A STUDY ON BUSINESS OPPORTUNITIES IN FINANCING SUPPLY CHAIN OF FRUITS AND VEGETABLES IN HYDERABAD

BY

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B.Sc. (CA&BM)

PROJECT REPORT SUBMITTED TO PROFESSOR JAYASHANKAR TELANGANA STATE AGRICULTURAL UNIVERSITY IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF

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2017

DECLARATION

I, **ATIFA TAMKEEN,** hereby declare that the thesis entitled **" A STUDY ON BUSINESS OPPORTUNITIES IN FINANCING SUPPLY CHAIN OF FRUITS AND VEGETABLES IN HYDERABAD"** submitted to **Professor Jayashankar Telangana State Agricultural University** for the degree of **Master of Business Administration** in School of Agribusiness Management in the major field of **Agribusiness Management** is the result of the original research work done by me. I also declare that no material contained in the report has been published earlier in any manner.

Place: Hyderabad **(ATIFA TAMKEEN)**

Date: **I. D. NO**. **RMBA/15-02**

CERTIFICATE

Ms. ATIFA TAMKEEN has satisfactorily prosecuted the course of research and that thesis entitled **"A STUDY ON BUSINESS OPPORTUNITIES IN FINANCING SUPPLY CHAIN OF FRUITS AND VEGETABLES IN HYDERABAD"** submitted is the result of original research work and is of sufficiently high standard to warrant its presentation to the examination. I also certify that neither the thesis nor its part thereof has been previously submitted by her for a degree of any university.

Date: **(Dr. P.RADHIKA)**

Chairperson

CERTIFICATE

This is to certify that the thesis entitled **" A STUDY ON BUSINESS OPPORTUNITIES IN FINANCING SUPPLY CHAIN OF FRUITS AND VEGETABLES IN HYDERABAD"** submitted in partial fulfillment of the requirements for the degree of 'Masters of Business Administration' of the Professor Jayashankar Telangana State Agricultural University, Hyderabad, is a record of the bonafide original research work carried out by **Ms. ATIFA TAMKEEN** under our guidance and supervision.

No part of the thesis has been submitted by the student for any other degree or diploma. The published part and all assistance received during the course of investigations have been duly acknowledged by the author of the thesis.

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Date:

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LIST OF SYMBOLS AND ABBREVIATIONS

&	:	And
%	:	Per cent
APEDA	:	Agricultural and Processed Food Products Export Development Authority
APMC	:	Agricultural Produce Marketing Committee
et al.	:	and other people
etc.	:	and so on
Ha	:	Hectare
i.e.,	:	That is
kg	:	Kilogram
MT	:	Million Tonnes
NHB	:	National Horticulture Board
PHC	:	Pre- Harvest Contractor
Rs.	:	Rupee
SCM	:	Supply Chain Management
t	:	Tonne
t/ha.	:	Tonne per hectare
viz.	:	namely

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ABSTRACT

The newly formed state of Telangana with a total geographical area of 114.84 lakh Ha has 80 per cent of its population dependent on farming. Hyderabad is the capital city of the newly formed Telangana state, occupying 650 square kilometers (250 sq m) along the banks of the Musi river.

It has a population of about 6.7 million and a metropolitan population of about 7.75 million, making it the fourth most populous city and sixth most populous urban agglomeration in India. A well-developed road, rail and air network, increased awareness among consumers for nutritive diet, blooming of retail chains in Hyderabad provide

impetus for demand of vegetables and fruits. The state of Telangana has 31 districts out of which 30 districts are witnessing agricultural, horticulture and allied activities. The total area under horticulture in Telangana was 8.20 lakh Ha and production was 94.54 lakh MT of horticultural crops in the year 2014-15. It stood 11^{th} in the area and 13^{th} in the production of vegetables in the country (Department of Horticulture, 2015). The major vegetables produced in Telangana state are tomato, onion, okra, brinjal and potato.

The total annual arrivals of vegetables in the city are estimated to be 7.8 lakh MT of which 6.3 lakh MT is estimated to come from three districts -Ranga Reddy, Mahbubnagar and Medak. Vegetables that arrive from these districts are cucumber, beet root, cauliflower, potato and gourds.

Per capita income of the people in the city is higher than any other city in the state. Because of the wide diversity of the people, the income levels are varied across the different locations of the Hyderabad. Hence the city is chosen for the study. Besides the city has many number of organized retailer stores, unorganized retail stores, platform sellers and push cart vendors who are involved in selling fruits and vegetables. Hence Guddimalkapur and Bowenpally markets were selected for collecting the information from farmers, retailers, wholesalers and commission agents for vegetables and Kothapet market was selected for collecting information on fruits. Therefore, this study was proposed to explore the business opportunity to intervene in providing credit to various stakeholders at varied stages of crop production and marketing based on the existing demand with the following objectives:

- To study the trends and patterns of arrival of the selected fruits and vegetables in major markets of Hyderabad.
- To analyse the various supply chain channels of selected fruits and vegetables in the study area.
- To estimate the financial needs of various players in the supply chain and document the problems in accessing finance.
- To suggest suitable intervention points and a mechanism to finance the supply chain partners.

Mango, papaya and guava among fruits and brinjal, okra, chilli among vegetables was selected for the study. The study included the arrival trends, cost of cultivation,

estimation of the marketing costs, marketing margins and the price spread of the selected fruits and vegetables. The primary data was collected through personal interview with the help of a pre-tested questionnaire designed especially for the purpose. The data was compiled, tabulated and analyzed and price and cost analysis was carried out. There were total seven marketing channels for fruits and vegetables each. Among them, three major marketing channels were studied for each fruit and vegetable. Among all the marketing channels for mango and guava, channel-I was the most prominent channel wherein the producers sell their produce to the pre harvest contractors who in turn sell it in the Gaddiannaram market yard through the commission agents. The next preferred channels were channels VI and Channel-VII. In case of papaya, channel-IV was the most preferred one where the farmers sold their produce to the wholesalers through the commission agents in the market yard and then the produce was bought by the consumers from the traditional retailers. The channel VII was next preferred channel for papaya. Channel VII was the most efficient channel for the farmers as it contributed the highest share for farmers in case of brinjal, Channel III was the most efficient channel for the farmers as it contributes highest share for okra and channel VI was most efficient for chilli.

The total cost involved in production of mango was Rs.44700 while the net income was Rs. 252300 per hectare. Major costs involved were for planting material and farm yard manure. The cost of cultivation for Papaya was nearly Rs. 25700 and the net income was Rs. 526300 per hectare. The cost of cultivation for guava was Rs.61200 and the net income was Rs. 438800 per hectare.

The total cost involved in the production of Brinjal, Okra and Green Chilli was Rs. 143336, Rs. 94567 and Rs. 144676 respectively. While the income was Rs. 82564, 170021 and 134174 for brinjal, okra and chilli respectively.

In case of farmers cultivating fruits, the average amount borrowed from the formal and informal sources was Rs.125000 and 50000 respectively. The informal sources were preferred only in case of emergencies as 70 per cent of the farmers were dependent only on banks for their financial needs. The vegetable farmers borrowed an average amount of Rs. 70,000 from the formal sources and an average amount of Rs. 40,000 from the informal sources.

