Inorganic fertilizers & chemical	7.91	10.13	8.59
Organic manure Qty (FYM)	51.32	75.00	58.57
Neem cake	2.71	4.20	3.16
Boron	0.07	0.15	0.09
Others	0.35	0.60	0.43

Table 4.8 : Type of harvesting tools used by farmers

Data	Small holdings (%)	Large holdings (%)	Per cent share
Chisel	6.67	93.33	49.95
Sickle	69.11	30.99	50.05

4.9 Annual yield and return structure in oil palm plantation

The per hectare yield of oil palm of sample farmers are presented in Table 4.9. The yield of oil palm plant varied with the age. During the first second and third year the yield was zero. During fourth year, the yield per hectare was 8 tons and the gross returns were Rs. 44,000 while the net returns were Rs. 25,000. During fifth year, the yield increased to ten 10 per hectare and the gross and net returns were Rs. 55,000 and Rs. 32,000 respectively. From 15th year onwards up to 25th year, the average yield was 22 tons per hectare and the gross and net returns were Rs.1, 36, 000 and Rs. 1, 15,000 respectively.

4.10 Transportation cost incurred in selling of oil palm fruits

Table 4.10 indicates the transportation details involved in transportation of FFB to nearest collection centre. The average distance traveled by the farmers is 4.9 kms and cost is Rs. 269.40 for one trip.

From the table it can be observed that oil palm farmers don't use any packing material and the labour cost involved in loading and unloading of fruits is Rs.61.63 for one trip.

Table 4.9 : Annual Yield and return structure in oil palm plantation

Year	Yield (Tonnes/ha)	Gross income (Rs)	Net income(Rs)
1	0	0	-84,000
2	0	0	-12000
3	0	0	-14000
4	8	44000	25000
5	10	55000	32000
6	13	72000	56000
7	16	88000	62000
8	18	110000	90000
9	20	126000	105000
10	20	126000	105000
11	21	132000	110000
12	21	132000	110000
13	21	132000	110000
14	22	136000	115000
15	22	136000	115000

Table 4.10 : Transportation cost incurred in selling of oil palm fruits

Data	Small holding	Large holding	Average
Distance from plantation to collection center (km).	4.02	6.93	4.91
Cost of transportation (Rs)	232.35	353.33	269.38
Labor Cost (Rs)	52.94	81.33	61.63
Quantity loss/quintal while loading and unloading (Rs)	0	0	0
Total	289.31	441.59	335.92

4.11 Business performance of farmers in Mysore district

Efficiency of the oil palm farmers in Mysore district is are represented in the Table 4.11. It is analyzed by applying Frontier production function by taking dependent variable (income) and independent variables such as labour cost, operation cost, fertilizer cost and year of plantation. In order to know the efficiency, eighteen progressive farmers are taken into consideration whose plantation is more than 5 years old.

From the table it can be observed that the farmer whose efficiency depends on his income only from the oil palm is 62.5 per cent in more than 9 year old plantation.

4.12 Perception of farmers regarding Production, Marketing and processing of oil palm

The perception of farmers in production of oil palm is by giving subsidy. From the above table 4.12 it was observed that most of the farmers agree that oil palm production and area can be increased by giving subsidy (73 %).

Entry of private companies made marketing risk free to the farmers and reduces their cost and effort in finding perfect market place to sell the produce (100 %).

From the table it can also be observed that Government officials and private company employees are motivating to grow oil palm and compete among the importing countries in order to get better yield and favorable prices, this statement was fully endorsed by the farmers (100 %).

Table 4.11 : Business performance of farmers in Mysore district

Age of Plantation	Income efficiency of farmer (%)
> 9	62.5
5-8	30.7
1-4	6.8

Table 4.12 : Perception of farmers regarding Production, Marketing and Processing of oil palm

Source of preference for palm cultivation	Percent (%)
Presence of subsidy	73
Absence of subsidy	27
Organized marketing	100
Motivation from Processors and Government	100
Lack of competition from others and favorable prices	100

4.13 Financial viability of investment in oil palm processing Industry

To evaluate the financial viability of investment on oil palm industry, the capital budgeting techniques namely Net Present Value (NPV), Benefit-Cost Ratio (BCR), Internal Rate of Return (IRR) and Payback Period (PBP) were used. While estimating the future net cash flows, it was assumed that both input and output prices would increase by the same proportions. The investments are used to know the financial viability of the industry. The results are presented in Table 4.13.

