

**BUSINESS PERFORMANCE OF FRESH FRUIT
PROCESSING PVT. LTD.: A CASE STUDY IN SIRSI
TALUK OF UTTARA KANNADA DISTRICT**

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GKVK, BANGALORE - 560 065**

2019

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*Project Report submitted to the
University of Agricultural Sciences, Bangalore
In partial fulfilment of the requirements for the degree of*

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SEPTEMBER, 2019



*Affectionately
Dedicated to
My Beloved
Parents, Brother
and My Guide*

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

CERTIFICATE

This is to certify that the Project Report entitled “**BUSINESS PERFORMANCE OF FRESH FRUIT PROCESSING PVT. LTD: A CASE STUDY IN SIRSI TALUK OF UTTARA KANNADA DISTRICT**” submitted by **Ms. SHREENIDHI GOPAL HEGDE, ID.No. MBAL 7026**, in partial fulfilment of the requirements of the degree of **MASTER OF BUSINESS ADMINISTRATION (AGRIBUSINESS MANAGEMENT)** to the University of Agricultural Sciences, Bangalore is a *bona fide* record of research work done by her during the period of her study in this University, under my guidance and supervision and the project work has not previously formed the basis of the award of any degree, diploma, associateship, fellowship or other similar titles.

Bangalore


September, 2019


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Bengaluru

September, 2019

(Shreenidhi Gopal Hegde)

**BUSINESS PERFORMANCE OF FRESH FRUIT PROCESSING PVT.
LTD: A CASE STUDY IN SIRSI TALUK OF UTTARA KANNADA
DISTRICT**

SHREENIDHI GOPAL HEGDE

ABSTRACT

The present study was conducted to study the business performance of Fresh Fruit Processing Pvt. Ltd. situated in Sirsi taluk of Uttara Kannada district. Primary data was collected from 30 farmers, 5 wholesalers, 5 retailers, 30 consumers and secondary data was collected from audit report of Fresh Fruit Processing Pvt. Ltd. Descriptive statistics, supply chain mapping, financial ratio analysis and Garrett's ranking techniques were used to analyze the data. The results revealing that the processing firm procured fruits from wholesalers constitute about 68.37 per cent followed by farmers (31.63%). Among the fruits, pineapple, papaya, muskmelon, grapes and cherry were procured for processing and processed fruit products like canned fruit products, fruit cocktail, pineapple slice, pulp, pineapple juice and pineapple titbits with a quantity of 425 tonnes and earned Rs.1,95,45,000 per month. The Compound Annual Growth Rate of net sales of Fresh Fruit Processing Pvt. Ltd. over the years was 8 per cent. Financial ratios indicated that the liquidity position of Fresh Fruit Processing Pvt. Ltd was good so that it can meet all current financial obligations. The net profit margin ranging from 2.7 to 4.77 over the years shown that still there is a scope for further improvement in Fresh Fruit Processing Pvt. Ltd. Major constraints faced by Fresh Fruit Processing Pvt. Ltd. were irregular supply of electricity, wastage during transportation and handling. Hence, there is a great need for conducting contact meeting with producers and processors to encourage contract farming so that producers will get more farm income.

September, 2019
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Major Advisor

ಉತ್ತರ ಕನ್ನಡ ಜಿಲ್ಲೆಯ ಶಿರಸಿ ತಾಲೂಕಿನ ಫ್ರೆಶ್ ಫ್ರೂಟ್ ಪ್ರೊಸೆಸಿಂಗ್ ಪ್ರೈ. ಲಿಮಿಟೆಡ್‌ನ ವ್ಯವಹಾರಿಕ
ಅಧ್ಯಯನ

ಶ್ರೀನಿಧಿ ಗೋಪಾಲ ಹೆಗಡೆ

ಸಾರಾಂಶ

ಉತ್ತರ ಕನ್ನಡ ಜಿಲ್ಲೆಯ ಶಿರಸಿ ತಾಲೂಕಿನ ಫ್ರೆಶ್ ಫ್ರೂಟ್ ಪ್ರೊಸೆಸಿಂಗ್ ಪ್ರೈ. ಲಿಮಿಟೆಡ್‌ನ ವ್ಯವಹಾರ ಕಾರ್ಯಕ್ಷಮತೆಯನ್ನು ವಿಶ್ಲೇಷಿಸಲು ಪ್ರಸ್ತುತ ಅಧ್ಯಯನವನ್ನು ನಡೆಸಲಾಯಿತು. 30 ರೈತರು, 5 ಸಗಟು ವ್ಯಾಪಾರಿಗಳು, 5 ಚಿಲ್ಲರೆ ವ್ಯಾಪಾರಿಗಳು, 30 ಗ್ರಾಹಕರುಗಳಿಂದ ಸಂಗ್ರಹಿಸಿದ ಪ್ರಾಥಮಿಕ ದತ್ತಾಂಶವನ್ನು ವಿಶ್ಲೇಷಿಸಲು, ವಿವರಣಾತ್ಮಕ ಅಂಕಿ ಅಂಶಗಳು, ಪೂರೈಕೆ ಸರಪಳಿ ಮತ್ತು ಗ್ಯಾರೆಟ್ ಶ್ರೇಯಾಂಕಗಳನ್ನು ಬಳಸಲಾಯಿತು ಮತ್ತು ಫ್ರೆಶ್‌ಫ್ರೂಟ್ ಪ್ರೊಸೆಸಿಂಗ್ ಪ್ರೈ. ಲಿ.ನ ಲೆಕ್ಕಪರಿಶೋಧನಾ ವರದಿಯಿಂದ ಸಂಗ್ರಹಿಸಲಾದ ದ್ವಿತೀಯ ದತ್ತಾಂಶಗಳನ್ನು ವಿಶ್ಲೇಷಿಸಲು ಆರ್ಥಿಕ ಅನುಪಾತವನ್ನು ಬಳಸಲಾಯಿತು. ಸಂಸ್ಕರಣಾ ಸಂಸ್ಥೆಯು ಹಣ್ಣುಗಳನ್ನು ಶೇಕಡಾ 68.37 ರಷ್ಟು ಸಗಟು ವ್ಯಾಪಾರಿಗಳಿಂದ ಮತ್ತು ಶೇಕಡಾ 31.63 ರಷ್ಟು ರೈತರಿಂದಲೂ ಖರೀದಿಸುತ್ತಿದ್ದಾರೆ. ಸಂಸ್ಕರಣೆಗಾಗಿ ಅನಾನಸ್, ಪಪಾಯ, ಕರಬೂಜ, ದ್ರಾಕ್ಷಿ ಮತ್ತು ಚೆರಿ ಹಣ್ಣುಗಳನ್ನು ಖರೀದಿಸುತ್ತಿದ್ದಾರೆ. ಫ್ರೆಶ್‌ಫ್ರೂಟ್ ಪ್ರೊಸೆಸಿಂಗ್ ಪ್ರೈ. ಲಿಮಿಟೆಡ್ ತಿಂಗಳಿಗೆ 425 ಟನ್‌ಗಳಷ್ಟು ಹಣ್ಣಿನ ಉತ್ಪನ್ನಗಳಾದ ಪೂರ್ವಸಿದ್ಧ ಹಣ್ಣಿನ ಉತ್ಪನ್ನಗಳು, ಹಣ್ಣಿನ ಕಾಕ್ಟೈಲ್, ಅನಾನಸ್ ಸ್ಲೈಸ್, ತಿರುಳು, ಅನಾನಸ್ ಜ್ಯೂಸ್ ಮತ್ತು ಅನಾನಸ್ ಟೆಟ್‌ಬಿಟ್‌ಗಳನ್ನು ಸಂಸ್ಕರಿಸಿ ಒಟ್ಟು ತಿಂಗಳಿಗೆ ರೂಪಾಯಿ 1,95,45,000 ಆದಾಯ ಗಳಿಸುತ್ತಿದ್ದುದು ಕಂಡುಬಂದಿತು.. ಫ್ರೆಶ್‌ಫ್ರೂಟ್ ಪ್ರೊಸೆಸಿಂಗ್ ಪ್ರೈ. ಲಿಮಿಟೆಡ್‌ನ ನಿವ್ವಳ ಮಾರಾಟದ ವಾರ್ಷಿಕ ಬೆಳವಣಿಗೆ ದರ 8 ರಷ್ಟಿದೆ. ಆರ್ಥಿಕ ಅನುಪಾತಗಳು ಫ್ರೆಶ್‌ಫ್ರೂಟ್ ಪ್ರೊಸೆಸಿಂಗ್ ಪ್ರೈ. ಲಿಮಿಟೆಡ್‌ನ ಉತ್ತಮ ದ್ರವ್ಯತೆ ಸ್ಥಿತಿಯನ್ನು ಸೂಚಿಸಿದೆ. ಇದರಿಂದಾಗಿ ಅದು ಪ್ರಸ್ತುತ ತನ್ನ ಎಲ್ಲಾ ಹಣಕಾಸಿನ ಜವಾಬ್ದಾರಿಗಳನ್ನು ಪೂರೈಸುತ್ತಿದೆ ಮತ್ತು ದಾಸ್ತಾನುಗಳನ್ನು ಮಾರಾಟವಾಗಿ ಪರಿವರ್ತಿಸುವ ಸಾಮರ್ಥ್ಯವನ್ನು ಹೊಂದಿದೆ. ಫ್ರೆಶ್‌ಫ್ರೂಟ್ ಪ್ರೊಸೆಸಿಂಗ್ ಪ್ರೈ. ಲಿಮಿಟೆಡ್‌ನ ನಿವ್ವಳ ಲಾಭಾಂಶವು ಕಳೆದ ವರ್ಷಗಳಲ್ಲಿ 2.7 ರಿಂದ 4.77 ರಷ್ಟಿದ್ದು ಮತ್ತಷ್ಟು ಸುಧಾರಣೆಗೆ ಅವಕಾಶವಿದೆ ಎಂದು ತೋರಿಸಿದೆ. ಫ್ರೆಶ್ ಫ್ರೂಟ್ ಪ್ರೊಸೆಸಿಂಗ್ ಪ್ರೈ. ಲಿಮಿಟೆಡ್ ಎದುರಿಸುತ್ತಿರುವ ಸಮಸ್ಯೆಗಳಲ್ಲಿ ಅನಿಯಮಿತ ವಿದ್ಯುತ್ ಸರಬರಾಜು, ಸಾರಿಗೆ ಮತ್ತು ನಿರ್ವಹಣೆಯ ಸಮಯದಲ್ಲಿ ಹಣ್ಣುಗಳು ವ್ಯರ್ಥವಾಗುವುದು ಪ್ರಮುಖವಾಗಿದೆ. ಹಣ್ಣುಗಳ ಉತ್ಪಾದನೆ ಮತ್ತು ಮಾರಾಟದಲ್ಲಿ ರೈತರು ಎದುರಿಸುತ್ತಿರುವ ಸಮಸ್ಯೆಗಳೆಂದರೆ ಕಾರ್ಮಿಕರ ಅಲಭ್ಯತೆ, ಉತ್ಪನ್ನಗಳಿಗೆ ಸರಿಯಾದ ಬೆಲೆ ಸಿಗದಿರುವುದು, ಹೆಚ್ಚಿನ ಕೂಲಿ ಇತ್ಯಾದಿ. ಆದ್ದರಿಂದ ಗುತ್ತಿಗೆ ಕೃಷಿಯನ್ನು ಉತ್ತೇಜಿಸಲು ಉತ್ಪಾದಕರು ಮತ್ತು ಸಂಸ್ಕರಣಾ ಕೇಂದ್ರಗಳು ಸಂಪರ್ಕ ಸಭೆ ನಡೆಸುವ ಅವಶ್ಯಕತೆಯಿದೆ. ಇದರಿಂದ ರೈತರು ಹೆಚ್ಚಿನ ಕೃಷಿ ಆದಾಯವನ್ನು ಪಡೆಯಬಹುದಾಗಿದೆ.

ಸೆಪ್ಟೆಂಬರ್, 2019

ಕೃಷಿ ಮಾರಾಟ, ಸಹಕಾರ

ಹಾಗೂ ವ್ಯವಹಾರ ನಿರ್ವಹಣಾ ವಿಭಾಗ

ಕೃಷಿ, ವಿಶ್ವವಿದ್ಯಾಲಯ, ಜಿಕೆವಿಕೆ,

ಬೆಂಗಳೂರು-560065

(ಜಿ. ಎನ್. ನಾಗರಾಜ)

ಪ್ರಮುಖ ಸಲಹೆಗಾರರು

Business Performance of Fresh Fruit Processing Pvt. Ltd: A Case Study in

Sirsi taluk of Uttara Kannada district

SHREENIDHI GOPAL HEGDE, MBAL 7026

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INTRODUCTION

India has witnessed voluminous increase in horticulture production over the last few years. Over the last decade, the area under horticulture grew by three per cent per annum and annual production increased by 5.4 per cent. During 2016-17, the production of horticultural crops was about 295.2 million tonnes from an area of 24.9 million hectares. As per the latest estimates by Central Institute of Post Harvest Engineering and Technology (CIPHET), Ludhiana, the wastage of fresh horticultural produce is up to 18 per cent due to poor post-harvest management practices.

In Karnataka, only about one per cent of the total production of fruits and vegetables is currently being processed for value addition. About 25 – 30 per cent of post-harvest loss is estimated due to inadequate cold storage, transport, poor handling, insufficient processing and other value addition facilities.

Uttara Kannada district is one of the major horticulture crops producing districts grown pineapple, sapota, banana etc. and most of the farmers sell their produce to nearby market and processing firm in order to reduce the wastage of fruits. Hence, there is huge scope for processing of perishable horticultural produce such as fruits and vegetables.

OBJECTIVE

To measure the financial performance of Fresh Fruit Processing Pvt. Ltd.

METHODOLOGY

Study area

The study was conducted in Sirsi taluk of Uttara Kannada district with Fresh Fruit Processing Pvt. Ltd.

Sampling design

For the study, the secondary data drawn from the audited annual statements of balance sheet, profit and loss account of Fresh Fruit Processing Pvt. Ltd. for the period of ten years (2008-09 to 2017-18) were subjected to financial ratio analysis.



Fig. 1: Map depicting the study area in Sirsi taluk of Uttara Kannada district

Analytical tool

Financial ratio analysis was used to analyze the financial performance of Fresh Fruit Processing Pvt. Ltd.