The fruit commission agents borrowed 150000 and Rs. 50000 through formal and informal sources of finance respectively. The vegetable commission agents, borrowed on an average amount of Rs.600000 from the formal sources while an average amount of Rs.175000 was borrowed from the informal sources.

The fruit retailers were mostly dependent on informal sources of finance though the rate of interest was high because of the cumbersome paper work involved in the formal sources. The vegetable retailers also mostly preferred informal sources for meeting their financial requirements. It was found that the retailers were not comfortable with the procedures followed by the banks to access loans. The institutional sources of finance were preferred by the majority of supply chain players.

Documentation work and inadequate credit were the biggest financial challenge for the supply chain partners. Transportation, risk of quality and price fluctuations were the biggest marketing problems.

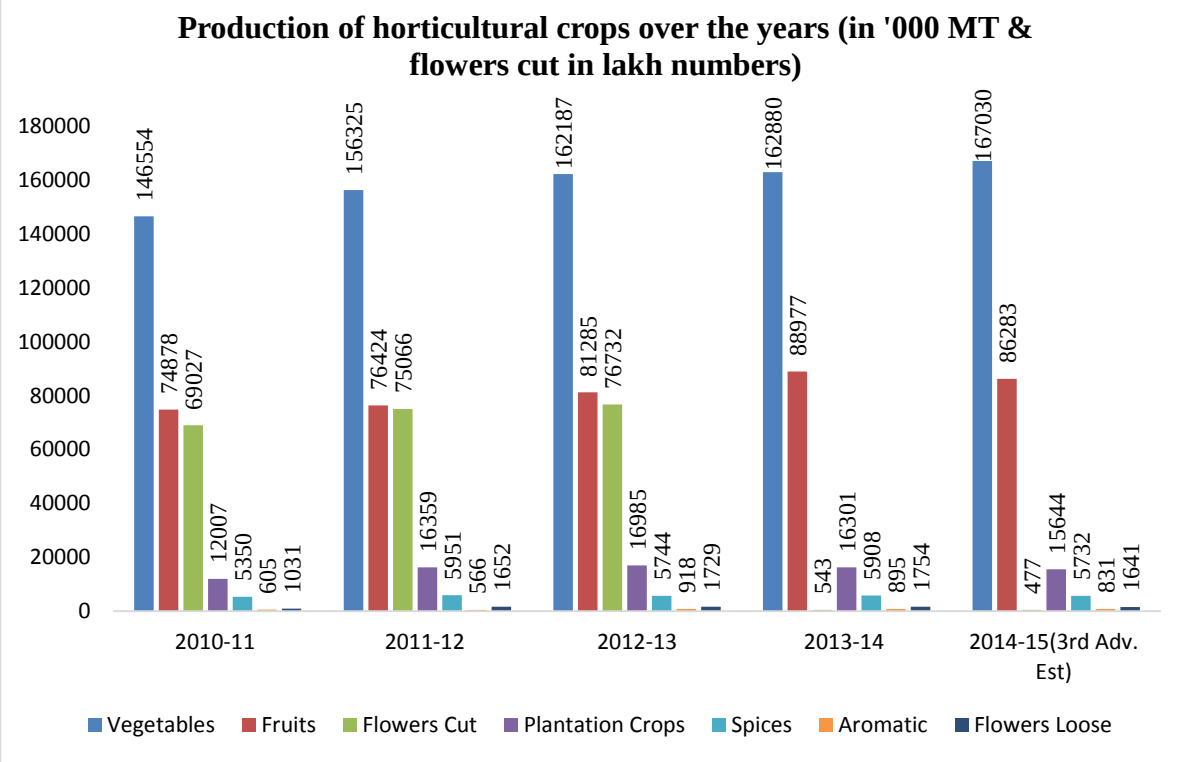
Chapter-I

INTRODUCTION

1.1 Status of Horticultural Crops

Today horticulture is a major contributor to the agriculture economy. Both exports and domestic demand for horticultural products is increasing. India with its favourable environmental conditions has been able to grow a variety of horticultural crops like fruits, vegetables, spices and plantation crops. Fruits and vegetables are an important dietary supplement providing vitamins, minerals, potassium and fibre. India grows multifarious fruits and vegetables and is the second largest producer of both fruits and vegetables in the world after China. Changes in the production system like use of hybrids, high yielding varieties and improved technologies have contributed significantly to improve the production. Good disposable incomes and refined tastes are making consumers increasingly addicted to fruits and vegetables. Horticulture has emerged as an important sector to diversify agriculture by improving the farm income through employment and improving the exports besides providing nutrition.

Figure1.1 Production of horticultural crops over the years in India (2010-11 to 2014-15)



(Source: Department of Agriculture and Cooperation, Horticultural Statistics Division, 2015)

Figure 1.1 shows that vegetables and fruits are the leading horticultural crops followed by cut flowers, plantation crops and spices respectively. The production of vegetables increased from 1.4 lakh MT in 2010-11 to 1.6 lakh MT in 2014-15 while the production of fruits increased from 75,000 MT in 2010-11 to 76,000 MT in 2014-15. There is still no stability in the production of aromatic crops while the production of spices remained almost around 6,000 MT from 2011-12 to 2014-15.

Fruits and vegetables account for nearly 90 per cent of the total horticulture production in the country. Better access to irrigation and higher demand from consumers pushed small farmers to grow more fruits and vegetables. Production of horticulture crops overtook that of food grains in the year 2015-16 and it stood at 282 million tonnes. Further the economic survey 2015-16 notes that the percentage share of horticulture output in agriculture is more than 33 per cent. India has witnessed voluminous increase in

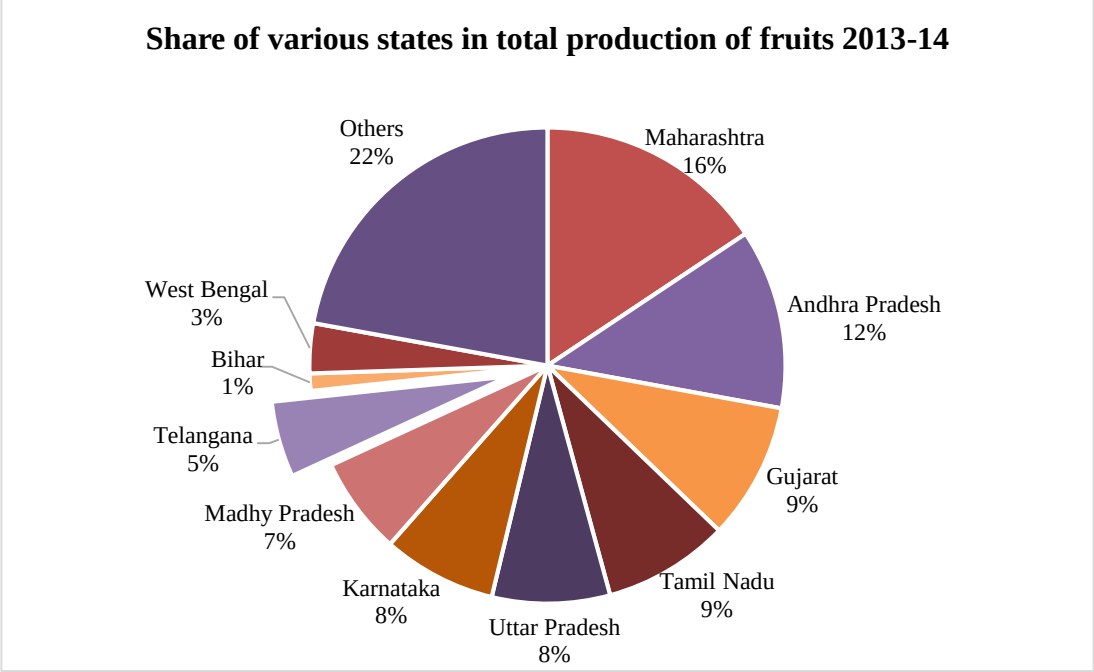
horticulture production over the last few years, and out of the total production of fruits and vegetables, nearly 76 per cent are consumed in fresh form, while wastage and losses account for 20 to 22 per cent (MOFPI, 2016).