4.13.1 Net Present Value

The cash flows were discounted at the cost of capital. The net present value was 1.243. Oil palm industry's net present value is positive, it can be interpreted that the investment on oil palm industry is financially viable.

4.13.2 Benefit-Cost Ratio

This criterion indicates the returns per rupee invested on oil palm industry. The benefit cost ratio was 2.62. As oil palm industry had a benefit cost ratio of more than unity, it can be interpreted that the investment on oil palm industry is financially viable.

4.13.3 Internal Rate of Return (IRR)

This criterion measures the rate of returns that can be earned by investing on oil palm industry. It also considers the reinvestment opportunities which are absent in other techniques. The internal rate of return was 19 per cent, which is much more remunerative when comparing to any agro industry standard. The investment on oil palm industry was found to be feasible.

4.13.4 Pay Back Period (PBP)

The time required to recover the initial capital investment made is explained by payback period in a project. It was found that the payback period for investment like 130 lakhs was 8 years,

From above all the results we can conclude that the investment of 130 lakhs will give NPV 1.243, B.C. Ratio 2.62, and IRR 19 per cent and pay back period of 8 years. The results show the sound economic viability factors of palm oil processing organization.

Table 4.13 : Financial viability of investment in oil palm processing Industry

Period	Investment (Lakhs)	IRR (%)	NPV	B:C RATIO (Rs)	PBP (years)
20 years	130	19	1.243	2.62	8



DISCUSSION

CHAPTER V

DISCUSSION

The results of the investigation presented in the preceding chapter are discussed in detail in this chapter. The main focus here is to throw light on some of the factors responsible for the major trends observed in the findings. This kind of analysis is done to identify such of the business and financial measures that can be implemented to overcome the constraints encountered by oil palm farmers and industries. Keeping the objectives of the study in view, the results are discussed under the following headings.

- 5.1 Profile of sample farmers.
- 5.2 Growth of Oil palm production in the State.
- 5.3 Growth of oil palm production in Mysore district.
- 5.4 Establishment cost of Oil palm plantation.
- 5.5 Source and method of irrigation.
- 5.6 Agricultural operation carried out in oil palm plantation.
- 5.7 Application of fertilizer in the oil palm plantation.
- 5.8 Type of harvesting tools used by farmers.
- 5.9 Annual yield and return structure in oil palm plantation.
- 5.10 Transportation cost incurred in selling of oil palm fruits.
- 5.11 Business performance of farmers in Mysore district.
- 5.12 Perception of farmers regarding Production, Marketing and Processing of oil palm.
- 5.13 Financial viability of investment in oil palm processing industry.

5.1 Profile of sample farmers

The general characteristics of the farmers in the study area are presented in Table 4.1. From the table, it could be seen that the average size of the family was about five members and the average land holding was 2-3 ha (small area holders) and four members and the average land holding was 4-5 ha (large area holders). Growing oil palm being a high investment enterprise has been perceived by these respondents mostly due to their income. This might have enabled the respondents to allocate the manageable size of the area under palm plants to get higher returns over other crops.

The oil palm varieties grown by the sample farmers are all exported varieties. Viz; Tanera, Golden Oak, No.36, No.39 etc...

5.2 Growth of Oil palm production in the State

To analyse the growth in FFB production, crude oil production and its percentage in the State, data was collected regarding the same from oil palm development project (Government of Karnataka undertaking). Since, data regarding the FFB production, crude oil production and its percentage was available only for the period from 1993-94 to 2009-10, the growth rates were estimated for this period.

From Table 4.2, it can be observed that the FFB production, crude oil production as well as its percentage in the State experienced a positive growth rate. The Oil palm development project of the State aims at setting up of more number of plantations under oil palm in the State. As a result of that the oil palm plantations is coming up in big way and five oil palm industries have been set up in the State. This has led to the expansion of FFB and crude oil production in the state.