The ratios used for analysis were as follows:

1. **Liquidity ratios** - a) Current ratio
b) Acid-test ratio
2. **Solvency ratios** - a) Debt-equity ratio
b) Coverage ratio
3. **Turnover ratios** - a) Inventory turnover ratio
b) Net asset turnover ratio
c) Current asset turnover ratio
d) Working capital turnover ratio
4. **Profitability ratios** - a) Gross profit margin
b) Net profit margin
c) Operating expenses ratio
d) Return on investment (ROI)

RESULTS

Table 1 : Financial performance of Fresh Fruit Processing Pvt. Ltd (2009-2013)

Sl. No	Ratios	2009	2010	2011	2012	2013
I Liquidity ratio						
1.	Current ratio	1.84	2.12	2.34	2.66	2.78
2.	Acid-test ratio	1.42	1.72	1.95	2.29	2.44
II Solvency ratio						
1.	Debt-equity	1.47	1.19	1.08	0.9	0.8
2.	Coverage ratio	2.72	2.67	2.77	2.63	2.74
III Turnover ratio						
1.	Inventory	16.39	16.74	17.54	18.22	19.27
2.	Net asset	4.31	3.96	3.78	3.48	3.24
3.	Current asset	4.09	3.53	3.20	2.83	2.60
4.	Working capital	10.69	8.71	7.86	4.52	4.06
IV Profitability ratio(%)						
1.	Gross profit	8.04	10.60	10.75	10.40	10.38
2.	Net profit	2.7	3.57	3.75	3.41	3.2
3.	Operating expense	4.18	5.48	5.44	5.53	5.53
4.	ROI	8.71	9.35	10.55	9.78	9.82

Table 2 : Financial performance of Fresh Fruit Processing Pvt. Ltd (2014-2018)

Sl. No	Ratios	2014	2015	2016	2017	2018
I Liquidity ratio						
1.	Current ratio	2.31	2.81	2.25	1.95	1.86
2.	Acid-test ratio	2.09	2.55	2.04	1.73	1.39
II Solvency ratio						
1.	Debt-equity	0.76	0.88	1.18	0.89	0.92
2.	Coverage ratio	2.89	3.04	3.28	3.17	3.32
III Turnover ratio						
1.	Inventory	20.75	20.99	21.43	22.90	12.50
2.	Net asset	3.26	2.82	3.19	2.62	3.48
3.	Current asset	2.25	2.13	2.23	2.88	3.42
4.	Working capital	3.96	3.30	4.01	5.89	7.37
IV Profitability ratio(%)						
1.	Gross profit	10.43	10.61	10.84	10.70	10.85
2.	Net profit	4.76	2.89	3.15	3.96	4.77
3.	Operating expense	5.62	5.73	5.81	5.8	5.83
4.	ROI	10.68	11.12	12.43	12.38	13.46

DISCUSSION

Liquidity ratios indicates the ability of a firm to pay off its short-term liability. The higher the ratio, the better the ability of firm to pay off its liability. The current ratio has improved over the years i.e., 1.84 to maximum of 2.81. However, the acid-test ratio has the value 1.42 to maximum of 2.55.

Solvency ratio indicates whether firm's cash-flow is sufficient to meet its medium and long term liabilities. The lower the solvency ratio, the greater the probability that it will default on its debt obligation. The debt-equity ratio ranges from 1.47 to 0.92. However the coverage ratio increasing over years i.e., 2.72 to 3.32 (Table 1&2).

Turnover ratios assess how effectively a firm is able to generate revenue in the form of cash and sales based on asset, liabilities and capital. Higher the ratios mean the firm is using its assets more efficiently. The inventory turnover ratio has increasing over the years i.e., 16.39 to maximum of 22.90.

Profitability ratios were used to evaluate the firm's ability to generate income as compared to its expenses and other costs. A high ratio represents the greater profit margin and it is good for the firm. net profit percentage of a firm has increasing over the years i.e., 2.7 to 4.77. However, the percentage of return on investment has increased from 8.71 to 13.46 (Table 1&2).

GRAPHS AND PHOTOGRAPHS

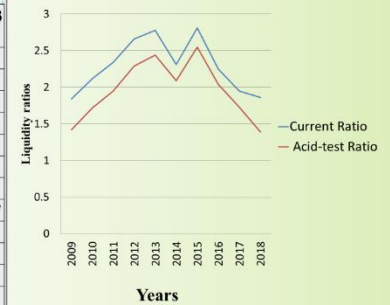


Fig. 2: Liquidity position of Fresh Fruit Processing Pvt. Ltd. (2009-2018)



Fig.3: Profitability measures of Fresh Fruit Processing Pvt. Ltd. (2009-2018)



Fig.4: Photographs of Fresh Fruit Processing Pvt. Ltd.

SUMMARY

The business performance of Fresh Fruit Processing firm is financially stable and economically viable starting from day of establishment to current financial year.

The financial measurements using different ratios like liquidity ratios, solvency ratios, turnover ratios and profitability ratios are found to be satisfactory indicating the performance of Fresh Fruit Processing Pvt. Ltd were meeting long-term financial obligations.

The Fresh Fruit Processing firm's liquidity position was good and satisfactory.

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3.	Profitability percentage of Fresh Fruit Processing Pvt. Ltd	46-47

I INTRODUCTION

Horticulture sector has become one of the major drivers of the growth in agriculture sector. Horticulture crops, especially fruits and vegetables are mostly grown by small and marginal farmers and helps in increasing the income of farmers. Fruits and vegetables are rich source of vitamins, minerals, proteins, and carbohydrates etc., plays an important role in human nutrition. Thus, these are considered as protective foods and helps for nutritional security of the people. The horticulture sector has gained importance over last few years contributing increasing share in Gross value Added (GVA) of the agriculture and allied sector.

Fruits and vegetables need not necessarily be used for domestic consumption but also converted into processed products through value addition (pulp, pickles, preserves sauces, jam, jelly squash, etc.). Along with this, certain quantities of fruits and vegetables are exported in fresh and processed form, focusing on foreign exchange to the country. Production of food grains has overtaken by the production of fruits and vegetables in the country. The total horticulture production has augmented from 191.8 MT in 2006-07 to 299.8MT in 2016-17. It is considered to be the matter of pride that India is the second largest producer of fruits and vegetables in the world. India ranks at first position in production of banana, mango, lime and lemon, papaya and okra (Horticulture at a Glance, 2017).

1.1 Global scenario of fruit cultivation

Globally, India is recognised as the second largest producer of Vegetables and Fruits and India's presence in global market is significant (Appendix-I). The different types of fruits are exported to the outside the country. Grapes occupy the premier position in exports with the quantity of 232.9 thousand tonnes valued at Rs. 2.08lakhs. Other fruits like banana and mango have attained significant position in exports. There is an increasing trend in the export of fresh vegetable (e.g. Peas, Potatoes etc.).The development achieved in the horticulture sector indicates that there is a growing demand for horticulture produce (Horticulture Statistics at a Glance, 2017).

1.2 Indian Scenario of Horticulture Crops

The need for diversification to horticulture sector was undertaken by the Government of India in mid-eighties by providing its attention on investment in horticulture sector. Presently, horticulture has gained its popularity by improving income through increased productivity, generating employment and through exports. Resultantly, horticulture sector slowly moved from rural confines to commercial venture.

The cultivation of horticulture crops has become encouraging in India. The percentage share of horticulture in agriculture has become 30 per cent. Under the purview of agriculture & allied activities, the share of plan outlay for horticulture which was 3.9 Per cent during 9th Plan, has increased to 4.6 per cent during the 12th Plan. India has witnessed voluminous increase in horticulture production over the last few decades. Significant growth has been made in area expansion resulting in higher production. Over the last few years, the area under horticulture grew by about 3 Per cent per annum and annual production increased by 5.4 Per cent. During 2016-17, the production of horticulture crops was about 295.2 million tonnes from an area of 24.92 million hectares (Appendix-II). The vegetable production has reported to be increased to 175 million tonnes in 2016-17. It is estimated that per capita availability of the fruits in the country is around 200.6 g per day but the recommended quantity is 230 g per capita per day. Hence, still there is a scope for production of fruits in the country.

India is recognised as the second largest producer of fruits and vegetables in the world after China with the fruit production of 28.2 million tonnes and vegetable production of 66 million tonnes. However, per capita consumption of fruits (46g) and vegetables (130g) was reported against a minimum of fruits (92g) and vegetables (300g). This is recommended by Indian Council of Medical Research and National Institute of Nutrition (NIN), Hyderabad. Based on the increase in population, the annual requirement of fruits will be estimated to be 39.41 million tonnes and the vegetables requirement will be of 84.10 million tonnes. Recently in India, the horticulture sector gained importance because it is consequent to the recognition of the need for attaining nutritional security.

India ranks third in terms of production of agricultural commodities in the world after China and USA. India produces mangoes (41%) followed by green peas (36%), cauliflower (30%), tea (28%), cashew nut (24%), banana (23%), milk produced in the world (16%) and onion (10%). The agricultural commodities play an important role in providing a large and varied amount of raw material base for food processing through value addition.

The varied climatic conditions of India ensure availability of different varieties of fresh fruits and vegetables. As per National Horticulture Board, during 2016-17, India produced 175 million metric tonnes of vegetables and 92.84 million metric tonnes of fruits. The area under cultivation of fruits was 6.4 million hectares and area under vegetables cultivation was around 10.29 million hectares (Appendix-III and IV). India is the largest producer of ginger and okra and among vegetables, ranks second in production of potatoes, onions, cauliflowers, brinjal, cabbages etc. In case of fruits, India ranks first in production of papaya (43.6%) followed by banana (25.7%), mangosteen and guava (40.4%). Production of varieties of fruits and vegetables in India offers great opportunities for export. During 2016-17, total fruits and vegetables exported from India worth Rs.9410.81crores in which fruits and vegetables comprised of worth Rs. 4229.03 crores and Rs. 5181.78 crores respectively, (Horticulture Statistics at a Glance, 2017).

1.3 Indian food processing and its importance

Food Processing Industry in India is widely considered as a 'sunrise industry' having huge potential for increasing the agricultural economy, creating large scale manufacturing of processed food products along with creation of employment and also earnings from the export. India has enormous growth potential as it is the second largest producer of food in the world; it is estimated to be number one producer of food all over the world in future.

Even though Indian food industry is still in nascent stage, but it would made efforts in increasing its contribution to world food trade every year. In India, the food sector has emerged as a high-profit sector particularly, within the food processing industry due to its immense potential for value addition accounting for about 32 per cent

of the total food market of the country. The Government of India has undertaken various policies for the growth and development of the food processing industry. The Government encourage the investments in food processing related business through the Ministry of Food Processing Industries (MoFPI).

India is regarded as sixth largest country in food and grocery market in the world. In this regard, retail sector plays a prominent role constitutes around 70 per cent of the sales. The Indian food processing industry contributes for about 32 per cent of the country's total food market. Food processing industry is one of the largest industries in India and is ranks fifth in terms of production, consumption and export. The contribution from food processing sector to the Gross Value Added (GVA) is about 8.80 per cent of in manufacturing followed by agriculture (8.39%), exports (13%) and total investment in industrial sector (6%). The Indian food market is presently growing at a Compound Annual Growth Rate (CAGR) of about 20 per cent. Similarly, the organic food market in India is expected to increase by three times by 2020.

As per the data of Department of Industrial Policies and Promotion (DIPP), around US\$ 7.54 billion worth of Foreign Direct Investment (FDI) has received by the food processing sector in India during the period from April 2000 up to March 2017. The Confederation of Indian Industries (CII) estimates that there is a great potential to the Indian food processing sector in order to attract the investment around US\$ 33 billion over the next 10 years and also to create employment opportunities of nine million person-days.

In the Indian food market, the semi-processed food constitutes around was 15 per cent followed by the processed food segment (10%). The unorganised sector dominates the food processing sector which accounts for about 42 per cent of all units with the small scale sector (33 %) and the organised sector (25%) of all food industry units.

1.4 Fruit and vegetable processing

It is reported that the perishable horticulture produce like fruits and vegetables are wasted during various stages of both production and post-harvest handling is considered

to be nearly 35 to 40 per cent. The earning capability of fruits and vegetables is regarded as 20 to 30 times foreign exchange per unit because of its higher yielding capacity and also better value when compared with the food grains in the international market. The cultivation of fruits and vegetables is gradually diverted towards the urban areas from rural and also from traditional agriculture practice to the commercial as well as corporate sector. This may led to implementation of improved technology, cultivation of commercial profitable crops. As per the latest estimates by Central Institute of Post-Harvest Engineering and Technology (CIPHET), Ludhiana, it is reported that the wastage of fresh horticultural produce in India is up to 18 per cent due to poor post-harvest management practices.

In Karnataka, only about one per cent of the total production of fruits and vegetables is currently being processed for value addition. About 25 – 30 per cent of post-harvest loss is estimated due to insufficient storage facility, lack of transport service, poor handling, insufficient processing and other value addition facilities. The new economic policy of the government rightly identified food processing sector as thrust area. However, the costs of procurement and management efficiency in processing determined the sustained growth of the industry and its viability.

Uttara Kannada district is one of the major horticulture crops producing districts grown pineapple, sapota, banana *etc.* and most of the farmers sell their produce to nearby market and processing firm in order to reduce the wastage of fruits. Hence, there is huge scope for processing of perishable horticultural produce such as fruits and vegetables.

The processing industry consists of public, private and co-operative sectors. India is having mixed economy so the performance point of view, many public and co-operative units have failed, while the private units have achieved some success. A detailed study of business performance of Fresh fruit processing Pvt. Ltd., would be of immense use to know whether the private sector follow the sound management principles for their success. With this background, the following specific objectives were framed.

1.5 Specific objectives of the study

- i. To analyse the procurement and processing of fresh fruits by Fresh Fruit Processing Pvt. Ltd.
- ii. To examine the supply chain management of fresh fruits.
- iii. To analyse the financial and business performance of Fresh Fruit Processing Pvt. Ltd.
- iv. To document the constraints faced in processing and marketing of the products.

1.6 Hypothesis of the study

1. Company is procuring 50 per cent of fresh fruits for processing directly from the farmers.
2. Company is having very strong forward linkages.
3. Business performance of Fresh Fruit Pvt. Ltd. is financially sound.

1.7 Limitations of the study

The present study has its own limitations. The necessary data required for the present study were collected from personal interview of farmers, wholesalers, retailers and consumers as primary data similarly; secondary data was collected from the audited annual report of the Fresh Fruit Processing Pvt. Ltd. The primary data was purely based on respondents recall memory because no records were maintained by them. So, this information would definitely have a bias. Even the time period of data collection was also too short to generalize and draw conclusions. The errors of secondary data are present in the study has to time and resource limitation.

1.8 Presentation of the study

The study has been presented in six chapters.