1.2 Status of fruit crops in India

Fruits provide the necessary nutrition supplements to our body and also improve the body condition. They also provide perfect supplement for hormonal imbalances. Fruits contain water that maintains necessary moisture in the body. All the fruits improve the sodium level content in the body and hence people with low sodium content should consume more fruits. The Centre for Disease Control and Prevention has recommended a person to consume at least five types of fruits daily or at least a part of a fruit because it promotes healthy living.

Out of six categories i.e., fruits, vegetables, flowers, aromatic plants, spices and plantation crops, the highest annual growth of 9.5 per cent is seen in fruit production during 2013-14 (Agriculture Today, 2016)

Figure 1.2 Share of various states in total production of fruits (2013-14)



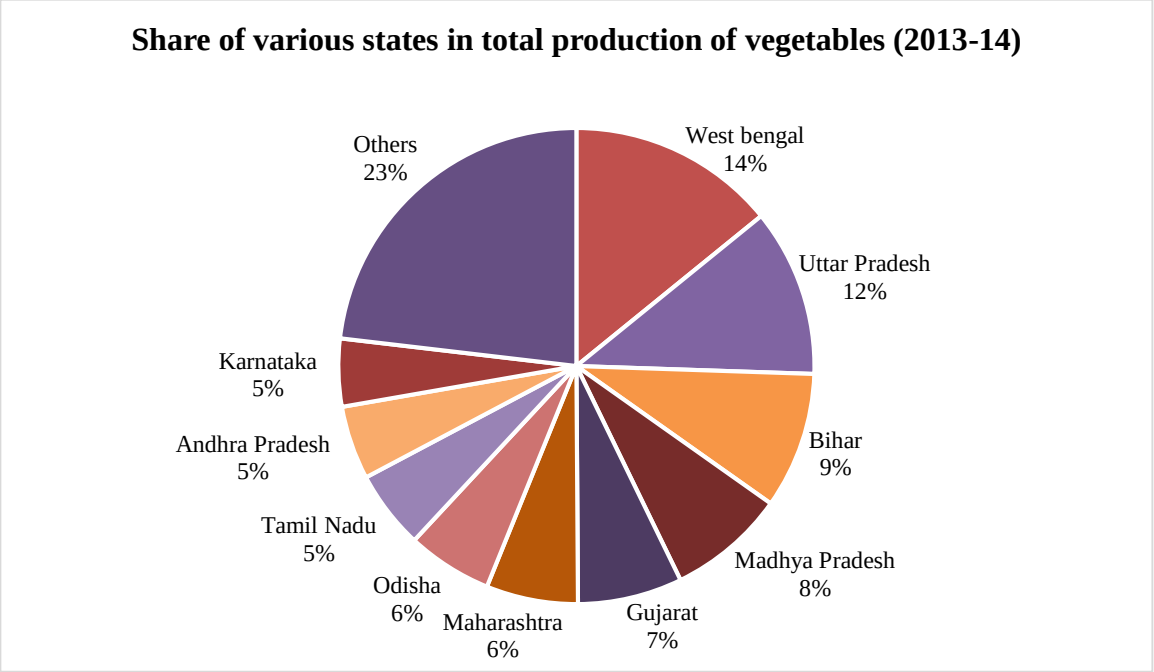
(Source: Department of Agriculture and Cooperation, Horticultural Statistics Division, 2015)

Banana, mango, citrus, papaya, guava and grape account for major share in total fruit production across India. The major fruit producing states are Maharashtra, Andhra Pradesh, Gujarat, Tamil Nadu, Karnataka and Uttar Pradesh. These eight states account for 62 per cent of the production under fruit cultivation. India is a front runner in many fruits in world production, 44.1 per cent of mangoes, 42.6 per cent of papayas, 25.6 per cent of bananas of world production are produced in India. Only 4 per cent of fruits produced are being processed (MOFPI, 2016).The per capita availability of fruits in 2014 was 199.2 g/person/day.

1.3 Status of vegetable crops in India

Vegetables are important constituents of Indian household consumption which is dominantly vegetarian. They play a major role in nutritional security owing to their short duration, high yielding and nutritional richness qualities. India is rich in biodiversity of vegetables and is the primary/secondary centre of origin of many vegetables.

Figure 1.3 Share of various states in total production of vegetables (2013-14)



(Source: Department of Agriculture and Cooperation, Horticultural Statistics Division, 2015)

Significant progress has been made in the area expansion and the area under horticulture grew by about 2.7 per cent per annum and annual production increased by 7.0 per cent. Thus, the production of vegetables increased from 58,532 thousand tonnes to 1, 67,058 thousand tonnes from 1991-92 to 2014-15 (Agriculture Today, 2016). Potato, tomato, onion, brinjal, cabbage, cauliflower and tapioca account for maximum share in vegetable production in the country. India is a front runner in many vegetables in world production, 20.2 per cent of onions, 35.6 per cent of cauliflowers and 37 per cent of okras of world production are produced in India. Only two per cent of vegetables produced are being processed (MOFPI, 2016). The per capita availability of vegetables in India in 2014 was 364.7 g/person/day.

1.4 Production of fruits and vegetables in Telangana state

The state of Telangana has 31 districts out of which 30 districts are witnessing agricultural, horticulture and allied activities. The total area under horticulture in Telangana was 8.20 lakh Ha and production was 94.54 lakh MT of horticultural crops in the year 2014-15.It stood 3rd in the area and 8th in the production of fruits and 11th in the area and 13th in the production of vegetables in the country (Department of Horticulture, 2015). The major vegetables produced in Telangana state are tomato, onion, okra, brinjal and potato while the major fruits produced in the state are citrus, mango, banana, papaya and guava (Ministry of statistics and programme implementation. Horticulture statistical year book India, 2016)

Table 1.1 Area and production of horticultural produce in Telangana (2015-16)

(Area in lakh Ha and Production in Lakh MTs)

S.No.	Name of the Crop	Area	Production
1	Fruits	3.235	41.97
2	Vegetables	1.718	31.95
3	Flowers	0.037	0.14
4	Plantation Crops	0.148	0.62
5	Spices	1.596	6.97
	Total	**6.734**	**81.65**

(Source: Horticulture Department, Telangana state)

Table 1.1 shows the area and production of various horticultural crops in Telangana. It is evident from the table that the area under fruits and vegetables is 48 per cent and 25 per cent respectively of the total horticulture area in the state.