5.3 Growth of oil palm production in Mysore district

To analyse the growth in growth rates of Area, Fresh Fruit Bunches (FFB) production, FFB value and crude oil production in the Mysore district. Data was collected regarding the same from Palm tech India ltd. Since, data regarding the Area, Fresh Fruit Bunches (FFB) production, FFB value and crude oil production had a positive growth rate of 18.54 per cent, 19.90 per cent, 8.20 per cent and 22.50 per cent respectively for the period from 2001-02 to 2009-10.

From the table 4.3, it could also be seen that the growth rates of Area, Fresh Fruit Bunches (FFB) production, FFB value and crude oil production had a positive trend. The main aim of palm tech India ltd is to increase the area of palm plantation and to extract the large amount of crude oil in order to meet the domestic demand by controlling the import on oil palm from other countries.

5.4 Establishment cost of Oil palm plantation

The investment pattern in oil palm plantation is similar to the one found in any other plantation or orchard. Heavy investment is needed for establishing a oil palm plantation. The cost of establishing oil palm plantation up to bearing included not only the cost incurred in the zero year (that is at the time of planting) but also the cost incurred in maintaining the plants upto three year of planting. From fourth year onwards the plants start bearing (Table No. 4.4). The per hectare total cost of establishment of oil palm plantation was about Rs. 1, 95,845.

For establishing oil palm plantation investment has to be made on bore well, pump set, land preparation, drip irrigation system, manures, fertilizers, pit marking, digging of pits, filling pits with FYM & fertilizers, planting of seedling, fence and bunds.

It can be observed from the table that the share of investment cost in the total establishment cost was about Rs.1, 41,500 (72.25 %). This was mainly because of the high cost of land preparation (21.06 %). The next major cost on borewell and pumpset (24 %), fence (15.82 per cent), drip irrigation (11.23 %) and bund preparation (4.6 %) were the other major items of establishment cost.

During the establishment period of one year, farmers incurred costs to maintain oil palm plantation. The maintenance cost incurred during this period was about Rs. 33,845 per hectare of which variable cost was Rs. 20,500 and fixed cost was Rs. 13,345

The total variable cost consisted of material cost and labour cost. Material cost (Rs. 17,500) accounted for 51.70 per cent of total cost of maintenance during the pre-bearing period while labour cost (Rs. 3000) accounted for 8.86 per cent.

Out of the items of material cost, fertilizers accounted for 31.02 per cent as the oil palm plants needs regular application of the recommended dose of fertilizers which is essential for keeping the plants healthier.

5.5 Source and method of irrigation

Oil palm plants requires huge amount of water. One plant consumes minimum 150-200 litres of water a day depending age of plants. The details regarding the source of irrigation are presented in Table 4.5 The irrigation source includes rainfall, Tube well, open well, canal irrigation, Tank irrigation, PVC's and Drip irrigation.

It can be observed from the table that the area covered by rainfall is zero per cent and most of the farmers are highly depend on Tube well (92.37 %) and open well (5.77 %). This is due to environmental conditions. Palm plants mainly grown in hot temperature and in dry

areas where annual rain fall is 150-180mm. So, farmers purely depend on Tube well for irrigating the palm plants.

As we compared to the area covered by Tank source, it is high in large area holding (100 %) because most of the oil palm farmers are rich in other source of income and in small area holding accounts to less when compared to large area holding. It can also be observed that the farmers likely prefer drip irrigation(57.26 %) for the method of irrigating palm are less depend on PVC's (25.38 %) and some of the farmers are very less depend on canal irrigation(17.35 %).

5.6 Agricultural operation carried out in oil palm plantation

Agricultural operations are very important in economic life span of oil palm plantation. If it is carried out in a proper way, than one can get better yield from the plants. The most important practice in oil palm plantation is basin preparation and weeding.

From the table 4.6 we can observe that Farmers don't use any weedicide, this is because of shade covered by palm plants. After palm plants reached the height of 2-3meters it will not allow sun light to fall on ground, from these weeds will not grow in the plantation. Small weeds are plucked by farmers in hands or in chisel during the rainy season.

5.7 Application of fertilizer in oil palm plantation

Oil palm fruit yield can be increased by applying FYM, fertilizers and other nutrients. From the table 4.7 it can be observed that the FYM accounts for 58.57 per cent, it leads to disease free fruit bunches and one can maintain the plantation very healthy. Fertilizers and chemicals accounts 8.59 per cent, Neem cake 3.16 per cent, Boron 0.09 per cent

and other-nutrients 0.43 per cent. Palm plants need more than 80 kgs of FYM when it starts yielding after four years.