Chapter I A brief introduction about horticulture sector, horticulture scenario in India, Indian food processing sector and its importance, fruits and vegetable

processing, specific objectives and limitations of the study has been clearly indicated.

Chapter II Presents review of literature on the related topics.

Chapter III Outlines the features of the study area, sampling framework, analytical tools and the concepts used in the study.

Chapter IV Presents the results and discussion obtained from the study.

Chapter V Presents the summary and policy implications.

Chapter VI Contains the references quoted in the different chapters.

II REVIEW OF LITERATURE

In this chapter, an attempt has been made to document the brief and relevant review of research literature related to the present study. The reviews are presented under the following headings keeping in view of the objectives.

2.1 Procurement and processing of fresh fruits

2.2 Supply chain management of fresh fruits

2.3 Financial and business performance of fresh fruit processing firm

2.4 Processing and marketing constraints

2.1 Procurement and processing of fresh fruits

Ali (1992) studied that procurement of raw materials like fresh fruits and vegetables in both private and public sectors processing units were accounted more than 90 per cent. The purchase of fresh vegetable by the private sector unit per annum was 12,841.60 metric tonnes worth Rs. 204.74 lakhs and in public sector unit was 575.5 metric tonnes worth Rs. 9.58 lakhs. This accounted for more than 77 per cent of the total value in private sector and 60 per cent of in total value of main raw material in public sector.

Shobha (1998) measured the performance of fruit and vegetable processing unit in co-operative and private sector in Uttar Kannada district found that fruits and vegetables procurement by the co-operative sector was 161 metric tonnes worth Rs. 6.22 lakhs. The procurement of fruits and vegetables by the private sector processing unit was 187.098 metric tonnes worth Rs. 8.37 lakhs. The study also showed that quantity wise purchase of total raw materials such as fresh fruits and vegetables constituted 87.58 per cent. While purchase of semi processed fruits and vegetables accounted for 12.42 per cent.

Veena and Tajindear (2000) measured the performance of Bhogpur and Jargoan sugar mills in Punjab. The procurement pattern of these two sugar mills, the Jargoan mill crushed 2238.67 thousand tonnes of sugarcane and produced 191.93 thousand tonnes of

sugar. The quantity of cane crushed and production of sugar were higher for Jargoan mill compared to the Bhogpur sugar mill. The quantity of cane crushed and the quantum of sugar production was higher for Jargoan mill by 38 and 35 per cent, respectively.

Emongor and Kirsten (2006) reported that supermarkets procured approximately 60 per cent of fresh fruits and vegetables from local farmers. Products not available in domestic market were imported from South Africa and other countries. Supermarkets procure dairy products from large processors. Small scale dairy processors do not access the supermarkets because of high transaction costs and lack of transport. Government involvement in the supply chain are important in determining the type of procurement strategies that develop, whether local producers especially small-scale farmers and processors access and supply to supermarkets.

Ahmad (2011) analysed the business performance of Bidar co-operative sugar factory limited and analysed the procurement and processing management in Bidar co-operative sugar factory. The results revealed that the average sugarcane procurement by sugar factory was 61.49 per cent and the average total cost of production was Rs. 1468.48 per quintal of sugar. And also observed compound annual growth rate of grower members (7.36%), total members (8.2%), reserve funds (0.94%), total assets (8.09%), total liabilities (13.03%), share capital (3.17%), total sales (12.50%), total inventory (18.03%) and net profit (9.92%) showed significant results except gross profit during 2005-06 to 2009-10.

2.2 Supply chain management of fresh fruits

Savant *et al.* (2001) conducted a study on marketing of mushroom, the system of assembling and distribution of dried mushroom consisted of mushroom growers, commission agents and consumers including hotels and big consumers. The commodity marketed through two main channels namely;

Channel -I Producer – Commission agent (farm gate) – Consumers

Channel-II Producer – Commission agent (market) – Consumers

In channel-I, the commission agents purchased mushroom from producer at their farm gate (22.70 %). While in channel-II, the producer directly sold mushroom to commission agents near big city, (77.3 % of quantity traded).

Chole *et al.* (2002) studied the price spread in marketing of Brinjal in Maharashtra. They identified three marketing channels:

Channel –I Producer—Retailer—Consumer,

Channel -II Producer—Wholesaler—Retailer—Consumer,

Channel –III Producer—Commission agent—Wholesaler— Retailer—Consumer.

They concluded that the producer's share in consumer's rupees were maximum in channel I (68.28 %), followed by channel II (57.94%) and channel III (53.14%). The share of retailer was 21.04 per cent in channel I, 24.37 per cent in channel II and 25.83 per cent in channel III. The share of wholesalers was 5.12 per cent in channel II and 5.06 per cent in channel III. The net share of commission agent was 6.17 per cent in channel III. The total marketing cost was maximum in channel III (46.86 per cent) and minimum in channel I (30.72 per cent). It was also revealed that the marketing efficiency was higher in Channel-I (2.25) followed by Channel-II (1.37) and Channel-III (1.13).

Narayana reddy (2004) studied on efficiency benefits pass on to consumers: New development in retail market environment in India. And reported that most (61%) of the retailers got their requirements from wholesalers, 15 per cent from the large and other retailers. Over 17 per cent of the selected retailers got their goods from more than one source, but a small percentage of retailers got some of their requirements from producers. From supply point of view, 67 per cent of the retailers got their requirements by paying cash. Only 13 per cent of the retailers got their requirements on credit and 19 per cent got credit partly from the suppliers. Apart from this, the study also shows that the organized retailers/hyper marketers and super marketers got wholesale margin plus concession, as they buy in bulk from the producers.

Sureshreddy (2005) studied the gaining competitive advantage through supply chain management and observed supply chain management was the management of upstream and downstream relationship with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole. Thus the focus of supply chain management was upon the management of the relationships in order to achieve a more profitable outcome for all parties in the chain.

Happek *et al.* (2007) studied that supply chain management strategies capture a holistic farm-to-fork perspective of food production and marketing. And Supply chain management includes the movement and exchange of knowledge and products from farms to final customers. This supply chain management links the producers, manufacturers/processors, distributors and markets. Thus, the quality of supply chain management practices can enhance the customer service, customer satisfaction, customer loyalty and the optimization in the use of resources across the supply chain.

Singh and Mishra (2013) assessed the vegetable supply chain, challenges and problems of supply chain of vegetables. The effort was expected to give an insight of the problems and attempted to suggest remedial measures for cost optimization and efficiency in the supply chain of vegetables from farm to consumer. And also noticed that farmers are not getting requisite realization of price commensurate to their efforts due to lack of storage facilities, poor market information and unorganized faulty supply chain.

Kalidas *et al.* (2017) conducted study on vegetable supply chain management in Kerala. The study helps to understand the various channels in SCM, barriers in SCM, problems and price spread of SCM. They concluded that Supply chain in Kerala is fragmented and involves numerous intermediaries such as distributors and resellers who earn the maximum benefit. Inter-state supply chain suffers from many taxes. For smooth functioning supply chain needs professional people but they do not have trained work force in this field. So training and education in supply chain management is required. Supply chain related vegetables in Kerala must be worked upon to increase the efficiency.

Bhaskar *et al.* (2018) evaluated the critical causal factors for post-harvest losses (PHL) in the fruit and vegetables (F&V) supply chain in India using the DEMATEL. The results highlighted that the most critical factors that should be tackled to ensure progressive PHL reduction are lack of proper packaging facilities, lack of proper storage facilities, insufficient infrastructure, improved handling of the products at the farm and marketplace, lack of processing facilities, lack of linkage between the farmers and processing units, lack of linkages in the marketing channel, and large number of intermediaries. The findings of this study are intended to guide various supply chain members and decision-makers for reducing PHL and improving the overall performance of the F&V supply chain.

2.3 Financial and business performance of fresh fruit processing firm

Reddy (1994) measured the financial performance of Mulkarnoor Co-operative rural bank by using different financial ratios and study revealed that the institution had very acceptable and appreciable values for current ratio (2.09) and quick ratio (1.74) reflects that liquidity position of the bank was good enough to meet its financial obligations. But profitability ratios were not give satisfactory results.

Waris and Chowdhary (1997) studied the economic efficiency of milk products through co-operative societies in Northern Bihar and the study revealed that the society was performing at level far below the minimum levels presented for different industries. They found that liquidity, profitability and debt-equity ratio for the period of five successive years were good enough to meet short and long term financial obligations.

Rao and Madhu (2001) measured the financial performance of dairy co-operative in Rajasthan. The study revealed that annual growth rate of milk products were 11.22 per cent, and total amount paid to products per year increased from Rs. 8.40 crores to Rs. 34.39 crores over the period. Milk products sales increased over the years at the rate of 69.33 per cent.

Vijay and Chahal (2010) analysed the performance of Primary Agricultural Co-operative Societies in India. Based on secondary data collected over the period of ten

years i.e., from 1998-09 to 2007-08 were analysed by using averages, percentages, ratios, index numbers, standard deviation and average compound growth rate. The study revealed that there is no significant growth in the expansion of the societies during study period. But, the membership as well as the number of borrowers was increased over a period with the annual compound growth rate of 3.92 per cent and 4.40 per cent, respectively.

Misra (2011) measured the financial and business performance of 23 selected sugar companies employing compound annual growth rate (CAGR), factor and financial ratio analysis. India's CAGR in sugarcane area (0.74%), production (1.21%) and productivity (0.46%) during 2000-01 to 2009-10. The performance of the companies were surged by the profitability dimension and impeded by the poor liquidity ratios maintained by most companies.

Deepak (2014) conducted study on business performance analysis of regional oilseeds growers' co-operative societies union limited, Chitradurga. The results obtained from the study revealed that, net sales of edible oil increase the compound annual growth rate by 17.04 per cent. The financial performance of the union showed satisfactory result and having comfortable liquidity position in order to meet the short term financial obligations. The major constraints faced by the union were procurement of raw material, non-availability of skilled labour and high wage rate, fluctuation in market price, electricity fluctuation etc.

Snehashree (2013) analysed the business performance of NSL sugar factory, Mandya had good managerial organization. The CAGR of share capital (1.11%), reserve funds (2.22%), total assets (4.39%), total liabilities (6.93%), total expenses (3.87%), total inventory (10.19%) and net profit (3.87%) were significant except fixed assets, total sales and gross profit. The average annual production of sugar was 8, 57,161 quintals. The cost of cultivation per acre of contract growers was Rs. 84,649.24 higher than non-contract growers was Rs. 69, 649.24. The profit of contract growers was Rs.19, 802.77 per acre.

2.4 Processing and marketing constraints

Saravanan *et al.* (2002) reported that the constraints of cashew nut processing units in Tamil Nadu were inadequate supply of raw materials from the domestic market and this would also constitute declining trend in import. More than 80 per cent of processors considered this as one of the major constraints. High purchase tax for raw nuts (8%) in domestic market and increasing competition from other countries in processing were the constraints faced by more than the 69 per cent of the respondents. Other constraints reported by the processors were high wage rate (86.67%), wide fluctuation in the prices of the cashew kernels and frequent power cuts during the processing period.

Pandit *et al.* (2003) identified the problems of potato marketing in India and reported that potato marketing was major constraint because of high marketing cost and margins and wide range of price fluctuations. In the export point of view, India's performance is dismal. Lack of cold chain, awareness of Indian potato varieties in foreign market, long term export strategy and suitable packaging material are some of the impediments in the way of sustained potato exports.

Sharma *et al.* (2004) analysed the problems faced by vegetable cultivators of the Kangra and Nagrota development blocks of Kangra district of Himachal Pradesh. The study revealed that the untimely availability of fertilizers followed by seed and irrigation were major problems in production, whereas in marketing, most of the respondent stated that non-availability of remunerative price. Among financial problems, indifferent and non-co-operative attitude of staff and lack of funds to purchase inputs were reported. In case of institutional problems, non-visiting of village level workers to fields followed by lack of extensions and training facilities were considered as one of the major constraints for vegetable cultivars.

Kshirsagar *et al.* (2004) reported that in India horticulture sector is terribly affected by inadequate marketing infrastructure (MI) facilities. The report showed that major constraints faced by farmers were shortage of pre-cooling, and cold-storage facilities, lack of skilled labour and high wages for grading and packing, shortage of packing material and its high prices, shortage of vehicles, high transportation cost,

inadequate or no access to vital market information, delayed payments, absence of transparency, need of training and shortage of processing facilities.

Kaur and Gupta (2008) studied the problems and strategies in production and marketing of fruits and vegetables in India. The study mainly emphasizes on seasonal variability, pre and post- harvest losses and market infrastructure. The study revealed that, at the time of harvesting, there is glut in market that situation adversely affects the prices. During the mid-season when the arrival shows a downward trend there is an upward trend in price indices. The study further observed that the pre-harvest losses occur due to attack of insect-pests, diseases.

Ali and Kapoor (2008) studied the perceptions of farmers about risks in production of fruits and vegetables in Uttar Pradesh. They found in their study that the perceived priorities of farmers about major sources or risks in production of fruits and vegetables have been reported under investment risks, socio-economic risks, environmental risks, production risks, and market risks. Among all types of risks faced by farmers, the price and production risks have been perceived as the most important sources of risk in production of fruits and vegetables in the study area.

Murthy *et al.* (2009) observed that post-harvest losses not only reduce the availability of fruits but also result in increased per unit cost of transport and marketing. It affects both the producers (reduction in share in consumer's price) and the consumers (reduced availability and higher prices).

Vasudeva (2009) conducted a study on the economic analysis of processing and marketing of paddy in Siruguppa taluk of Bellary district. The study revealed that small millers (53.33%) were not able to procure sufficient quantity of raw materials due to lack of working capital. Large millers (14.28%) thought that inadequacy in capital as their constraints. This helps to made observations that, small millers were not able to achieve better capacity utilisation due to limited working capital. And in case of large size millers, higher prices of raw materials (71.43%) and lack of transport (78.57%) coupled with higher cost of transportation (71.43%) were major problems.

Mundad (2011) identified the problems faced by the FCIGs (Farmers Commodity Interest Groups) in organizing, pooling and marketing of the commodities indicating socio-economic status of the farmer was considered as major problem. And when it came to pooling of commodities, majority of the FCIGs faced the high cost of transportation as the major problem followed by scarcity of labours during peak period.