1.5 Supply chain of fruits and vegetables and importance of finance in the supply chain

A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain includes not only the manufacturer and suppliers, but also transporters, warehouses, retailers, and even customers themselves. Within each organization, such as a manufacturer, the supply chain includes all functions involved in receiving and filling a customer request. These functions include, but are not limited to, new product development, marketing, operations, distribution, finance, and customer service (Chopra, 2015).

The flow of funds to and among the various links within a value chain comprises what is known as value chain finance. Stated another way, it is any or all of the financial services, flowing to and/or through a value chain to address the needs and constraints of those involved in that chain to access finance. (Miller and Jones, 2010).

Supply chain management plays an integral role in minimising the cost and maximising the profit. The flow of product, information and finance is very important in managing the supply chain. The flow of product includes the movement of goods from a supplier to a customer, as well as any customer returns or services needed. The flow of information involves transmission of information from the market to the intermediaries and vice versa. The flow of finance includes all the financial aspects such as cash flows among the various supply chain partners. The present challenge in supply chain management is to maintain all three flows in an efficient manner, resulting in optimal results for farmers, wholesalers, customers and other supply chain partners. Supply chain also manages the relationship between businesses responsible for the efficient production and supply of fresh produce products from farm level to ultimate consumers, to reliably meet the requirements of the customer in terms of quality, quantity, and price.

Agricultural supply chains in India are much unorganized where each partner in the supply chain suffers from inefficiencies due to the lack of coordination, no proper

infrastructure like warehouses and difficulties in access to finance and non-remunerative prices for the farmers. The marketing channels are clogged with middlemen. There is no transparent pricing mechanism in markets.

Horticulture also throws varied challenges. Marketing system is highly inefficient in case of fruits and vegetables. The market infrastructure is better developed for food grains but fruits and vegetables markets are not that well developed and are congested and unhygienic. Lack of warehousing and cold storage facilities prevents the farmer and the traders to get remunerative prices for their produce. Presence of large number of intermediaries makes the farmer to greatly rely on intermediaries. Marketing infrastructure for grading, standardisation at the mandis is another challenging factor. Lesser control on product safety and quality across the supply chain because of manual handling leads to higher degradation of the produce. Lack of transparency in pricing and heavy fluctuations in the prices in the mandis challenges the farmers from getting proper prices for their efforts and fresh produce. High wastage along the supply chain and losses in transportation also reduce the income of supply chain partners. These features make the marketing system of fruits and vegetables to differ from other agricultural commodities, particularly in providing time, form and space utilities.

Horticultural produce is highly perishable and markets are inefficient which is reflected by the price gap between the producer's price and consumer's rupee. Government of India has not included any of horticultural crops in the list of minimum support price commodities. Besides this, fruits and vegetables also require proper transportation, handling and storage facilities in order to reach in fresh state to a customer.

Sufficient economical and technological support to all the supply chain partners is very essential to prevent exploitation and increase their income. Providing finance at reasonable rates of interest, free from cumbersome processes at different levels of supply chain would also empower the partners and free them from the clutches of money lenders.

1.6 Marketing of fruits and vegetables in Hyderabad

Marketing of fruits and vegetables is complex activity because of perishability, seasonality and bulkiness. The production of fruits and vegetables is dominated by small and marginal farmers, and the marketing of vegetables is longer with a chain of middlemen rendering high marketing costs. This has led to steep rise in the price while the return to the farmers is much lower to sustain this activity. Developing the efficiency across the channel will help in realizing better returns to the farmers. In this backdrop, this study is proposed to identify the weak links in the supply chain of fruits and vegetables marketed in Hyderabad.

The newly formed state of Telangana with a total geographical area of 114.84 lakh Ha has 80 per cent of its population dependent on farming. Hyderabad is the capital city of the newly formed Telangana state, occupying 650 square kilometres (250 sq m) along the banks of the Musi river. It has a population of about 6.7 million and a metropolitan population of about 7.75 million, making it the fourth most populous city and sixth most populous urban agglomeration in India. A well-developed road, rail and air network, increased awareness among consumers for nutritive diet, blooming of retail chains in Hyderabad provide impetus for demand of fruits and vegetables.

The total annual arrivals of vegetables in the city are estimated to be 7.8 lakh MT of which 6.3 lakh MT is estimated to come from three districts -Ranga Reddy, Mahbubnagar and Medak. (Department of Horticulture, 2015). Vegetables that arrive from these districts are cucumber, beet root, cauliflower, potato and gourds. Fruits that majorly come are mango , melons and papaya. Some of the states contributing to the arrivals of vegetables in the markets of Hyderabad are Agra, Andhra Pradesh, Maharashtra and Madhya Pradesh. Some of the states from where fruits arrive in the markets of Hyderabad are Maharashtra, Karnataka, Andhra Pradesh and Kerala (Primary Survey, 2017).

Per capita income of the people in the city is higher than any other city in the state. Because of the wide diversity of the people, the income levels are varied across the different locations of the Hyderabad. Hence the city is chosen for the study. Besides the city has many number of organized retailer stores, unorganized retail stores, platform sellers and push cart vendors who are involved in selling fruits and vegetables.

Samunnati Financial intermediation and services aims to understand the financial needs of the various supply chain partners in the fruits and vegetables supply chain so as to provide better access to the markets through financial intermediation, market linkages and advisory services so that the supply chain operates at a higher equilibrium thereby creating value for all the stake holders in the chain. Hence, this study was taken up with the following objectives to provide Samunnati with useful data and findings through which value addition could be done at all the levels of fruits and vegetables supply chains in Hyderabad.

1.7 Objectives of investigation

- To study the trends and patterns of arrival of the selected fruits and vegetables in major markets of Hyderabad.
- To analyse the various supply chain channels of selected fruits and vegetables in the study area.
- To estimate the financial needs of various players in the supply chain and document the problems in accessing finance.
- To suggest suitable intervention points and a mechanism to finance the supply chain partners.

1.8 Scope of the study

The study was conducted in Hyderabad region of Telangana state. Growers, traders, wholesalers and retailers involved in cultivation and trade of selected fruits and

vegetables formed the sample. The study seeks to analyse the supply chains of selected fruits and vegetables and the arrival pattern of the same at the market yards in Hyderabad. The study also tries to understand the various financial aspects of markets like the mode of the supply chain players, terms of credit, requirement of finance, besides knowing the major players in the supply chain and constraints faced by them.

The results of the study will be helpful to improve marketing practices for high value realization. Knowing the various marketing channels would be helpful in suggesting appropriate financial intervention points to the firm. Understanding the financial needs, would enable the firm in designing products according to the requirements of the respective supply chain partners. The importance of studying the variability among actors in the supply chain in terms of finance and marketing is to assess the gap between the producers and consumers, as well as to help improve efficiency at each stage of the supply chain and to understand the main factors that might help to reduce the variability in the fruits and vegetables supply chain. Understanding the financial needs of each supply chain player would also help the government in appropriate policy making. It would also throw a light on the opportunities lying in the supply chain for public and private banks, Non-banking Financial Companies and other financing institutions.

1.9 Limitations of the study:

As there is no recent survey regarding the area under production of fruits and vegetables by national level agency, the data regarding area and production is only estimated data given by National Horticulture Board, Government of India. As most of the marketing channel members were apprehensive about sharing the data, it was difficult to get accurate data with regards to costs and revenues. The market functionaries also were not maintaining any records, making the researcher mostly depend on the recall memory of the sample. However within the limitations, the researcher has put in best efforts to collect relevant and accurate data.