5.8 Type of harvesting tools used by farmers

Harvesting fruits is one of the problems in oil palm plantation after plants reaches an height above 15 feet. Palm bunches got thorn, it is difficult to pick bunches in hands and more over palm fruit bunches are heavy in weight, and one bunch can even reach upto 30-35 kgs. So from the table 4.8, it can be observed that most of the farmer's uses sickle (50.05 %) and chisel (49.95 %) for harvesting of fruits.

5.9 Annual yield and return structure in oil palm plantation

The yield of oil palm varied with the age of plant (Table 4.9). During the first, second and third year, the yield was zero. During fourth year, the yield per hectare was eight tons and the gross returns were Rs. 44,000 while the net returns were Rs.25, 000. During fifth year, the yield increased to 10 tons per hectare and the gross and net returns were Rs. 55000 and Rs. 32,000 respectively. From tenth year onwards it has the potential to yield more than 20. To increase the constant yield of 22 tons per hectare is maintained in subsequent years resulting in the gross and net returns of Rs. 1, 36,000 and Rs. 1, 15,000 respectively.

5.10 Transportation cost incurred in selling of oil palm fruits

Transportation details involved in carrying of FFB to nearest collection centre. From the table 4.10 it can be observed that the average distance travelled by the farmers is 4.9 kms and cost is Rs. 269.40. Most of the farmers use tractor (69 %) for their transportation.

From the above table it can be observed that oil palm farmers don't use any packing material. It is because of due to bulk quantity of bunches. The labour cost involved in loading and unloading of fruits is

Rs.61.63 for one trip. Here farmers only unload the bunches with the help of tractors, no extra labour is required for unloading and carrying of bunches.

5.11 Business performance of farmers in Mysore district

It is analysed by Frontier production function by taking dependent variable (income) and independent variables such as labour cost, operation cost, fertilizer cost and year of plantation. In order to know the efficiency, eighteen progressive farmers are taken into consideration whose plantation is more than 5 years old.

From the table 4.11 it can be observed that the farmer whose efficiency depends on his income only from the oil palm is 62.5 per cent in more than 9 years old plantation.

5.12 Perception of farmers regarding Production, Marketing and Processing of oil palm.

Perception of farmers in production of oil palm by giving subsidies. From the above table 4.12 it can be observed that most of the farmers agree that oil palm can be increased by giving subsidy (73 %), disagreed (27 %). Here farmers are showing interest in growing oil palm due to longer yield and return. Farmers are getting better prices for their produce. Any farmer maintains the palm plantation well then he will get the subsidy benefit from the Government of Karnataka for bore well, drip irrigation, harvesting tools etc.

Intervention of private companies made marketing risk free to the farmers and reduces their cost and effort in finding perfect market place to oil palm (100 %).

From the table it can also be observed that Government officials and private company employees help farmers to motivate to grow oil

palm and compete among the importing countries in order to get better yield in their plantation.

5.13 Financial viability of investment in oil palm processing industry

Oil palm is a plantation crop, once established continues to bear upto 25 years. The returns are expected only after three year of planting. Till then, heavy investment is required. Once, the resources are committed retrieval is impossible. Further, this needs vast resources and the income is spread over a number of years. Therefore, costs and returns have to be analyzed carefully to test the worthiness of investment on oil palm industry. Hence, to evaluate the financial viability of investment on oil palm industry, the capital budgeting techniques namely Net Present Value (NPV), Benefit - Cost Ratio (BCR), Internal Rate of Return (IRR) and Payback Period (PBP) were used. The investment is used to know the financial viability of the industry.

5.13.1 Net Present Value

The annual net cash flows were discounted at 19 per cent to obtain the present value of net benefits from oil palm industry. It can be observed from Table 4.13 that the NPV of investment on oil palm industry was about Rs. 130 lakhs. Since the NPV is positive, the investment on oil palm industry is financially viable.

5.13.2 Benefit-Cost Ratio

This criterion indicates the returns per rupee invested on oil palm industry. The benefit cost ratio was 2.62. As oil palm industry had a benefit cost ratio of more than unity, it can be concluded that the investment on oil palm industry is financially viable.