III METHODOLOGY

This chapter describes company profile, sampling technique adopted, the nature and sources of data, the method of data collection and analytical tools and techniques used in the study for analysing data and evaluating the results of Fresh Fruit Processing Pvt. Ltd in Sirsi taluk of Uttara Kannada district. The methodology used in the study is briefly discussed under the following sub headings;

- 3.1 Company profile
- 3.2 Sampling design adopted
- 3.3 Nature and sources of data
- 3.4 Analytical tools and techniques

3.1 Company profile

Fresh Fruit Processing Pvt. Ltd. is a modern fruit processing unit situated at Banavasi village near Sirsi, Uttara Kannada district, Karnataka State in the heart of the fruit growing area where availability of raw material is assured. This processing unit was established in 2008 and now become one of the top suppliers of beverages in India. It is one of the leading sellers of mango pulp, pineapple titbits, pineapple cubes etc.

Banavasi region is famous for tropical fruits especially the pineapples. The pineapples grown in this region have gained market throughout the country and have carved their niche in Indian fruit market. The processing unit is located in one of the India's finest tropical fruit growing region that has proper climate and soil for producing finest quality pineapple, mango, banana, papaya in abundance. It is mainly a canning industry selling its products in the name of 'Tahoora' brand. At present, the products are marketed prominently in Andhra Pradesh, Gujarat, Rajasthan, Maharashtra, Delhi states along with Karnataka state.

All the promoters of this unit are farm owners, have own agricultural land and grow variety of tropical fruits in abundance along with ginger, areca nut etc. To meet the

growing demand for fruit supply, the processing unit entered into agreement with selected farmers in this region for contract based farming. It is giving direct/indirect employment to more than 150 youths from surrounding villages. Epoxy based polyurethane flooring is laid throughout the 6000 sq.ft production hall to maintain high standard hygiene. The processing unit has the capacity of processing 15MT per shift. Depending on the season, the processing unit is engaged in processing of refined products especially aseptic, frozen purees and concentrates from various tropical fruits such as pineapple, mango, papaya etc. The plant has the facility to pack fruit pulp and juice in sterilized and hermetically sealed cans of 450/850 gm. and 3.1 kg OTS cans. The stringent quality measures maintained in the processing unit to ensure that the food products processed by the unit would meet the industry's safety and quality standards and also meet the criteria of freshness & hygiene as specified in FPO regulations.

Sl. No.	Items	Processing unit
1.	Location	Banavasi village, Sirsi taluk, Uttara Kannada district
2.	Year of establishment	2009
3.	Capacity utilization	98%
4.	Finished products	Pineapple slice Pineapple juice Canned fruits Pineapple titbits Pulp Fruit cocktail
5.	Marketing practice	Domestic trade

3.2 Sampling design

For the purpose of studying the business growth and performance of Fresh Fruit Processing Pvt Ltd, the data were collected from both primary and secondary sources. The primary data were collected from 30 farmers, 5 wholesalers, 5 retailers and 30 consumers in Sirsi taluk of Uttara Kannada district through personal interview method. The secondary data were drawn from annual reports and audit records maintained by Fresh Fruit Processing Pvt. Ltd.

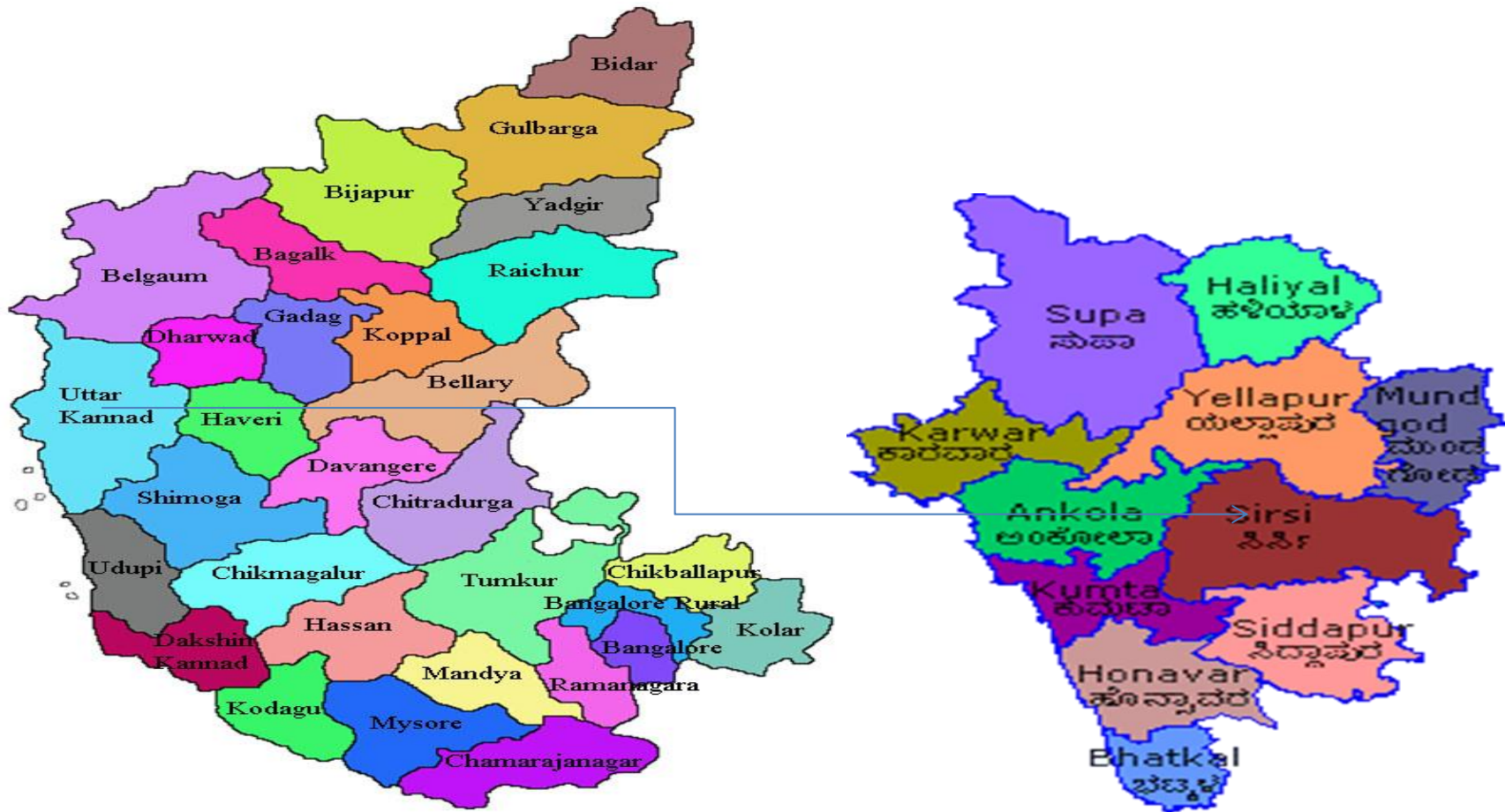


Fig. 1 : Map showing the study area *i.e.*, Sirsi taluk of Uttara Kannada district

3.3 Nature and source of data

The necessary data were collected from both primary and secondary sources. The requisite primary data were collected from sample farmers, wholesalers, retailers and consumers by personal interview method.

The secondary data were collected from audited annual report of balance sheet, profit and loss statement, manufacturing and trading accounts of Fresh Fruit Processing Pvt. Ltd. for the period of ten years (2008-09 to 2017-18) on socio-economic status, investments, costs, yield, price and returns.

3.4 Analytical tools and techniques

The statistical tools and techniques employed to analyse and interpret the objectives of present study were as follows:

3.4.1 Descriptive statistics

3.4.2 Compound Annual growth Rate (CAGR)

3.4.3 Financial ratio analysis

3.4.4 Garrett's ranking technique

3.4.1 Descriptive statistics

The technique was used to analyse the feature of gathered data from various sources. This tool helped to summarize the statistical measures like percentage, average etc. to draw meaningful interpretations.

3.4.2 Compound Annual growth Rate (CAGR)

An exponential function was employed to estimate the growth rate is given below.

$$Y = ab^t \dots\dots\dots (i)$$

Where,

Y= Indicator

a= Constant

b= Regression co-efficient

t= time in years

Annual average compound growth rate in percentage was calculated as follows:

$$\text{CAGR} = (\text{Antilog } b-1) * 100 \dots\dots\dots (ii)$$

The analysis has covered the data for the period of 10 years from 2008-09 to 2017-18. The compound growth rate of the variable indicates the rate of change in each year. The exponential function assumes constant growth rate and it is obtained by deducting unity from the co-efficient 'b'. Hence, if 'b' is greater than one, the growth rate would be positive.

3.4.3 Financial ratio analysis

Financial ratio analysis is the systematic use of different ratios to analyse and interpret the financial position of a firm. And it is the process of identifying the liquidity, solvency, efficiency, profitability, and strength and weakness of a firm by properly establishing relationship between the items of balance sheet and profit and loss accounts.

The secondary data were collected from audited annual report of balance sheet, profit and loss statement, and manufacturing and trading accounts of Fresh Fruit Processing Pvt. Ltd. for the period of ten years (2008-09 to 2017-18) were subjected to financial ratio analysis. The financial ratios used to analyse the data were described below.

3.4.3.1 Liquidity ratios

Liquidity is basic need for continuous operation of any business organization. It measures the ability of the firm to meet its short term financial obligations. Thus, liquidity ratio is considered as inputs to analyse the asset portfolio and capital structure of a firm. The current ratio and acid-test ratios were calculated as a part of liquidity ratio.

(a) Current ratio

The current ratio would give the relationship between current assets and current liabilities. It is calculated by dividing current assets by current liabilities.

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

Current assets included were cash on hand and bank balance, inventory, sundry debtors, account receivables, pre-paid expenses, and fixed deposits in banks. The current liabilities included were bills payable, sundry creditors, income tax liabilities, short term loans and advances, accrued expenses. The ratio of 2:1 is considered as standard ratio and would give satisfactory results.

(b) Acid-test ratio

It is most rigorous test of liquidity than current ratio and also called as quick ratio. It is complementary ratio to the current ratio and represents the ratio between quick assets and current liabilities. It is calculated by using following formula.

$$\text{Acid-test ratio} = \frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}}$$

Quick assets are the current assets, which can be converted into cash in a short period of time i.e., within a year. The ratio of 1:1 is considered as standard ratio and that would give satisfactory results.

3.4.3.2 Solvency ratios

Solvency ratio indicates whether the firm's cash-flow is sufficient to meet its medium and long term liabilities. It is also called as leverage ratio and this would provide basis for measuring the leverage effect on the performance of processing firm. The solvency position of processing firm was computed by following ratios.

(a) Debt-equity ratio

The debt-equity ratio used in the study indicates the relationship between external and internal equities of processing unit and it is important to analyse the medium and long term solvency of processing firm.

The ratio was calculated by using following formula,

$$\text{Debt-equity ratio} = \frac{\text{Total debts}}{\text{Equity}}$$

(b) Coverage ratio

This ratio is also called as time interest earned ratio or interest coverage ratio. Coverage ratio shows the number of times the earnings of the firm are able to cover the fixed interest liability of the firm. The ratio was computed by,

$$\text{Interest coverage} = \frac{\text{Earnings before interest and tax (EBIT)}}{\text{Interest}}$$

3.4.3.3 Turnover ratios

Turnover ratio is also known as activity ratios or efficiency ratio. This turnover ratio assesses how effectively a firm is able to generate the revenue in the form of cash and sales based on asset, liabilities and capital. The following turnover ratios were calculated to evaluate the effectiveness of assets in a firm.

(a) Fixed asset turnover ratio

This ratio was calculated by dividing total sales by the net fixed assets of the firm in a given period of time.

$$\text{Fixed asset turnover ratio} = \frac{\text{Total sales}}{\text{Net fixed asset}}$$

(b) Current asset turnover ratio

Current asset turnover ratio was calculated by dividing sales by the current asset of the firm in a given period of time.

$$\text{Current asset turnover ratio} = \frac{\text{Total sales}}{\text{Current assets}}$$

(c) Working capital turnover ratio

This ratio was helpful for assessing the efficiency of the total working capital employed in the business by the firm. Higher the turnover ratio, greater would be the efficiency and profitability rate of the organization.

$$\text{Total working capital} = \frac{\text{Total sales}}{\text{Total working capital}}$$

3.4.3.4 Profitability ratios

Profitability ratios were used to evaluate the firm's ability to generate income as compared to its expenses and other costs. A high ratio represents the greater profit margin and it is good for the firm because, profit is the ultimate output of the company. These ratios calculated to measure the operating efficiency of the company.

(a) Gross profit margin

It is computed by dividing gross profit by sales. It measures the relationship between gross profit and sales.

$$\text{Gross profit margin} = \frac{\text{Gross profit}}{\text{Net sales}} \times 100$$

Gross profit is the difference between sales and cost of goods sold.

(b) Net profit margin

This ratio indicated the rate of profit earned on the total assets and it was computed by,

$$\text{Net profit margin} = \frac{\text{Net profit}}{\text{Total assets}}$$

(c) Operating expense ratio

This ratio establishes the relationship between total operating expenses and net sales. It is calculated by dividing operating expenses by the net sales. Operating expenses includes cost of goods produced and sold, general and administrative expenses, selling and distributive expenses.

$$\text{Operating expenses} \frac{\text{Operating expenses}}{\text{Net sales}} \times 100$$

3.4.4 Garrett's ranking technique

In this study, Garrett's ranking technique was used as a tool to analyse the constraints of processing firm. The respondents were asked to rank the constraints in business performance of processing unit.

According to this technique, constraints faced by respondents were converted into ranks by using the formula.

$$\text{Per cent position} = \frac{100 (R_{ij}-0.50)}{N_j}$$

Where,

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

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

The per cent position of the rank was converted into scores by referring the tables given by Garrett and Woodworth (1969). Then for each factor, the scores of the various respondents were added and finally, the mean score was estimated. The mean scores calculated for each of the attributes were arranged in a descending order. The attribute having highest mean value was regarded as the major constraint followed by other constraints.

IV RESULTS AND DISCUSSION

The data collected from primary and secondary sources were analysed and results are interpreted for drawing the meaningful conclusion. The findings of the study are presented in this chapter under the following headings.

4.1 Socio-economic profile of sample farmers, wholesalers, retailers and consumers

4.2 Procurement and processing of fresh fruits by Fresh Fruit Processing Pvt. Ltd

4.3 Supply chain management of fresh fruits

4.4 Financial and business performance of Fresh Fruit Processing Pvt. Ltd

4.5 Constraints in processing and marketing of products

4.1 Socio-economic profile of sample farmers and consumers

The socio-economic profile of the sample farmers in the study area were identified through personal interview method. The variables like age, education, family type, family composition, occupation and annual income, food habit and farming types are listed in Table 4.1.