1.10 Structure of the thesis work

The study is presented in five chapters as follows.

I-Introduction	In the introductory chapter, the status of horticultural crops along with production and marketing of fruits and vegetables is given. Further, the aspects objectives, scope and limitations of the study are presented.
II-Review of Literature	The second chapter is devoted to the review of past work done on arrival patterns and price trends of horticultural produce, supply chain of horticultural crops and importance of finance in horticultural supply chains.
III-Material and methodology	The third chapter deals with the description of study area, sampling design, sources of data, different analytical techniques employed and terms used in the study.
IV-Results &Discussion	This chapter presents the critical results and discussion based on the study done.
V-Summary & Conclusions	This chapter gives the summary of the whole study, draws conclusions and also the appropriate suggestions

Chapter II

REVIEW OF LITERATURE

For any proper investigation, the review of earlier studies provides valuable insights about attempts made to solve the problem and sets direction for the research process. An extensive review of literature must therefore be undertaken in order to have a clear knowledge of the various aspects related to the study and to understand key achievements already covered related to the problem and to explore the areas to be focused further. In this chapter, an attempt has been made to review the literature of the past research work in India and abroad relevant to the present study. The review has been presented under the following heads.

2.1 Studies on arrival patterns and price trends of horticultural produce

2.2 Studies on supply chain of horticultural produce

2.3 Studies on importance of finance in the supply chain of horticultural produce

2.1 Studies on arrival patterns and price trends of horticultural produce

Pawar (2007) stated with respect to trends and variations in arrivals and prices of green gram in Marathwada region of Maharashtra that a positive significant relationship between arrivals and prices exits in Partur market and positive but non-significant relationship exists in Sillod, Paithan and Bhokardan markets. A negative relationship was seen in Aurangabad, Vaijapur, Jalna and Ambad markets but was non-significant. Thus

both types of relationship (negative and positive) were observed in selected markets during study years.

Kumar *et al.* (2009) studied the seasonality in arrivals and prices of important vegetable crops such as green chilli, onion, potato and tomato in Bangalore market. The study indicated that in all the crops with respect to arrivals and prices, there was a presence of seasonality within a year and seasonal pattern did not change over years in the market except in onion prices. Direct relationship existed between arrivals and prices in the case of green chilli, onion and tomato indicating that prices lead arrivals. Heavy arrivals in these vegetable crops attracted more buyers from long distance like Andhra Pradesh, Tamil Nadu, Maharashtra and Kerala.

Keerthi (2012) in her study on a variation in arrivals and prices of Tomato in the selected markets of Chitoor district, Andhra Pradesh found that the peak arrivals were noticed in the month of April, May and June. The lowest arrivals were noticed in the months of December, January and November. The two ways ANOVA showed a presence of seasonality within a year and seasonality doesn't change over years. The correlation coefficients computed to ascertain the pattern of association between the market arrivals and prices of tomato revealed that price and arrivals were moving in the opposite direction in the long run.

Kumar (2011) in his work on a micro level study on production and economics of production and marketing of principal vegetable crops in north Bihar found that the arrivals of cauliflower in the wholesale markets of Vaishali district were highest during the month of January which accounted for 16.08 per cent of the annual arrivals followed by December and February. The arrivals were low in June, May and July .The arrivals of Brinjal were peak during January, May and September. March, July and October had low arrival rates. In case of Okra the arrivals were highest in the month of June followed by

May, October and April. November, December, January, February and March had low arrivals.

Rajur *et al.* (2009) computed coefficient of variation (CV) to study the variation in market arrivals of chilli. The coefficient of variation in prices of chilli was found to be higher in Byadagi market as compared to Bijapur and Hubli markets in Karnataka indicating higher variation in Byadagi market and lower in Gulberga and Raichur markets. In case of arrivals, coefficient of variation was found to be highest in Hubli followed by Raichur, Gulberga, Bijapur and Byadagi markets. The considerable variations both in prices and arrivals were observed in chilli in all the selected markets as evident from higher coefficient of variation.

Laxminarayana (2005) in his study on mapping profile of market participants, trade practices, regions and their modus operandi in commodity futures trade of chilli and devising marketing strategies to make futures trading in chilli popular on NMCE platform , found that 60 per cent of chilli flows into the market during February to April. As the crop gets harvested from October onwards arrivals tend to increase from January and reach peak during February to April.

Kumar *et al* (2005) in their study on behaviour of market arrivals and prices of selected vegetable crops: a study of four metropolitan markets found that in cabbage the extent of variability in the arrivals was lower in Bangalore and higher in Mumbai. Its prices were relatively stable in Mumbai but were more volatile in Bangalore. There was broadly a similar pattern in the price variability across different months in the Kolkata and Delhi markets. In the case of cauliflower, the variability in the market arrivals was more pronounced in the Kolkata than the remaining three markets. The price variability was, however, more marked in the Delhi market with values of coefficient of variation in most of the months staying above 50 per cent. The extent of variability in the market arrivals of tomato across different months was very high in all the four markets. Likewise, while the

maximum variability in the prices of peas was noted in Delhi market, these were relatively less marked in Bangalore. The study has confirmed the negative relationship between market arrivals and prices over the years in all the four metropolitan markets. However, across different months, there have been several instances of positive relationship between arrivals and prices in all the four markets. These positive and significant correlation coefficients could be attributed to the off-season supplies of these vegetables which fetch higher prices.

Ramakrishnudu (2003) studying the seasonal behaviour of prices of tomato concluded that the price of tomato in Madanapalle market of Chitoor district of Andhra Pradesh was highest during June (Rs. 150.08) followed by November (Rs 132.55) and July (Rs 126.22). The price indices were low during the period from January to April, June and July being off season months they exhibited high prices, whereas August and September were the months of peak arrivals, therefore the prices were low during the respective months.

2.2 Studies on supply chain of horticultural produce

Negi and Anand (2015) through their study on issues and challenges in the supply chain of fruits and vegetables sector in India: a review, found that there is an improper supply chain management, lack of cold chain infrastructure and food processing units which is leading to maximum inefficiencies and resulting in losses and wastage of fruits and vegetables. The entire supply chain of fruits and vegetables is laden with the issue of post-harvest losses and wastages due to long and fragmented chain, dependency on intermediaries, poor road infrastructure, inefficient mandi system, inadequate cold chain infrastructure facilities, high cost of packaging, poor quality of distribution and weak links in supply chain These factors are resulting in poor price realization for growers on one hand and high prices for consumers on the other end. The authors were of the view that highly

inefficient supply chain and cold chain infrastructure are the major impediments in the path of speedy growth of agriculture sector in India.

Mani *et al.,* (2015) found that in the crop-wise information on sale by agriculture household, on an average across different crops (20 crops excluding sugarcane), majority of the households offering their produce for sale had sold off their marketable surplus either to local private trader (57.3 per cent) or in the mandi (28.4 per cent). The input dealers were the next important agency who were contacted by 8.8 per cent of farmers offering their produce for sale.