5.13.3 Internal Rate of Return (IRR)

This criterion measures the rate of returns that can be earned by investing on oil palm industry. It also considers the reinvestment opportunities which are absent in other techniques. The internal rate of return was 19 per cent. Since the IRR is greater than the opportunity cost of capital, investment on oil palm industry is financially viable.

5.13.4 Pay Back Period (PBP)

The time required to recover the initial investment made is explained by PBP of a project. It was found that the payback period was 8 years.

Though, oil palm industry requires substantial amount of investment based on the value of PBP it can be inferred that the investment could be recovered in a short period of time.



**SUMMARY &
POLICY IMPLICATIONS**

CHAPTER VI

SUMMARY AND POLICY IMPLICATIONS

Karnataka is one of the important States growing oil palm. Five irrigated command areas are considered as the important oil palm growing regions in Karnataka. Oil palm cultivation requires heavy investment of capital as well as time to get returns. In addition, to produce oil palm, the farmers have to put in hard efforts and high investment at the time of establishment of palm plantation. Nevertheless, the oil palm growers are always found to suffer due to high price fluctuations at international market. To overcome this problem, there is need for increasing productivity, primary value addition of oil palm at farm gate and formulation and promotion of innovative oil palm products in both the domestic and international markets. One such important product of oil palm is crude oil palm. In Karnataka, there are plenty of opportunities for production of crude oil palm. The climatic conditions in the State are best suited for the production of oil palm and suited for crude oil making. There is a very good demand for crude and refined oil at domestic and international markets.

In Karnataka, more than 6 varieties of exotic oil palm plants are used for producing crude oil Viz., Tanera, Guinia, Cameroon, Golden oak, No36 and No39. These varieties are mostly grown in Mysore, Coorg, Shimoga, Hassan districts. Karnataka is the fourth largest producer of crude oil palm, next to Maharashtra. The important factors contributing for increasing consumption of oil is its relatively inexpensive price and promotion of oil as a healthier product. The price recovery of crude oil is Rs. 56 per kg to the farmer, who harvests around 22 tons per hectare, Whereas the refined oil cost Rs.70 to Rs.75 per kg at shelf. Most of the varieties grown in the state require less water and can be grown organically to recover premium price.

India with its diversity of soils and climate is advantageously placed for producing practically all varieties of tropical and sub-tropical fruits. A oil palm (*Elaeis*) is one of such fruits. It belongs to the family *Arecaceae*. The fruit is rich in energy giving sugars and some useful minerals like phosphorus, iron and vitamins like vitamin B₁ and vitamin B₂.

In Karnataka, oil palm is grown on commercial scale and occupies about 2.50 lakh ha. in the 5 irrigation command areas and crude oil production of 1165.44MT. The pre-dominant oil palm growing districts in Karnataka are Mysore, Shimoga, Hassan, Chamarajnagar, Coorg, Haveri, Bellary, Koppal, Raichur district.

In Mysore district oil palm plantation is being grown on commercial scale. The area under oil palm oil palm in the district is 160 hectares, with production of 614 tons of FFB and crude oil production of 112MT.

The research study is incomplete in the area of financial analysis due to paucity of data both at farm level and also at industry level. The accurate cost figures of establishment and operating cost and other input data required for analysis was collected from the respondents by using schedules and personal interview. However the respondents were kind enough to provide even minute data known to their best of their knowledge and recalling ability.

The specific objectives of the study were as follows

1. To document growth of oil palm farms in the state
2. To analyze business and financial performance of oil palm farms in the state.

3. To access perception of oil palm farmers in production, processing and marketing of oil palm in the state.
4. To study the financial viability of investments in oil palm processing units in Karnataka.

Selection of sample and tools employed

Oil palm cultivation is practiced throughout the Mysore district. with the large scale cultivation of oil palm is concentrated mainly at Mysore taluk. The area under oil palm plantation in Mysore district is about 165 ha. Hence, Mysore district was selected purposively for the study.

The primary data on socio-economic characteristics of oil palm growers, cost and returns, business performance and investment on oil palm was obtained from fifty oil palm growers with the help of a pre-tested schedule. In addition, the backward linkage in procurement of crude oil palm by the Palm Tech India Company was collected by personal interview method with the help of a structured schedule. In this regard, a case study approach was employed by selecting two oil palmries present in the study area.