4.1.1 Age

The results revealing that about 37 per cent of the farmers were the age of above 50 years. 23 per cent of the farmers were more than 40 and less than 50 years and 20 per cent of the sample farmers were within the age of 20 to 30 and more than 30 to 40 years each.

4.1.2 Education level

Education was considered as one of the important variables to evaluate the status of individual. The results revealing that around 33 per cent farmers were completed primary, 33 per cent were and 30 per cent farmers were completed their secondary education and pre-university and above respectively and 7 per cent of the farmers were illiterates.

4.1.3 Family type

Type of the family was one of the major demographic features that help to assess the household composition. The table indicated that around 63 per cent of the farmers live in joint family and 37 per cent were live in nuclear family. The results revealed that majority of the families were joint family in the study area.

4.1.4 Occupation and annual income

The main occupation of the sample respondents was mainly farming. In the study area, agriculture was regarded as main occupation and their average annual income was Rs. 73,267.

4.1.5 Food habit

Food habit was one of the important socio-demographic variables is presented in Table 4.1. From the table, it was found that majority (77.00 %) of sample farmers were non-vegetarians followed by vegetarians (23%). The results revealed that three fourth of the sample farmers were non vegetarians and remaining one fourth of sample respondents were vegetarians in the study area.

4.1.6 Farming type

Further, the table revealed that 83 per cent farmers were non-contract farmers in the present study area which means majority of the farmers were not undergone contract farming and only 17 per cent of the farmers were contract farmers. (Table 4.1)

4.1.2 Crops cultivated by the sample farmers

The cropping pattern of sample farmers is presented in Table 4.2. From the table, it is clear that total area under cultivation of various crops was 163.25 acres. Out of this, the area of 69.5 acres (43%) was under the cultivation of pineapple, 27.5 acres (17%) banana, 26.25 acres (16%) arecanut, 11.75 acres (7%) ginger, 25.25 acres (15%) paddy and 3 acres (2%) flowers were occupying the remaining area under cultivation.

Table 4.1: Socio-economic profile of sample farmers**n=30**

Sl. No.	Particulars	No. of farmers	Percentage
1.	Age (years)		
	20-30	6	20.00
	>30-40	6	20.00
	>40-50	7	23.00
	Above 50	11	37.00
	Total	30	100.00
2.	Education Level		
	Illiterate	2	7.00
	Primary (1-7)	10	33.00
	Secondary (8-10)	9	30.00
	Pre-university and above (>10)	9	30.00
	Total	30	100.00
3.	Family Type		
	Joint	19	63.00
	Nuclear	11	37.00
	Total	30	100.00
4.	Farming type		
	Contract	5	17.00
	Non contract	25	83.00
	Total	30	100.00

Table 4.2: Crops cultivated by sample farmers

Sl. No.	Crops	No. of farmers	Area (Acres)	Percentage
1.	Pineapple	29	69.50	43.00
2.	Banana	27	27.50	17.00
3.	Arecanut	25	26.25	16.00
4.	Ginger	26	11.75	7.00
5.	Paddy	25	25.25	15.00
6.	Flowers	10	3.00	2.00
	Total		163.25	100.00

4.1.3 Economics of major crops grown by sample farmers

Economics of major crops grown by sample farmers is depicted in the Table 4.3. The results revealing that major cropping pattern of Sirsi and Soraba taluk is under fruit and vegetable cultivation, crops were pineapple, banana, arecanut, ginger, paddy. Per acre cost of production of pineapple is Rs. 1,25,000 and it is yielding 300 quintals per acre. The price per quintal is Rs.800 (procuring price of Fresh Fruit Processing Pvt.Ltd) and total returns per quintal is 2,40,000. The net returns realised were 1,15,000. Hence, the results revealing that the pineapple cultivation in Sirsi and Soraba taluk is economically profitable.

Per acre cost of production of banana is Rs.1,50,000 and its yielding 250 quintals per acre. The price per quintal is Rs.1800. Total returns per quintal is 4,50,000 and the net returns were Rs.3,00,000 per quintal. Similarly, arecanut is cultivated with a yield of 15 quintals per acre. Cost of production is Rs.25,000 per acre and price per quintal is reported Rs.25,000. Total returns per quintal is Rs.3,75,000 and the net returns realised were Rs. 3,50,000.

Ginger is one of the major crops grown with a production of 190 quintals per acre. The cost of production is Rs.2,09,700 per acre. The price per quintal Rs.2500 and total

returns per quintal is Rs.4,75,000. The net returns per quintal were Rs.2,65,300. Among the food grains, paddy is the main crop that majority of the sample farmers were grown in the study area. Per acre cost of production is Rs.34,000 and it is yielding 45 quintals per acre. The price per quintal is Rs.1500 and total returns per quintal are Rs. 67,500. The net returns realised were Rs.33,500.

Table 4.3: Economics of major crops grown by sample farmers

Sl. No.	Crops	Production /Acre (qtl.)	Cost of production (Rs.)	Quantity sold (qtl.)	Price (Rs. /qtl.)	Total returns (Rs. /qtl.)	Net returns (Rs. /qtl.)
1.	Pineapple	300	1,25,000	300	800	2,40,000	1,15,000
2.	Banana	250	1,50,000	250	1800	4,50,000	3,00,000
3.	Arecanut	15	25,000	15	25000	3,75,000	3,50,000
4.	Ginger	190	2,09,700	190	2500	4,75,000	2,65,300
5.	Paddy	45	34,000	45	1500	67,500	33,500
		800	5,43,700	800	31,600	16,07,500	10,63,800

4.1.4 Socio-economic profile of the sample wholesalers

The socio-economic profile of the sample wholesalers in the study area were identified through personal interview method. The variables like age, education and experience in marketing are listed in Table 4.4.

4.4.1 Age

The results revealing that about 40 per cent of the wholesalers were having the age of more than 30 and less than 50 years each and 20 per cent were comes under the age group of 20 to 30 years.

4.4.2 Education level

Education was considered as one of the important variables to evaluate the status of individual. The results revealing that around 80 per cent of the wholesalers were

completed pre-university education and only 20 per cent have completed secondary school education.

4.4.3 Experience in marketing

The results from the table shows that majority (60%) of the wholesalers had experience of more than 15 years in marketing followed by 5-15 years of marketing experience (40%).

Table 4.4: Socio-economic profile of wholesalers

(n=5)

Sl. No.	Particulars	No. of wholesalers	Percentage
1.	Age (years)		
	20-30	1	20.00
	>30-40	2	40.00
	>40-50	2	40.00
	Above 50	0	0.00
	Total	5	100.00
2.	Education Level		
	Illiterate	0	0.00
	Primary (1-7)	0	0.00
	Secondary (8-10)	1	20.00
	Pre-university and above (>10)	4	80.00
	Total	5	100.00
3.	Experience in marketing (years)		
	5-15	2	40.00
	More than 15	3	60.00
	Total	5	100.00

4.1.5 Socio-economic profiles of the sample retailers

The socio-economic profile of the sample retailers in the study area were identified through personal interview method. The variables like age, education and experience in marketing are listed in Table 4.5.

Table 4.5: Socio-economic profile of retailers

(n=5)

Sl. No.	Particulars	No. of retailers	Percentage
1.	Age (years)		
	20-30	1	20.00
	>30-40	1	20.00
	>40-50	2	40.00
	Above 50	1	20.00
	Total	5	100.00
2.	Education Level		
	Illiterate	0	0.00
	Primary (1-7)	1	20.00
	Secondary (8-10)	2	40.00
	Pre-university and above (>10)	2	40.00
	Total	5	100.00
3.	Experience in marketing (years)		
	5-15	3	60.00
	More than 15	2	40.00
	Total	5	100.00

4.1.5.1 Age

The results revealing that about 40 per cent of the retailers were having the age of more than 40 and less than 50 years followed 20 per cent were comes under the age group of 20 to 30 years and 20 per cent were comes under more than 30 and less than 50 and above 50 years each.

4.1.5.2 Education level

Education was considered as one of the important variable to evaluate the status of individual. The results revealing that around 40 per cent of the retailers were completed secondary and pre-university education followed by 20 per cent were completed primary school education.

4.1.5.3 Experience in marketing

The results from the table revealing that majority (60%) of the retailers had experience of 5-15 years in marketing followed by more than 15 years of marketing experience (40%).

4.1.6 Socio-economic profile of the consumers

The socio-economic profile of the consumers was identified through personal interview method. The variables like age, education, family type, occupation, monthly income and food habit are listed in Table 4.6.

4.1.6.1 Age

The results presented in the Table 4.6 indicated that about 30 per cent of the consumers were within the age of 20 to 30 and more than 30 to 40 years respectively. Similarly, 20 per cent if the consumers were within the age of more than 40 and less than 50 years and above 50 years respectively.

4.1.6.2 Education level

Education was regarded as one of the important feature to evaluate the status of an individual. The results revealed that around 66.67 per cent consumers were comes under

the category of pre-university and above followed by 20 per cent consumers completed their secondary education and 13.33 per cent of primary education.

4.1.6.3 Family type

Type of the family was considered as one of the major demographic features that help to assess the household composition. The Table 4.6 indicated that around 66.67 per cent were live in nuclear family followed by 33.33 per cent of the consumers live in joint family. The results revealed that majority of the families were nuclear families.

4.1.6.4 Gender

Distribution of respondents based on their gender was presented in Table 4.6. About 53.33 per cent were female consumers followed by male (46.67%).

4.1.6.5 Occupation

The results in the table revealed the different occupation of consumers. From the table, it is clear that 33.33 per cent consumers were students followed by 20 per cent of private job holders, 16.67 per cent were house wife and government officials each and 13.33 per cent consumers were doing their own business.

4.1.6.6 Food habit

Food habit was one of the important socio-demographic variables presented in Table 4.6. From the table, it was found that 70 per cent were non vegetarians and only 30 per cent of the sample respondents were vegetarians.

4.1.6.7 Monthly income

The results revealed that 26.66 per cent of consumers were earning less than Rs.10,000 per month, 16.67 per cent were earning 10-15 thousand rupees, 10 per cent were earning between 15 and 25 thousand rupees, 16.67 per cent consumers were comes under earning category of 25 to 50 thousand rupees, 20 per cent were earning between 50 thousand to one lakh rupees and only 10 per cent were earning more than one lakh rupees per month (Table 4.6)

Table 4.6: Socio-economic profile of the consumers

(n=30)

Sl. No.	Particulars	No. of consumers	Percentage
1.	Age (years)		
	20-30	9	30.00
	>30-40	9	30.00
	>40-50	6	20.00
	Above 50	6	20.00
	Total	30	100.00
2.	Education Level		
	Illiterate	0	0.00
	Primary (1-7)	4	13.33
	Secondary (8-10)	6	20.00
	Pre-university and above (>10)	20	66.67
	Total	30	100.00
3.	Family Type		
	Joint	10	33.33
	Nuclear	20	66.67
	Total	30	100.00
4.	Gender		
	Male	14	46.67
	Female	16	53.33
	Total	30	100.00
5.	Occupation		
	Student	10	33.33
	House wife	5	16.67
	Government sector	5	16.67
	Private sector	6	20.00
	Business	4	13.33
	Total	30	100.00
6.	Food Habit		
	Vegetarians	9	30.00
	Non vegetarians	21	70.00
	Total	30	100.00
7.	Monthly income		
	< Rs. 10,000	8	26.66
	Rs. 10,000-15,000	5	16.67
	Rs. 15,000-25,000	3	10.00
	Rs. 25,000-50,000	5	16.67
	Rs. 50,000-1,00,000	6	20.00
	>Rs.1 lakh	3	10.00
	Total	30	100.00

4.2 Procurement and processing of fresh fruits by Fresh Fruit Processing Pvt. Ltd.

4.2.1 Procurement of fruits by Fresh Fruit Processing Pvt. Ltd.

Fresh Fruit Processing Pvt. Ltd. procuring fruits from wholesalers of Sirsi and from Maharashtra, The quantity of 400 quintals of fruits were purchased constitutes about 68.37 per cent of total procurement of fruits followed by total quantity of 185 quintals of fruits were purchased constitutes around 31.62 per cent from the farmers of Sirsi and Soraba taluk.

Among the fruits, pineapple, papaya, muskmelon, grapes and cherry were procured for processing. Monthly expenditure of processing firm for the procurement of fruits from farmers was Rs.2,01,000 and from wholesalers was Rs.3,40,000. The total expenditure for procurement of fruits was Rs.5,41,000.

Table 4.7: Procurement of fruits by Fresh Fruit Processing Pvt. Ltd.

Sl. No.	Sources of procurement	Place	Fruits	Variety	Quantity purchased per month (Qtl.)	Price per quintal (Rs.)	Amount (Rs.)
1.	Farmers	Sirsi taluk	Pineapple	Kew	100	1200	1,20,000
			Papaya	Local	35	600	21,000
		Soraba taluk	Pineapple	Kew	50	1200	60,000
	Sub- total				185 (31.62)		2,01,000
2.	Wholesalers	Sirsi	Pineapple	Kew	200	1800	3,60,000
			Papaya	Local	60	1000	60,000
			Muskmelon	Local	120	1200	1,44,000
		Maharashtra	Grapes	Anab-e-Shahi	12	6000	72,000
			Cherry	8	8000	64,000
	Sub-total				400 (68.38)		3,40,000
Grand total				585 (100.00)		5,41,000	

Note: Figures in the parentheses indicates the percentage to the total

4.2.2 Processing of fruit products by Fresh Fruit Processing Pvt. Ltd.

Processing of various fruit products by Fresh Fruit Processing Pvt. Ltd. is depicted in Table 4.8. The processed fruit products like canned fruit products, fruit cocktail, pineapple slice, pulp, and pineapple juice and pineapple titbits with a total quantity of 425 tons were produced per month. 60 tons of canned fruit products produced per month. Similarly, fruit cocktail of 75 tonnes, pineapple slice of 80 tonnes, pineapple juice of 80 tonnes, pulp of 85 tonnes and pineapple titbits of 45 tonnes quantity produced per month. The price per kg of products ranged between 45 and 48 rupees. The total amount earned from the processed products was about Rs.195.45 lakhs per month.

Table 4.8: Processing of fruit products by Fresh Fruit Processing Pvt. Ltd.