Singh *et al.* (2015) in their article enhancing global competitiveness of Indian apple: investigating the value chain perspective, found that the total trader margin in the supply chain of imported apples amounts to 51 per cent and for Indian apples the producer's share was estimated to be 56.6 per cent in the consumer's rupee. The meagre share of producers in the supply chain was attributed to a number of factors like losses during transportation and storage, lack of appropriate technologies, lack of capital, knowledge, information and transparency in supply chain.

Singh *et al.,* (2013) analyzed the value chain of vegetables in Palpa district of Nepal. Seven different vegetable marketing channels were found in the district. These are:

Channel-I = Farmers - Consumers

Channel-II = Farmers - Retailers - Consumers

Channel-III = Farmers - Collection Centre - Wholesalers (Butwal) - Retailers -Consumers

Channel-IV= Farmers - Collection Centre - Wholesalers (Butwal) - Retailers (India) - Consumers

Channel-V = Farmers- Collection centre- Wholesalers (East Palpa) - Retailers - Consumers

Channel-VI= Farmers - Collection Centre - Apex body - Retailers - Consumers

Channel-VII= Farmers - Wholesalers (Aryabhanjyang) - Retailers - Consumers

Out of these channels, channel-VI for tomato, channel-III for green chilli and channel- VII for cauliflower were found to be best channels of marketing.

Deliya *et al.*, (2012) in his paper reported that the present supply chain that connects the farmers to both the organized, as well as the unorganized retail, is highly inefficient with several intermediaries and manual handling. The result is lots of wastages as much as nearly 30 per cent and also less remuneration for the farmers. Major constraints in production and marketing of fresh fruits and vegetables are non- availability of Quality seeds, inadequate irrigation facilities, inefficiency in pest management, credit availability constraint, high cost of production, lack of timely information, huge post-harvest losses, lack of roads, cold storage, inadequate space, poor market network and high transportation cost. Due to inefficient supply chain, the price received by the farmers is only about 24 to 58 per cent of the retail price paid by the consumer.

Krishna (2012) in his paper private participation in agricultural marketing infrastructure in India: an assessment, suggested that fine-tuning of APMC regulations enables the farmers to face new challenges in the post-globalization context. A new wave of treatment is needed with private participation for cleaning, grading, quality certification, packaging, storage, transportation, financing, wholesaling and retailing. The post-WTO regime requires private participation in agri related activities like insurance, finance, marketing, storage and supply chain.

Siddalingappa (2012) in his work on farmers preference for modern retailing formats in marketing of vegetables revealed that the different factors influencing farmers to sell their produce to the modern retailers were remunerative prices, absence of intermediaries, spot payment, correct weighment, less physical loss, services rendered by them , proximity and transport facility. The study further revealed that the farmers were

able to reduce their marketing cost by Rs.74/quintal and the farmer could save the commission charge of Rs.68.75/quintal.

Kumar (2011) in his work on a micro level study on economics of production and marketing of principal vegetable crops in North Bihar found four channels of marketing. They were:

Channel-I= Producer - Consumer

Channel-II= Producer- Retailer- Consumer

Channel-III= Producer-Commission Agent - Retailer- Consumer

Channel-IV= Producer- Commission Agent- Wholesaler- Consumer

It was found that among the four channels identified, producer's share in consumer's rupee was highest in channel-I i.e., producer to consumer, mainly because of absence of intermediaries. Further it was seen that as the length of the channel increased the producer's share in consumers rupee decreased. The total marketing cost was also low in channel I due to the absence of intermediaries. The marketing efficiency also decreased with the increase in the length of the channel.

Gaurav (2012) analysed the marketed surplus and price spread for okra in Western Uttar Pradesh and concluded that the share of producer in consumer rupee is high in channel were there are less number of intermediaries. The marketing cost incurred by wholesaler in different channels were estimated to be 6.92 per cent, 6.98 per cent and 8.29 per cent of the consumer price respectively and their corresponding net margins were 9.76 per cent, 10.13 per cent and 12.78 per cent of the price paid by the consumer.

Sharma *et al*. (2010) studied production and marketing of walnut in Budgam district of Jammu and Kashmir, and they have identified three marketing channels.

Channel-I: Producer – Retailer– Consumer

Channel-II: Producer – Wholesaler – Retailer –Consumer

Channel-III: Producer-Kachha wholesaler – Retailer – Consumer

The study highlights the fact that the producer's share is very low in channel-III (64 percent) of the consumer price. Alternatively, they also suggested that the regulated markets can expand their reach by appointing procurement agents for different clusters of villages as it will help walnut growers to cut down the transaction costs.

Anchal and Sharma (2009) in their study on price spread of litchi in Punjab revealed that the increase in the margins of middlemen and cost of litchi per quintal led to the higher price spreads in the marketing of litchi. The price spread of various channels of litchi marketing, revealed that the first channel (Producer- Pre-harvest contractor- Retailer – Consumer local market) was the most efficient from producer as well as consumer point of view, because the producer received the maximum and the consumer got the litchi fruit at the minimum price.

Sreenivasa *et.al., (*2009) in their study on marketing and post-harvest losses in fruits, i.e. mango ,grape, banana and pomegranate found that the marketing cost, margins and efficiency of marketing depends primarily on the channels of marketing. The marketing cost in mango, grapes, banana and pomegranate accounted for nearly 16.82, 23.15, 27.52 and 20.98 percent respectively. Farmer's net margin in the consumer's price was low due to predominant role played by the wholesalers and retailers who among themselves shared 37 on an average per cent of the consumer's rupee, about 46 per cent in mango and about 68 per cent in grapes. In banana and pomegranate, the farmer's net share in the consumer's price was 53 and 50 per cent respectively. The market efficiency in mango, grapes, banana and pomegranate was 0.85, 2.13, 1.12 and 1.01 per cent respectively.

Dass (2005) in his paper economics of production and marketing of chillies in India with special reference to Haryana found that there were three important channels of marketing for chillies in Haryana. They are

Channel-I= Producer– Consumer

Channel-II=Producer- Retailer- Consumer

Channel-III=Producer- Commission Agent – Retailer- Consumer

The study showed that the marketing efficiency was inversely proportional to the number of intermediaries. In channel-I the producer got an average of about 95 per cent of consumer's rupee and it decreased to 75.85 per cent in channel II and 65.57 per cent in channel-III.

Singh *et al,* .(2005) analysed the price spread of Kinnow in Punjab and mentioned that net price received by the selected farmers of Ferozepur district was 795 per quintal which was about 42 per cent of the price paid by the consumers of Delhi market in January, 2003. The margin to the contractor was about 28 percent and the retailer got 9 per cent in Delhi market. The grower's share in the consumer rupee in Hoshiarpur district was about 40 per cent for sale of fruit through contractor in Delhi market. The margin of contractor was about 29 per cent. The study showed that producer's share in consumer rupee in Ferozepur and Hoshiarpur districts was about 56 and 54 per cent respectively. In the Amritsar market, the producer's share in consumer rupee in two districts was about 57 and 54 per cent respectively.

Baurah *et al.* (2001), in their study on marketing margin, price spread and marketing efficiency of cauliflower in Barpeta district of Assam, identified two marketing channels for cauliflower. Channel I comprised of producer, primary wholesaler, secondary wholesaler, retailer and consumer. Channel II comprised of producer, retailer and consumer. The marketing cost borne by the primary wholesalers and secondary wholesalers were 6.95 per cent and 5.58 per cent of consumer's price respectively in channel I. Price spread as per cent of consumer's rupee was found to be 60.38 per cent in channel I. Marketing efficiency was higher in channel II. The farmers were found to sell their produce to intermediaries under financial obligations and were unable to store their produce owing to lack of proper storage facilities.