Frontier production function and capital budgeting techniques were used to for analyze the oil palm cultivation to guide the investment decision on oil palm unit, Compound Growth Rates and Trend analysis were used to analyze the growth of area and production of oil palm in the State.

This research study is modest attempt to find out constraints faced by the oil palm growers, their perception towards the crop and government patronage. The will through light on major issues faced by

the stake holders to take proactive policy decisions to assist all the stake holders of this industry.

Major findings of the study

1. All the selected sample farmers had fairly long standing experience in oil palm cultivation. The average size of palm plantation family ranges between four to five members.
2. The growth rate analysis of area and production of oil palm plantation as well as crude oil palm in Karnataka showed positive in both area and production.
3. The cost of establishment per hectare of oil palm plantation is Rs.1, 95,845 of which initial investment constitutes about 72 per cent and maintenance cost during gestation period accounts 28 per cent. It was observed that the average economic life span of palm plantation is 30 years. The farmers start to harvest the viable yield from seventh year onward, though palm starts yielding from fourth year with moderate returns. The peak yielding years are between 10th to 25th years of plant life and continue up to thirty years of its age.
4. The yield of oil palm depends on the age of plant. During the first, second and third year, the yield was zero. During fourth year, the yield per hectare was eight tons and the returns were Rs. 44,000. During fifth year, the yield increases to ten tons per hectare and the returns estimated at Rs. 55,000. From eleventh year to 30th year, the average yield accounts around 22 tons per hectare and the returns Rs. 1, 36,500.
5. Backward linkage of the crude oil palm industry involves many stages, viz., harvesting of the oil palm, transportation, processing and packaging.

6. The major source of irrigation in the oil palm plantation is through Tube wells, it accounts for 92.37 per cent and open well 5.77 per cent. Over 50% of the farmers are adopting drip for irrigating palm plantation and less dependent on Pipeline and canal irrigation (25.38% and 7.35%) respectively.
7. The farmers income efficiency depend on oil palm cultivation varies from farmer to farmer, which is mainly depend on land holding and age of plantation. It was observed that, more than nine years old oil palm plantation getting 62.5 per cent of income only from oil palm.
8. The perception of farmers for taking up of oil palm cultivation is mainly because substantial subsidy (73%) component.
9. Majority of the respondent farmers use organic fertilizer to their plantations. About 58 per cent of the farmers use organic fertilizers like FYM, Neem cake 0.5 per cent. Where has 8.59 per cent of the farmers use inorganic fertilizers and others have no specific fertilizer application pattern.

Policy implications

Based on the research findings of the study, the following policy implications are drawn.

1. As the initial investment in establishing oil palm plantation is relatively high, the farmers interested in establishing oil palm plantation need to be provided with the required financial assistance from financial institutions and Government in the form of subsidy and low interest long term loan.
2. The new oil palm policy is very much favorable towards progressive farmers in providing subsidy. It is suggested that the subsidy shall extend to all potential farmers, so that many farmers can take decision to grow oil palm.

3. The processors and farmers are not aware of benefits given by the government, therefore efforts to be initiated to disseminate the features of this policy to facilitate wider participation of both farmers and processors.
4. The edible oil industry gained a national importance for the last two decades with an aim to attain self-sufficiency in edible oil production. This mission the government is encouraging to achieve sustainable growth in oil production through various schemes. This is further emphasized through this study.
5. The oil palm schemes will help to save most valuable foreign exchange, long term sustainability and self-reliance of edible oil.
6. The oil palm processors are facing the problem of availability of trained workforce. The state government should speedily implement the policy of establishing training programmes to scientifically handle post harvest practices of fruit bunches.
7. There is a wide fluctuation in the procurement price of raw palm (FFB) which is not motivating the farmers to take up this profitable venture. There is an urgent need to find an appropriate solution to fix pre-harvest price by including all the players of this industry under the leadership of Oil Palm Development Programme. The option of contract farming also is explored to provide remunerative price to growers.
8. The productivity of fresh fruit bunch (FFB) is relatively low. There is scope for improving the palm yield. This calls for effective extension and training programmes by Oil Palm Development Programme and the processing industry.



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CHAPTER VIII

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