Sl. No	Products	Quantity produced per month (tonnes)	Price (Rs. /kg)	Amount (Rs.in lakhs)
1.	Canned products	60	48	28.80
2.	Fruit cocktail	75	45	33.75
3.	Pineapple slice	80	48	38.40
4.	Pineapple juice	80	45	36.00
5.	Pulp	85	45	38.25
6.	Pineapple titbits	45	45	20.25
	Total	425		195.45

4.2.3 Sales details of processed fruit products of Fresh Fruit Processing Pvt. Ltd.

Sales details of Fresh Fruit Processing Pvt. Ltd. depicted in Table 4.9. Fresh Fruit Processing Pvt. Ltd. is selling canned fruit products at the rate of Rs.48 per kg and quantity of 15 tonnes to the manufacturers, 20 tonnes to the traders and 25 tonnes to the wholesalers per month. It's returning around Rs.28.80 lakhs. Similarly, the product like fruit cocktail is selling at the rate of Rs.45 per kg and quantity of 20 tonnes to manufacturers and traders each and 35 tonnes to the wholesalers. It's returning around Rs.33.75 lakhs.

Table 4.9: Sales details of processed fruit products of Fresh Fruit Processing Pvt. Ltd.

Sl. No.	Products	Quantity sold (tonnes/month)			Price (Rs. /kg)	Amount (Rs. in lakhs)			Total (Rs. in lakhs)
		Manufacturers	Traders	Wholesalers		Manufacturers	Traders	Wholesalers	
1.	Canned products	15	20	25	48	7.20	9.60	12.00	28.80
2.	Fruit cocktail	20	20	35	45	9.00	9.00	15.75	33.75
3.	Pineapple slice	25	25	30	48	12.00	12.00	14.40	38.40
4.	Pineapple juice	20	25	35	45	9.00	11.25	15.75	36.00
5.	Pulp	25	25	35	45	11.25	11.25	15.75	38.25
6.	Pineapple titbits	12	10	23	45	5.40	4.50	10.35	20.25
Total		117	125	183		53.85	57.60	84.00	195.45

Pineapple slice is selling at the rate of Rs.48 per kg and quantity of 30 tonnes is selling to the wholesalers and 25 tonnes each to both manufacturers and traders. It's returning around Rs.38.40 lakhs. Pineapple juice is selling at the rate of Rs.45 per kg and quantity of 20 tonnes is selling to manufacturers, 25 tonnes to the traders and 35 tonnes to the wholesalers. It's returning around Rs.36.00 lakhs.

Pulp is another processed fruit product selling at the rate of Rs.45 per kg and quantity of 25 tonnes to the manufacturers, 25 tonnes to traders and 35 tonnes to wholesalers. It's returning around Rs.38.25 lakhs. Pineapple titbits is selling at the rate of Rs.45 per kg and quantity of 12 tonnes to manufacturers, 10 tonnes to traders and 23 tonnes to wholesalers. It's returning around Rs.20.25 lakhs.

4.2.4 Raw material procurement by Fresh Fruit Processing Pvt. Ltd.

The value for the raw material procurement by Fresh Fruit Processing Pvt. Ltd. is presented in Table 4.10. The raw materials like fruits, sugar, citric acid, packaging materials, cans and firewood were procured for processing of fresh fruit products.

Fruits were procured valued at Rs.410 lakhs in 2009. There has been increase in the procurement to Rs.600.26 lakhs in 2017-18. Sugar was procured for a value of Rs.70.62 lakhs to Rs.104.14 lakhs. The results reveal that there was an increase in trend of raw material procurement over the years ranged from Rs. 750.15 lakhs (2009) to Rs.1119.03 lakhs (2018). Similarly, citric acid was procured at the value of Rs.2.02 lakhs (2009) to Rs.3.40 lakhs (2018). Packaging materials were procured at the value of Rs. 27.98 lakhs (2009) to Rs. 41.56 lakhs. Cans of various sizes were procured at the value of Rs.240.58lakhs in 2009-10 to Rs.356.65 lakhs in 2017-18. The firewood was procured at the value of Rs.8.95 lakhs (2009) to Rs. 13.02 lakhs (2018).

The table highlights that there was an increase in trend of procurement of raw materials over the years ranged from Rs. 760.15 lakhs (2009-10) to Rs.1119.03 lakhs (2017-18). The reasons attributed for increase in the procurement was due to increased demand for processed fruit products from the end consumers.

Table 4.10: Raw material procurement from Fresh Fruit Processing Pvt. Ltd.**(Value in Lakh Rs.)**

Sl. No.	Raw materials	Years									
		2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
1.	Fruits	410.00	430.50	449.87	470.11	493.62	515.83	539.04	560.61	585.83	600.26
2.	Sugar	70.62	74.15	77.49	80.20	84.21	88.00	92.15	95.83	99.67	104.14
3.	Citric acid	2.02	2.12	2.21	2.29	2.40	2.49	2.85	2.97	3.10	3.40
4.	Packaging material	27.98	29.38	30.30	31.93	33.52	34.86	36.65	38.12	39.64	41.56
5.	Cans	240.58	252.61	210.32	270.60	284.14	295.5	302.12	314.21	326.77	356.65
6.	Firewood	8.95	9.40	9.77	10.01	10.51	11.25	11.65	12.36	12.68	13.02
Total		760.15	798.16	779.96	865.14	908.4	947.93	984.46	1024.1	1067.69	1119.03

Source: Audit Report of Fresh Fruit Processing Pvt. Ltd. (2009-10 to 2017-18)

4.3 Supply chain mapping of fresh fruits

4.3.1 Backward and forward linkages of Fresh Fruit Processing Pvt. Ltd.

In agriculture, backward linkages refer to channels through which the raw materials, services, information and flow of money between a farm and its suppliers and forward linkage refer to channels through which outputs, service, information and flow of money between a farm and customers /consumers.

The backward and forward linkages of Fresh Fruit Processing Pvt. Ltd. are presented in the form of flowchart in fig.2. The backward linkage of Fresh Fruit Processing Pvt. Ltd. consists of farm, farmers, commission agents and wholesalers. Similarly, the forward linkage consists of the processed products produced by the Fresh Fruit Processing Pvt. Ltd. and marketing channels includes other manufacturers, sales agents, wholesalers, retailers and consumers.

4.3.1.1 Backward linkages of Fresh Fruit Processing Pvt. Ltd.

The backward linkage of Fresh Fruit Processing Pvt. Ltd. is presented in fig.2. Fresh Fruit Processing Pvt. Ltd. procured fruits from farmers of nearby villages of Sirsi and Soraba taluk and wholesalers from Sirsi and also from other state like Maharastra. Commission agents play an important role in connecting the farmers with the processing firm.

Fresh Fruit Processing Pvt. Ltd. is processing fresh fruit products in its processing unit. This processed fruit products, manufactured by its own fruit processing unit situated in Banavasi village.

4.3.1.2 Forward linkages of Fresh Fruit Processing Pvt. Ltd.

The forward linkage of Fresh Fruit Processing Pvt. Ltd. is presented in fig.2. Fresh Fruit Processing Pvt. Ltd. processed fruit products like canned fruit products, fruit cocktail, pineapple juice, pineapple slice, pulp etc. These processed products are marketed through various channels like other manufacturers, sales agents, wholesalers, retailers and consumers in domestic market.

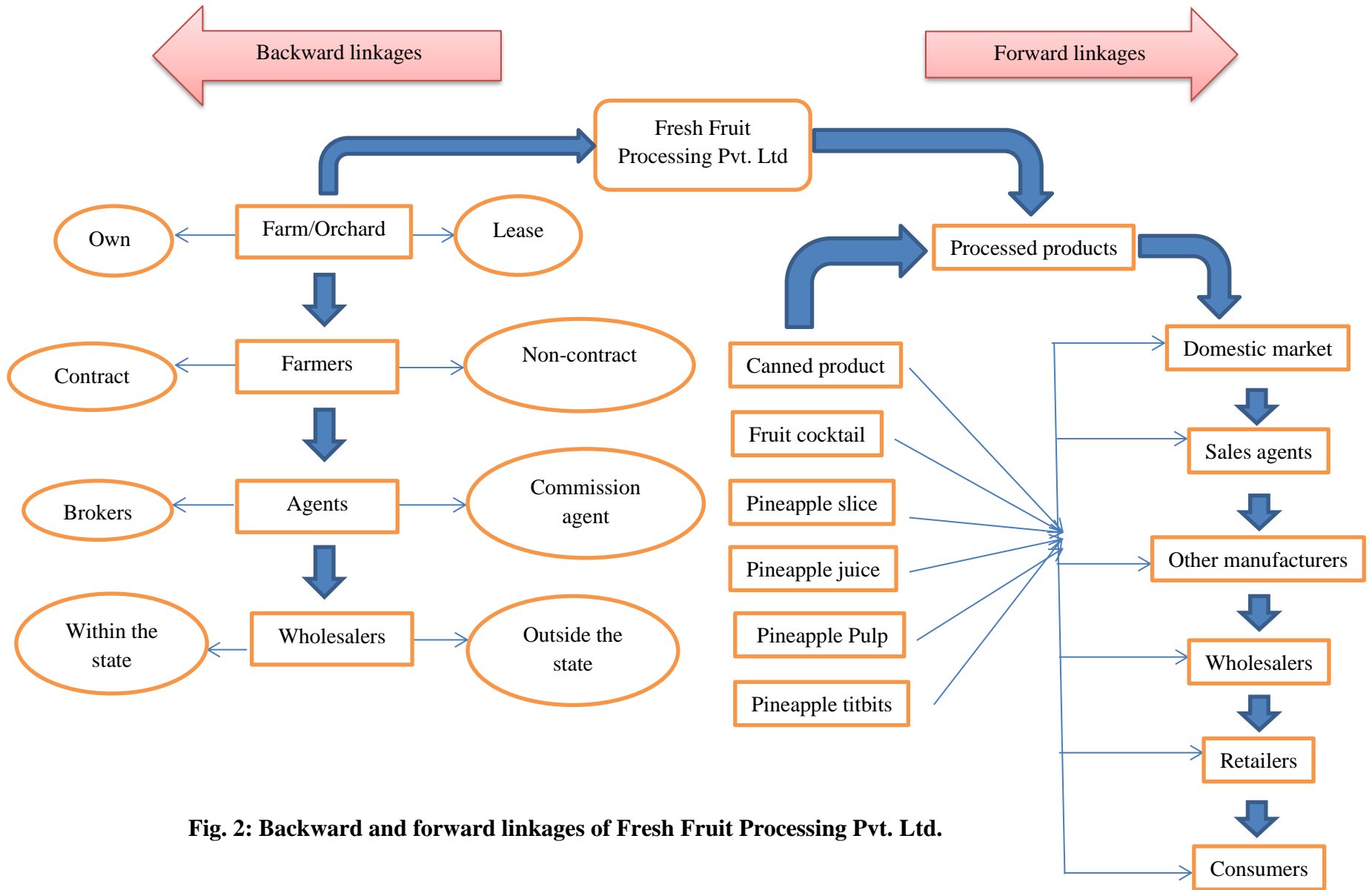


Fig. 2: Backward and forward linkages of Fresh Fruit Processing Pvt. Ltd.

Thus, it is clearly indicates that the supply chain management followed by Fresh Fruit Processing Pvt. Ltd. (Fig.2) is very complex and dynamic in nature. Fresh Fruit Processing Pvt. Ltd. has been able to create both backward and forward linkages that help the farmers and also the end consumers. As a result, the farmers are benefitted in terms of assured reasonable price for their produce and also consumers through supply of quality products at reasonable price.

4.4 Financial and business performance of Fresh Fruit Processing Pvt. Ltd.

4.4.1 Compound annual growth rate of net sales of processed products of Fresh Fruit Processing Pvt. Ltd.

The annual compound growth rate of net sales of processed products was estimated for Fresh Fruit Processing Pvt. Ltd. by using exponential growth function as indicated in methodology is depicted in Table 4.11. The growth rate was computed for the period of 2008-09 to 2017-18 revealed that during these ten years period, the processing firm registered annual compound growth rate of 8.00 per cent of net sales.

Table 4.11: Compound annual growth rate of net sales of processed products of Fresh Fruit Processing Pvt. Ltd.

Sl. No	Year	Net sales (lakh Rs.)
1.	2008-09	968.52
2.	2009-10	1012.35
3.	2010-11	1057.91
4.	2011-12	1125.45
5.	2012-13	1175.68
6.	2013-14	1225.45
7.	2014-15	1465.12
8.	2015-16	1628.35
9.	2016-17	1754.25
10.	2017-18	1968.25
CAGR (%)		8.00***

Note: *Statistically significant at 1% level**

The results from the analysis revealed that the growth rate was positive and statistically significant. Therefore, it may be concluded that the capacity expansion of the Fresh Fruit Processing Pvt. Ltd. paved the way for growth in the procurement. The net sales (value in Lakh Rs.) analysis expressed in financial terms was highly significant. Thus, it may be said that the increasing demand from the market intermediaries such as wholesalers, retailers for processed fruit products due to rise in the awareness about the brands in end consumers, the net sale of total processed products of Fresh Fruit Processing Pvt. Ltd. has expanded 8.00 per cent. Suprabha (2009) also reported similar findings in her study of the business performance of Karnataka Oilseed Federation Ltd.

4.4 Financial performance of Fresh Fruit processing Pvt. Ltd.

4.4.1 Liquidity Ratios

Liquidity ratios indicate the ability of a firm to pay off its short-term liability. The higher the ratio better will be the ability of firm to pay off its liability. Current ratio and acid test ratios were used to analyze the liquidity position of the Fresh Fruit Processing Pvt. Ltd.

As per the result (Table 4.12), it showed that the current ratio has improved over the years *i.e.*, from 1.84 (2009) to 1.86 (2018). The maximum ratio was 2.78 (2013) and minimum was 1.84 (2009). And the average current ratio over the years was 2.29. Generally, the firm should maintain acceptable level of current ratio *i.e.*, 2:1 to meet the current short term financial obligations. But the ratio greater than one is also acceptable as the current assets of the firm were enough to pay off all its current liabilities.

The results revealed that the average of acid-test ratio over the period of ten years was 1.96. The maximum ratio was 2.55 (2015) and minimum was 1.39 (2018). A ratio of 1:1 would be considered as a suitable standard. The above table indicated that acid-test ratio showed satisfactory result and can meet all its short term financial obligations.

Finally, the results of liquidity ratio projects that Fresh Fruit Processing Pvt. Ltd. was in a good position to meet all its current financial obligations.

4.4.2 Leverage Ratios

Solvency ratio indicates whether firm's cash-flow is sufficient to meet its medium- and long-term liabilities. Long term lenders, financial institutions, debenture holders and other stakeholders are more concerned with company's long-term financial strength.