2.3 Studies on importance of finance of horticultural produce

Kumar and Sharma (2016) in their paper, agricultural value chains in India: prospects and challenges found that credit for pre and post-harvest inputs, guarantee and risk for final output have not been made part of overall agriculture and export policies in India. Hence the study recommended that apart from government banks, private and foreign banks should also be encouraged to open their branches in rural areas and provide financial support to farmers and new entrepreneurs.

Tadasse *et.al.* (2016) in their paper rural finance and agricultural technology adoption in Ethiopia: does the institutional design of lending organizations matter? found that access to institutional finance has a significant positive impact on both the adoption and extent of technology use. However, when impacts are disaggregated by type of financial institution and farm size, heterogeneities were observed. In particular, financial cooperatives have a greater impact on technology adoption than microfinance institutions, and the results appear to vary depending on farm size and types of inputs.

Swamy and Dharani (2016) in their article analyzing the agricultural value chain financing: approaches and tools in India found that there is a need to review the value chain models that exist in the context of – lead actors, business model and sustainability strategy. Determining actual and critical points of finance such as the current flows of funds and their sources of financing, what is needed and at what point in time is significant to enhance the effectiveness of the models. Further, there is a need to analyze and compare financing options such as their relative strengths, risks and costs of financing for each level of participant in the chain. The authors observed that rather than investing in one component of the chain, the financial institution can grow expertise in the chain, share this knowledge and provide financing to support services. This not only benefits clients, but also expands lending opportunities while lowering the risks.

Zhou (2015) in case study on Syngenta Frijol Nica program: supporting Nicaraguan bean growers, found that effective partnerships and alliances with various entities is the key success factor. The programme runs with several cooperatives, who receive the finance from big banks. These banks offer low interest rates to the farmers and gives credit to 80-100 per cent of the total cost of the inputs as a credit. Private extension services characterized by a combination of provision of input supply, financing, technical assistance and linkages with traders will also play a major role in supporting the growers. In a country where public extension is limited, private extension has proved to be valuable in bridging the knowledge gaps of small scale farmers. Innovative design and sound corporate management have enabled effective service delivery and creation of value for both producers and private actors. Such an approach can be replicated and expanded to other crops and to other countries by private companies in the agricultural input industry.

Rima (2014) in her study on agricultural credit flow of commercial banks and impact on agricultural production in Nepal found that agricultural credit per cultivated area is the major factor that significantly impacts the agricultural production of the country i.e. a percentage change in agricultural credit flow of commercial banks brought 0.183 percent change in Agricultural Gross Domestic Product (AGDP). Although the consumption of fertilizer and improved seeds showed positive relation with AGDP, it did not bring significant changes in agricultural production in the country during the period. Thus, the study concluded that agricultural credit flow of commercial banks have positive impact on agricultural production and is significant determinant of improving agricultural gross domestic product of the agrarian country like Nepal.

Taiwo *et al.,* (2014) in his paper prospects, challenges and institutional linkages of vegetable value chain in Ibadan city of Nigeria found that an informal network of producers-marketers-consumers exists for the vegetable value chain in the city. The network provides income ranging from N 50,000.00-500,000.00 (N 150 = $ 1.00) per

annum for participants based on activities within the chain. Vegetables (Amaranthus, Corchorus, Celosia, okra and pepper) production accounts for 42 per cent of the crop production enterprise. The crops are planted on roadsides (23 per cent), in backyards (22 per cent), and near streams (14 per cent), among other locations. Inadequate finance ranked highest among the listed constraints, and institutional linkages are weak. The authors were of the view that concerted and conscious efforts with enabling policies should be instituted to attain the full potential of the vegetable-value chain in the city of Ibadan.

Hedge and Madhuri (2013) in their paper a study on marketing infrastructure for fruits and vegetables in India suggested that financial assistance for small / marginal farmers must be available from various private/public sector institutions without much delay and at nominal charges of interest. Small and marginal fruit and vegetable growers need to form cooperative societies for their welfare to reap the remunerative prices in the market.

Kumar (2012) in his paper- agriculture value chain financing regulations has mentioned that intermediary institutions that mobilize farmers and work in their interest are necessary to ensure 'inclusive growth' and income enhancement in the hands of the small farmers. These farmer collectives have a significant role to play in productivity enhancement, access to finance and improving income realization through taking up value addition activities. Such institutions of farmers require state support in the initial years so that they access finance from mainstream banks till they get through the gestation period. Establishing a larger network of banks in the rural areas and designing customized products for small farmers are identified as essential for successful value chain financing.

Tamasese (2009) worked on the constraints in the selected vegetable value chain in Samoa and explained that the relative importance of the different constraints within each category differs by crop type and this gives an indication as to where to target initial activities so as to ensure an appropriate and sequential alleviation of constraints.Although

financing may prove to be a less demanding constraint than for the fruit crops, success is however, reliant upon adequate supply of production inputs and upon the market price achieved. Both aspects require improved provision of information and a degree of coordination.

Shilpa (2008) in her thesis work on supply chain management in vegetable marketing: a comparative analysis, studied traditional, cooperative/organised and the modern retail supply chains of vegetables and found that in the cooperative supply chain the farmers mainly faced the problem of financial assistance from the company. In the modern supply chain, the farmers selling their produce to modern format faced the problem of financial assistance from the company, lack of market information and lack of contracting agencies. Hence it was recommended that these formats may provide needed credit facilities, support with market information and purchase only from the contracted farmers.

Malaisamy *et al*. (2007) in their study found about the market functions, market practices, value chain from the farmer to consumer in terms of handling, value addition, packing, marketing cost, marketing margin and price spread for mango in Dhampuri and Vellore district of Tamil Nadu in India. The results of the study showed that the average gross price received by the producer was Rs. 950 per quintal of Senthura variety of mango and price received for Totapuri, Alphonso and Bangannapalli were Rs. 1250,Rs. 1395 and Rs. 1140 respectively. The farmer's share of consumer rupee for Senthura was 47.36 and the same for Totapuri, Alphonso and Bangannapalli were 51.39,48.35 and 45.19 respectively, in Channel–I (Producer- Pre-harvest contractor – Wholesaler – Retailer - Consumer) of Dharmapuri district. The average gross price received by the producer was Rs. 910 per quintal of Senthura variety of mango and the same of Totapuri, Alphonso and Bangannapalli were Rs. 985, Rs. 1125 and Rs. 925 respectively in Vellore district.

Shepherd (2006) in his paper financing of horticultural marketing in Asia found that sources of working capital are the traders' own funds, friends and family and local money lenders as well as other intermediaries in the marketing system. Farmers also provide finance by accepting deferred payment for their products. Marketing system participants use credit mainly to secure supply, guarantee markets and reduce transaction costs. There are many vertical financial linkages within those systems, usually revolving around wholesalers in wholesale markets. The general conclusion was that availability of working capital is not a major constraint to the functioning of horticultural marketing systems. Banks rarely offer a satisfactory alternative to informal financial sources, even if interest rates are much lower. Without suitable collateral banks are generally reluctant to lend and their procedures are too slow. Working capital needs of horticultural traders are unpredictable and loans are often required immediately. Banks should examine whether they can develop loan products more adapted to the needs of the horticultural sector.