It was found that (Table 4.12), debt equity ratio maximum recorded was 1.47 (2009) and the minimum was 0.76 (2014). It was observed to be below two in every year with an average of 1.00 over the ten years. This implies that company's dependency on outside borrowing was very less and the investment made by the equity shareholders was very high. This indicated that the processing firm is capable of managing its own funds effectively by avoiding excessive dependence on borrowed funds to earn higher returns on equity.

A coverage ratio has increased over the years i.e., from 2.72 (2009) to 3.32 (2018). The maximum ratio was 3.32(2018) and the minimum was 2.63(2012). It also indicated the average coverage ratio was 2.92. This result showed that higher the coverage ratio, the easier it should be to make interest payments on its debt or pay dividends. Thus, it can be concluded that the processing firm has the ability to meet all its long term financial obligations.

4.4.3 Activity/Turnover Ratios

Turnover ratios assess how effectively a firm is able to generate revenue in the form of cash and sales based on asset, liabilities and capital. Higher the ratios mean the firm is using its assets more efficiently. Hence, to study the operational efficiency of the firm, activity ratios like inventory turnover, net asset, current asset and working capital turnover ratios were calculated.

The inventory turnover ratio ranged between 16.39 (2009) to 22.90 (2018) and the average was 18.67 for the ten-year period. The average inventory turnover ratio (Table 4.12) of 18.67 implies that the processing firm was turning its inventory of finished products into sales 18.67 times in a year. In other words, it holds an average inventory of

19 days. The ratio showed the satisfactory result because higher inventory turnover ratio was desirable for the growth and expansion of business of the processing firm.

Net asset turnover ratio had an average value of 3.41, maximum of 4.31 (2018) and minimum of 2.62 (2017). Net asset turnover ratio over the ten years period was 3.41 which means the firm was producing Rs.3.41 of sales for one rupee of capital employed in net assets.

The current asset turnover ratio had maximum value of 4.09 (2018) and minimum value of 2.13 (2009). The average value over the years was 2.91. It was noticed that the average value of current asset turnover was 2.91 means that the processing firm turns over its fixed assets faster than current assets.

The working capital turnover ratio had an average value of 6.03, maximum value of 10.69 (2018) and minimum of 3.30 (2015). The average value of working capital turnover (sales to net current assets) ratio was 6.03 implies that for one rupee of sales the firm needs Rs.71 of net current assets. Thus, long term sources of funds and bank borrowings helped to meet this gap.

4.4.4 Profitability Ratios

The profitability ratios were analyzed for measuring the efficiency of the processing firm utilizing their resources for generating the profits. The profitability of the processing firm was assessed through various types of profitability ratios like gross profit margin ratio, net profit margin ratio, operating expense ratio and return on investment.

Gross profit margin ratio was found to be maximum of 10.85 (2018) and minimum of 8.04 (2009). The average value was 10.32 per cent over the period of ten years. A high gross profit ratio was the indication of better management of the firm. (Table 4.12) showed that gross profit margin ratio was almost same over the years since 2009. Thus, it can be concluded that the firm has scope for improvement in its gross profit margin.

Table 4.12: Financial performance of Fresh Fruit Processing Pvt. Ltd.

Sl. No.	Financial Ratios	Reference period (Years)											Average	Max	Min
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018				
I.	Liquidity Ratios														
a)	Current Ratio	1.84	2.12	2.34	2.66	2.78	2.31	2.81	2.25	1.95	1.86	2.29	2.78	1.84	
b)	Acid-test Ratio	1.42	1.72	1.95	2.29	2.44	2.09	2.55	2.04	1.73	1.39	1.96	2.55	1.39	
II.	Leverage Ratios														
a)	Debt-equity Ratio	1.47	1.19	1.08	0.90	0.80	0.76	0.88	1.18	0.89	0.92	1.00	1.47	0.76	
b)	Coverage Ratio	2.72	2.67	2.77	2.63	2.74	2.89	3.04	3.28	3.17	3.32	2.92	3.32	2.63	
III.	Activity/Turnover Ratios														
a)	Inventory Turnover Ratio	16.39	16.74	17.54	18.22	19.27	20.75	20.99	21.43	22.90	12.50	18.67	22.90	12.50	
b)	Net Asset Turnover Ratio	4.31	3.96	3.78	3.48	3.24	3.26	2.82	3.19	2.62	3.48	3.41	4.31	2.62	
c)	Current Asset Turnover Ratio	4.09	3.53	3.20	2.83	2.60	2.25	2.13	2.23	2.88	3.42	2.91	4.09	2.13	
d)	Working Capital Turnover Ratio	10.69	8.71	7.86	4.52	4.06	3.96	3.30	4.01	5.89	7.37	6.03	10.69	3.30	
IV.	Profitability Ratios														
a)	Gross Profit Margin	8.04	10.60	10.75	10.40	10.38	10.43	10.61	10.84	10.70	10.85	10.36	10.85	8.04	
b)	Net Profit Margin	2.7	3.57	3.75	3.41	3.20	4.76	2.89	3.15	3.96	4.77	3.71	4.77	2.89	
c)	Operating Expenses Ratio	4.18	5.48	5.44	5.53	5.53	5.62	5.73	5.81	5.8	5.83	5.59	5.83	5.18	
d)	Return on Investment	8.71	9.35	10.55	9.78	9.82	10.68	11.12	12.43	12.38	13.46	10.92	13.46	9.35	

Net profit margin ratio had an average value of 6.52 per cent over the years from 2009 to 2018, maximum value of 4.77 per cent (2018) and minimum value of 2.7 per cent (2009). A firm with high net profit margin can make better use of favourable conditions such as decrease in cost of production, increase in selling price and demand for the product. It was noticed that the average value of net profit margin was 6.52 per cent found to be satisfactory.

But the ratio was stagnant and decreasing since 2015 indicates that operating expenses related to sales has decreasing.

Operating expense ratio over the years had the maximum value of 5.83 per cent (2018), minimum value of 4.18 per cent (2009) and average value of 5.49 per cent.

Return on investment was found to be at a maximum of 13.46 per cent (2018) and minimum of 8.71 per cent (2009) and had an average value of 10.82 per cent from 2009 to 2018. This value implies that return on investment for the total asset was on an average 10.82 per cent and this was equivalent of return on capital employed.

4.5 Constraints in processing and marketing of processed fruit products.

4.5.1 Constraints faced by sample farmers in production and marketing of fresh fruits

The survey was conducted to know the constraints faced by farmers during production and post-harvest management of farm produce (Table 4.13). Based on the results of Garrett's test, it was found that Non-availability of labour was major problem and hence it was ranked first. This problem becomes serious because of migration of rural population towards urban areas in search of various jobs.

This constraint was followed by marketing constraints i.e., the farmers were not getting proper price for their farm produce. One of the main reasons for this problem was commission agents, lack of proper market facility in nearby places. High wage rate is also a major problem for agricultural production in the study area.

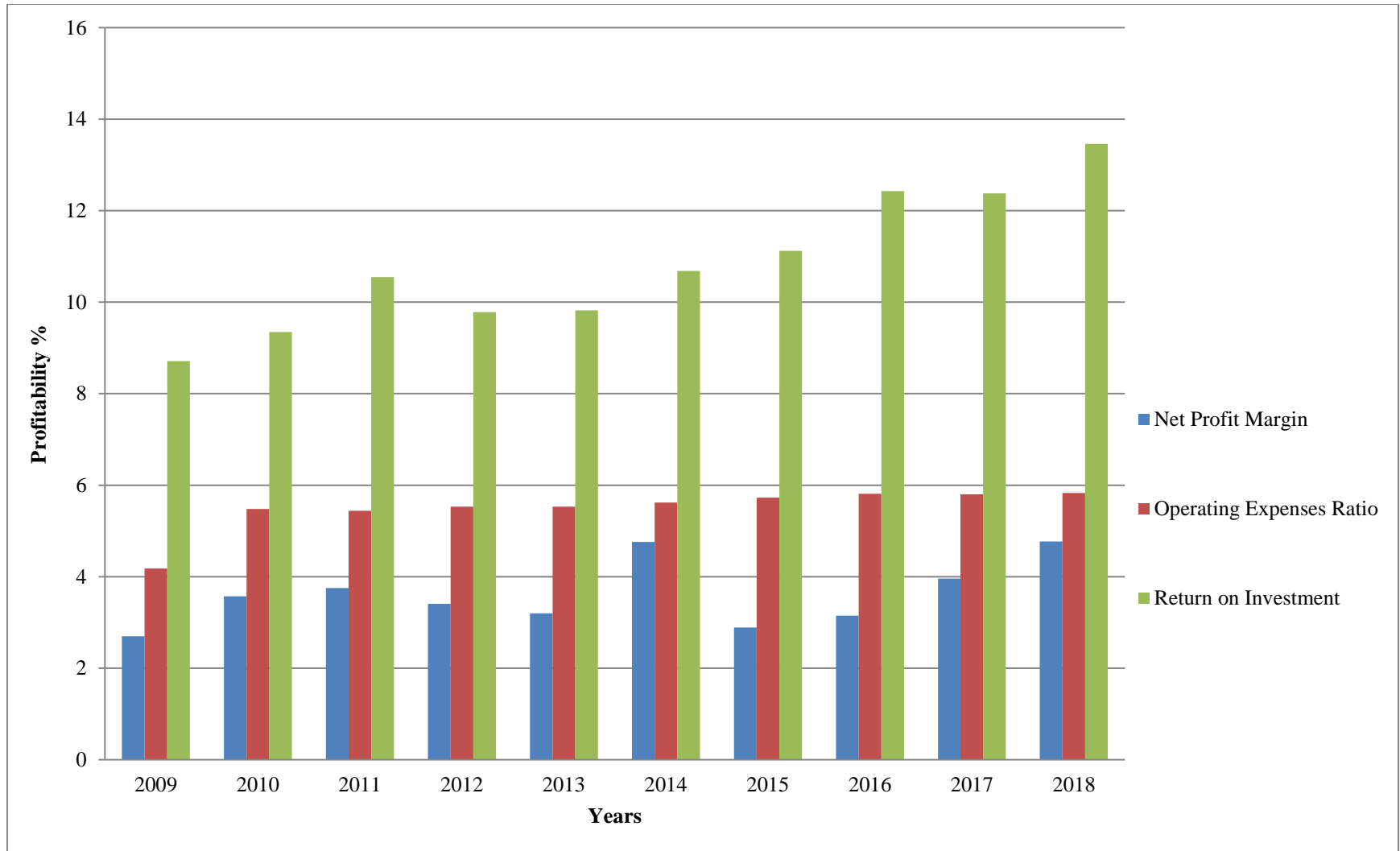


Fig. 3: Profitability percentage of Fresh Fruit Processing Pvt. Ltd.

Environmental factors like natural calamities were also a problem. Lack of storage facility for storing harvested farm produce followed by transportation because, there is no proper market in nearby places and cost of transportation was high depending on the distance to the market.

Unawareness about new technology about farming and post-harvest related activities was one of the constraints in the study area. Loss due to damage by storage pest was another problem for the loss of farm produce. This was mainly due to lack of storage facility, hence the sample farmers were kept their farm produce in casual manner. Non-availability of required land was the problem because farmers were interested to cultivate more, but due to limitation in the land leading to decreasing production and income.

Table 4.13: Constraints faced by sample farmers in production and marketing of fresh fruits

Sl. No.	Constraints	Mean score	Rank
1.	Non- availability of labour	63.50	I
2.	Marketing constraints	62.13	II
3.	High wage rate	55.00	III
4.	Natural calamities	53.40	IV
5.	Lack of storage facility	52.26	V
6.	Lack of transportation	41.50	VI
7.	Unawareness about new technology	41.10	VII
8.	Loss due to damage by storage pest	40.23	VIII
9.	Non availability of required land	38.00	IX

4.5.2 Constraints faced by Fresh Fruit Processing Pvt. Ltd. in processing and marketing of processed fruit products

The processing and marketing constraints faced by processing firm were listed through the opinion survey (Table 4.14). As per the response, Electricity problem becomes the major problem and hence it was ranked first. As the processing firm is modernised, use of machineries were also increased and for the better work throughout the day needs electricity. Hence, regular supply of electricity is considered as pre-requisite for maximum utilisation of installed capacity. Similar results were observed by Deepak in his study on business performance of KOF.

Non-availability of labour is next serious problem faced by processing firm especially during the peak season of production. This was followed by wastage of fruits and vegetables during transportation and handling since the produce is perishable in nature. Lack of technical experts was another major problem because of increase in the use of machineries needs more technical experts for better handling of that equipment.

Non-availability of raw materials during non-season was also one of the constraints. Due to this problem, the production of the product which would fetch great demand in the market was also reduced. This was followed by maintenance of equipment. Because, most of the equipment was imported from other countries so the availability of spare parts and its repair becomes the major issue.

Transportation was one of the major problems faced by processing firm. This includes lack of transportation service due to transport operators frequent strike issue and also high transportation cost. Labour cost was also a problem to processing firm. Another problem was marketing because of competition among the different manufacturers and processors. Insufficient capital is also becomes problem sometimes because capital is pre-requisite for the expansion of the business.

Table 4.14: Constraints faced by Fresh Fruit Processing Pvt. Ltd. in processing and marketing of processed fruit products

Sl. No.	Constraints	Rank
1.	Irregular power supply	I
2.	Non-availability of labour	II
3.	Wastage of F&V during transportation and handling	III
4.	Lack of technical experts	IV
5.	Non- availability of raw material	V
6.	Maintenance of equipment	VI
7.	High transportation cost	VII
8.	Increase in the labour cost	VIII
9.	Marketing of products	IX
10.	Insufficient capital	X

4.5.3 Constraints faced by wholesalers and retailers in marketing of processed products

The survey was conducted to know the constraint faced by wholesalers and retailers (Table 4.15). Based on the results obtained from Garrett's test, competition from the substitute products sold by wholesalers and retailers of the study area was considered as the major problem. Hence, it was ranked first. This was followed by poor quality of the product since; the processed products were prepared by fruits and vegetables which are perishable in nature. Fluctuation in the price of the product was one of the major constraints faced by wholesalers and retailers of the study area because, during off season the price is low and demand for the products are also less when compare with seasonal conditions.

Marketing risk was another problem because of less demand for the products during off season and keeping quality is also one of the reasons that constitute marketing

risk for wholesalers and retailers. This was followed by lack of transportation facility due to often strike by the transport operators and high transportation cost was also creating problem for wholesalers and retailers. Similar results were observed by Deepak in his study on business performance of KOF. Challenge of retaining existing customers also become problem because of non-availability of all types of the products based on the needs of the customers in the study area.

The lack of storage facility was considered as one of the problem faced by wholesalers and retailers. This was followed by wastage during transport and handling.

Table 4.15: Constraints faced by wholesalers and retailers in marketing of processed products

Sl. No.	Constraints	Mean score	Rank
1.	Competition from substitute products	68.8	I
2.	Poor quality of product	64.4	II
3.	Fluctuation in the price of the product	59.3	III
4.	Marketing risk	57.4	IV
5.	Lack of transportation facility	46.3	V
6.	Challenge of retaining the existing customers	38.6	VI
7.	Lack of storage facility	34.8	VII
8.	Wastage during transport and handling	26.4	VIII

V SUMMARY AND POLICY IMPLICATIONS

Horticulture sector has become one of the major drivers of the growth in agriculture sector. Horticulture crops, particularly fruits and vegetables are mostly grown by small and marginal farmers and helps in increasing the income of farmers. Fruits and vegetables are rich source of vitamins, minerals, proteins, and carbohydrates etc., plays an essential role in human nutrition. Thus, these are considered as protective foods and helps for nutritional security of the people. The sector has gained importance over last few years contributing increasing share in GVA of the agriculture and allied sector.

India is regarded as sixth largest country in food and grocery market in the world. In this regard, retail sector plays a prominent role constitutes around 70 per cent of the sales. The Indian food processing industry contributes for about 32 per cent of the country's total food market. Food processing industry is one of the largest industries in India and is ranks fifth in terms of production, consumption and export.

As per the latest estimates by Central Institute of Post-Harvest Engineering and Technology (CIPHET), Ludhiana, it is reported that the wastage of fresh horticultural produce in India is up to 18 per cent due to poor post-harvest management practices. In Karnataka, only about one per cent of the total production of fruits and vegetables is currently being processed for value addition. About 25 – 30 per cent of post-harvest loss is estimated due to inadequate cold storage, transport, poor handling, insufficient processing and other value addition facilities.

Uttara Kannada district is one of the major horticulture crops producing districts grown pineapple, sapota, banana *etc.* and most of the farmers sell their produce to nearby market and processing firm in order to reduce the wastage of fruits. Hence, there is huge scope for processing of perishable horticultural produce such as fruits and vegetables. With this background, the following specific objectives were framed.

- i. To analyse the procurement and processing of fresh fruits by Fresh Fruit Processing Pvt. Ltd.
- ii. To examine the supply chain management of fresh fruits.
- iii. To analyse the financial and business performance of Fresh Fruit Processing Pvt. Ltd.
- iv. To document the constraints faced in processing and marketing of the products.

5.1 Methodology

For the purpose of studying the business growth and performance of Fresh Fruit Processing Pvt Ltd, the data were collected from both primary and secondary sources. The data were collected from 30 farmers, 5 wholesalers, 5retailers and 30 consumers in Sirsi taluk of Uttara Kannada district through personal interview method. The secondary data were drawn from annual reports and audit records maintained by Fresh Fruit Processing Pvt. Ltd. The statistical tools and techniques employed to analyse and interpret the objectives of present study were descriptive statistics, supply chain mapping, financial ratio analysis and Garrett's ranking technique.

5.2 Major findings of the study

1. Majority of the sample farmers found to be above the age of 50 years (37%). About 33.00 per cent of the farmers were completed primary school.
2. Agriculture was the main occupation of the sample respondents in the study area. Among them, 83 per cent were non-contract farmers and only 17 per cent were contract farmers and their average annual income was Rs.73,267.
3. Total area under cultivation of various crops by the sample farmers was 163.25 acres. Out of this, pineapple crop occupied major area under cultivation (43%) in the study area.

4. Majority of the sample wholesalers (40%) were within the age of 30 to 50 years. About 80 per cent of the wholesalers were completed pre-university education and most of the wholesalers (60%) had experience of more than 15 years in marketing.
5. Majority of the sample retailers (40%) were within the age of 40 to 50 years. About 40 per cent of the retailers were completed secondary and pre-university education and most of the retailers (60%) had experience of 5-15 years in marketing.
6. Majority of the sample consumers were between the age group of 20 and 40 years. About 66.67 per cent of the consumers were comes under the category of pre-university and above graduation in their education.
7. Among the sample consumers, majority (33.33%) were students followed by private job holders (20%) and the monthly income of around 26.66 per cent of consumers were earning less than Rs.10,000.
8. Fresh Fruit Processing Pvt. Ltd. procured fruits from both wholesalers of fruits and vegetables of Sirsi and Maharashtra constitutes about 68.37 per cent followed by farmers of Sirsi and Soraba taluk constitutes about 31.62 per cent of total procurement.
9. Among the fruits, pineapple, papaya, muskmelon, grapes and cherry were procured for processing. Monthly expenditure of Fresh Fruit Processing Pvt. Ltd. for the procurement of fruits from farmers was Rs.2,01,000 and from wholesalers was Rs.3,40,000.
10. Fresh Fruit Processing Pvt. Ltd. processed fruit products like canned fruit products, fruit cocktail, pineapple slice, pulp, pineapple juice and pineapple titbits with a total quantity of 425 tonnes per month and total amount earned from the processed products was around Rs.1,95,45,000 per month.

11. Fresh Fruit Processing Pvt. Ltd. sold the quantity of 183 tonnes of processed fruit products to wholesalers followed by 125 tonnes to traders and 117 tonnes to manufacturers. The price was ranged between Rs.45 to 48 per kg.
12. Liquidity ratios like current ratio with an average of 2.29 and acid-test ratio of 1.96 showed satisfactory results and projects that Fresh Fruit Processing Pvt. Ltd. was in a good position to meet all its current financial obligations and more efficient in using the working capital and had the ability to convert inventory into sales.
13. The results of leverage ratios of Fresh Fruit Processing Pvt. Ltd. shows that debt-equity ratio ranging from 1.47 to 0.92 implies that the processing firm was capable of managing its own funds effectively by avoiding excessive dependence on borrowed funds to earn higher returns on equity. And average value of coverage ratio was 2.92 indicates that higher the coverage ratio, the easier it should be to make interest payments on its debt. Thus, it can be concluded that the processing firm has the ability to meet all its long term financial obligations.
14. The average inventory turnover ratio of Fresh Fruit Processing Pvt. Ltd. was 18.67 implies that the processing firm was turning its inventory of finished products into sales 18.67 times in a year showed satisfactory result because higher the inventory turnover ratio is desirable for the growth and expansion of their business.
15. Net asset turnover ratio had an average value of 3.41 implies that firm was producing Rs.3.41 of sales for one rupee of capital employed in the net assets and the average value of current asset turnover ratio was 2.91 which means Fresh Fruit Processing Pvt. Ltd turns over its fixed assets faster than current assets.
16. The results of activity ratios and asset turnover ratios indicated that Fresh Fruit Processing Pvt. Ltd. managed the assets efficiently through the higher sales volume.
17. Gross profit margin ratio (ranging from 8.04 to 10.85 per cent) and net profit margin ratio (ranging from 2.7 to 4.77 per cent) showed that ratio was almost same over the

- years since 2009. Thus, it can be concluded that Fresh Fruit Processing Pvt. Ltd. has scope for further improvement.
18. The compound annual growth rate of net sales of Fresh Fruit Processing Pvt. Ltd. over the years was 8.00 per cent which means there was increase in growth rate by 8 per cent annually.
 19. Constraints faced by the farmers in production and marketing of fruits were non availability of labour, not getting proper price for their produce, high wage rate, natural calamities, insufficient storage facility, high transportation cost, unawareness about new technology of farming, loss due to damage by storage pest and non-availability of cultivable land.
 20. Constraint faced by Fresh Fruit Processing Pvt. Ltd. were Irregular power supply, non-availability of labour, wastage of F&V during transportation / handling, lack of technical experts, non- availability of raw material, maintenance of equipment, high transportation cost, increase in the labour cost, marketing of products and capital.
 21. Constraints faced by wholesalers and retailers in marketing of processed products were increase in domestic competition, poor quality product issue, fluctuation in the price of the products, market risk, wastage during transport and handling, changing consumption trend, difficulties in finding the new customers, lack of transportation facility, challenge of retaining of existing customers and lack of storage facility.

5.3 Policy implications

1. Fresh Fruit Processing Pvt. Ltd. is purchasing fruits directly from farmers and market intermediaries. Hence, there is lot of scope for contract farming through which they can procure required raw material for the processing industry.
2. There is a great need for conducting contact meeting with producers and processors to encourage contract farming. So that producers will get more farm income.

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APPENDICES

Appendix-I: Major fruits producing countries in the world

Sl. No.	Country	2013			2014		
		Area	Production	Productivity	Area	Production	Productivity
1.	China	13.86	154.364	11.14	13.34	161.00	12.07
2.	India	6.94	82.632	11.91	7.15	88.48	12.38
3.	Brazil	2.29	37.774	16.50	2.25	37.41	16.62
4.	USA	1.13	26.986	23.88	1.14	25.95	22.72
5.	Mexico	1.28	17.553	13.71	1.30	17.85	13.70
6.	Spain	1.57	17.699	11.27	1.56	17.76	11.42
7.	Indonesia	0.71	16.003	22.54	0.73	17.37	23.65
8.	Philippines	1.23	15.887	12.92	1.31	16.23	12.37
9.	Italy	1.15	16.371	14.24	1.15	15.64	13.66
10.	Turkey	1.15	15.341	13.34	1.20	14.29	11.92
11.	Others	28.31	276.06	9.75	40.71	438.40	10.77

Area (Million ha) Production (million tonnes) Productivity (Tonnes/ha)

Source: FAOSTAT, 2017

Appendix-II: Area, production, productivity of horticulture crops in India from 2009-2017

Sl. No.	Year	Area (*000ha)	Production (*000MT)	Productivity (MT/ha)
1.	2009-10	20,876	2,23,089	10.69
2.	2010-11	21,825	2,40,531	11.02
3.	2011-12	23,243	2,57,277	11.07
4.	2012-13	23,694	2,68,848	11.35
5.	2013-14	24,198	2,77,352	11.46
6.	2014-15	23,410	2,80,986	12.00
7.	2015-16	24,472	2,86,188	11.69
8.	2016-17	24,925	2,95,164	11.84

Source: Horticultural Statistics at a Glance, 2017

Appendix-III: Area, production, productivity of fruit crops in India from 2009-2017

Sl. No.	Year	Area (*000ha)	Production (*000MT)	Productivity (MT/ha)
1.	2009-10	6329	71,516	11.30
2.	2010-11	6383	74,878	11.73
3.	2011-12	6705	76,424	11.40
4.	2012-13	6982	81,285	11.64
5.	2013-14	7216	88,977	12.33
6.	2014-15	6110	86,602	14.17
7.	2015-16	6301	90,183	14.31
8.	2016-17	6480	92,846	14.33

Source: Horticultural Statistics at a Glance, 2017

**Appendix-IV: Area, production, productivity of vegetable crops in India from
2009-2017**

Sl. No.	Year	Area (*000ha)	Production (*000MT)	Productivity (MT/ha)
1.	2009-10	7985	1,33,738	16.75
2.	2010-11	8495	1,46,554	17.25
3.	2011-12	8989	1,56,325	17.39
4.	2012-13	9205	1,62,187	17.62
5.	2013-14	9396	1,62,897	17.34
6.	2014-15	9542	1,69,478	17.76
7.	2015-16	10,106	1,69,064	16.73
8.	2016-17	10,290	1,75,008	17.01

Source: Horticultural Statistics at a Glance, 2017

Appendix V: Cost Estimates for Ginger

	Cost components	Units	Price/unit	Cost (Rs.)
A	Cost of land development			
1.	Land levelling and ploughing	1 Acre	5000	5000
2.	Establishment of micro sprinkler irrigation	1 Acre	25000	25000
	Total (A)			30000
B	Cost of inputs			
1.	Planting material	8Qtl.	4000	32000
2.	Fertilizers	1 Acre	9000	9000
3.	Chemicals	1 Acre	6000	6000
4.	Manures (20t/acre)	1 Acre	25000	25000
	Total (B)			72000
C	Cultivation cost (Labour cost)			
1.	Preparation of nursery beds	1 Acre	10000	10000
2.	Planting	1 Acre	2000	2000
3.	After care (cultural practices like fertiliser application, irrigation, harvesting)	1 Acre	20000	20000
4.	Contingency	1 Acre	2000	2000
	Total (C)			34000
	Grand Total (A+B+C)			136000
Income				
	Crop	Ginger		
	Acrage	1		
	Yield/acre (qtl.)	120		
	Price	2500		
	Total income	300000		

Appendix VI: Cost Estimates for Paddy (Transplanted)

	Cost components	Units	Price/unit	Cost (Rs.)
A	Cost of Inputs			
1.	Seeds	20 kg	20	400
2.	Fertilisers	1Acre	2600	2600
3.	Chemicals	1Acre	1000	1000
4.	Manures @5 t/acre	1Acre	6000	6000
	Total (A)			10000
B	Cultivation Cost			
1.	Land preparation	1Acre	10000	10000
2.	Transplanting	1Acre	5600	5600
3.	After Care (includes fertiliser application, irrigation, harvesting etc.)	1Acre	8000	8000
4.	Contingency	1Acre	2000	2000
	Total (B)			25600
	Grand Total (A+B)			35600
Income				
	Crop	Paddy		
	Acrage	1		
	Yield/acre (qtl.)	20		
	Price	1250		
	Paddy straw	8000		
	Total income	33000		

Appendix VII: Cost Estimates for Pineapple

	Cost components	Units	Price/unit	Cost (Rs.)
A	Cost of land development			
1.	Land levelling and ploughing	1 Acre	5000	5000
2.	Establishment of micro sprinkler irrigation	1 Acre	25000	25000
	Total (A)			30000
B	Cost of inputs			
1.	Planting material (Suckers)	12000	4	48000
2.	Fertilizers & Chemicals (NPK – 12:4:12g/plant)	12000	1	12000
3.	Manures (20t/acre)	1 Acre	25000	25000
4.	Grass rings (protection from sun scorch)	12000	0.25	3000
	Total (B)			88000
C	Cultivation cost (Labour cost)			
1.	Digging of trenches (sq.ft)	36000	0.5	18000
2.	Planting (Suckers)	12000	0.5	6000
3.	After care (cultural practices like fertiliser application, irrigation, harvesting)	1 Acre	10000	10000
4.	Contingency	1 Acre	2000	2000
	Total (C)			36000
	Grand Total (A+B+C)			154000
Income				
	Crop	Pineapple		
	Acrage	1		
	Yield/plant (kgs.)	1.75		
	Total yield	21000		
	Price	10		
	Total income	210000		

PHOTOGRAPHS