Chapter III

MATERIAL AND METHODS

A systematic approach to investigate the problem and interpret the results is very important to accomplish the objectives of the study. This chapter presents the description of the study area, nature and method of data collection, sampling procedure and analytical tools and techniques applied in attaining the objectives of the study from the primary and secondary data collected. This chapter is presented under the following sub headings.

3.1 Description of study area

3.1.1 Location and Geographical Area

Established in 1591 by Muhammad Quli Qutb Shah, Hyderabad is the capital city of the new southern state, Telangana. The relics of Qutb Shahi and Nizam rule remain visible even today-the Charminar which was commissioned by Muhammad Quli Qutb Shah has come to symbolize Hyderabad. Golconda fort is another major landmark. The influence of Mughlai culture is also evident in the region's distinctive cuisine. Hyderabad's lakes and the sloping terrain of its low-lying hills provide habitat for an assortment of flora and fauna. As of 2016, the tree cover was 1.66% of total city area. Hyderabad is the nation's fourth most populous city and a home to many upscale restaurants. With huge population there is high demand for fresh fruits and vegetables and various forms of retailing are adopted to make the produce reach the final consumer.

3.1.2 Topography

Hyderabad is 1,566 kilometers south of Delhi, 699 kilometers southeast of Mumbai, and 570 kilometers north of Bangalore by road. It lies on the banks of the Musi River, in the northern part of the Deccan Plateau. Greater Hyderabad covers 650 km^2 (250 sq m), making it one of the largest metropolitan areas in India. With an average altitude of 542 metres (1,778 ft), Hyderabad lies on predominantly sloping terrain dotted with small hills, the highest being Banjara Hills at 672 metres (2,205 ft). The city has numerous lakes such as Hussain Sagar (built in 1562 near the city centre), Osman Sagar and Himayat Sagar.

3.1.3 Demography

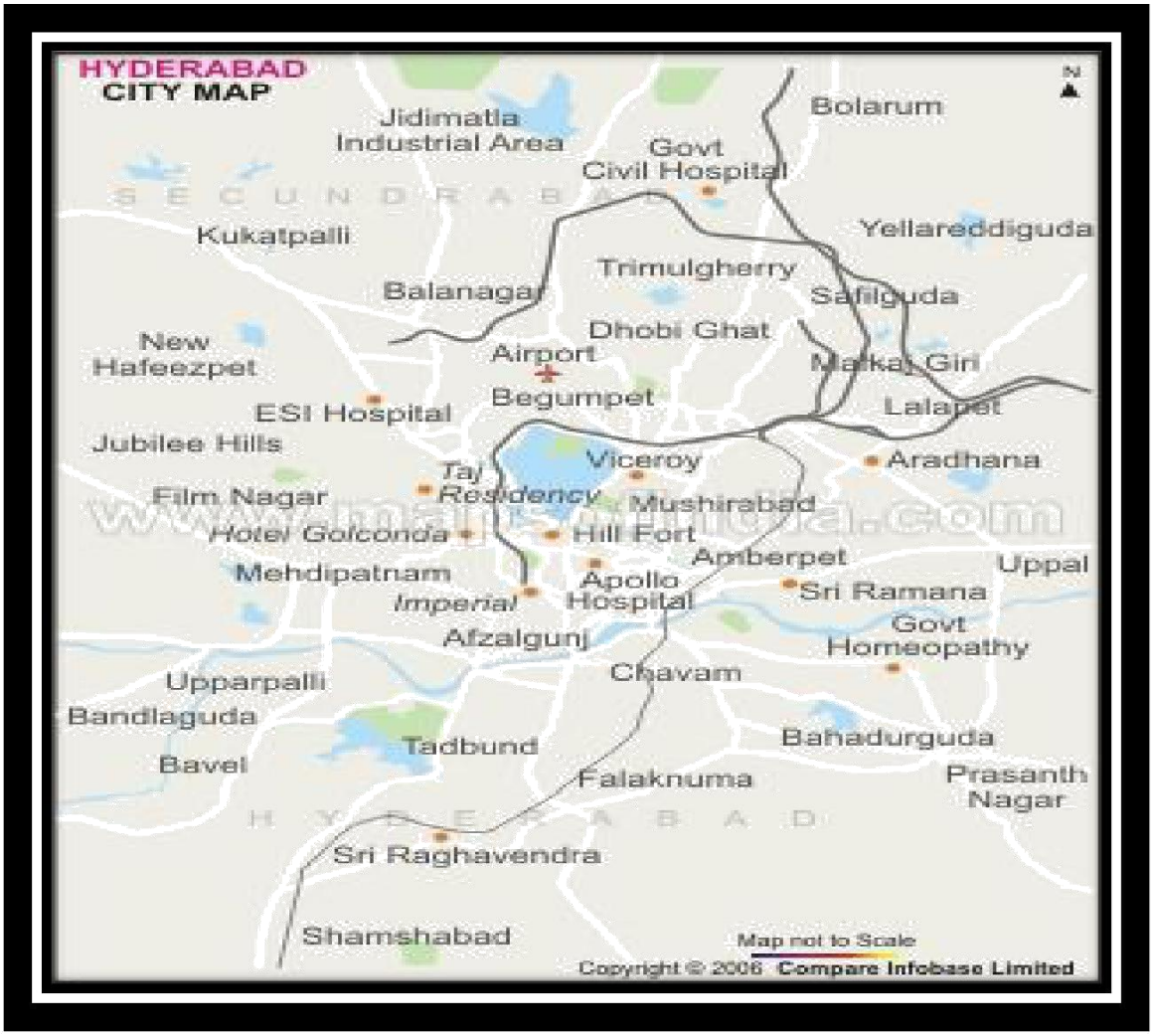
The population increased by 87 per cent , from 3,637,483 in the 2001 census to 6,809,970 in the 2011 census, 24 per cent of which are migrants from elsewhere in India. The socio-economic strata consist of 20per cent upper class, 50 per cent middle class and 30per cent working class. As of 2011, the population density is 18,480/$km^{2.}$ Literacy stands at 82.96per cent (male 85.96per cent; female 79.79 per cent), higher than the national average of 74.04 per cent . Hyderabad is home to a unique dialect of Urdu called Hyderabadi Urdu. Predominantly, the residents of Hyderabad are Telugu and Urdu speaking people.

3.1.4 Climate and rainfall

Hyderabad has a tropical wet and dry climate bordering on a hot semi-arid climate. The annual mean temperature is 26.6 °C (79.9 °F); monthly mean temperatures are 21–33 °C (70–91 °F). Summers (March–June) are hot and humid, with average highs in the mid-to-high 30s Celsius maximum temperatures often exceed 40 °C (104 °F) between April and June. The coolest temperatures occur in December and January, when the lowest temperature occasionally dips to 10 °C (50 °F). Heavy rain from the south-west summer monsoon falls between June and September, supplying Hyderabad with most of its mean annual rainfall. The average rainfall in Hyderabad would be 241.5mm.

Figure: 3.1 Map of Telangana State

Figure: 3.2 Map of Hyderabad City



3.2 Sampling design

Primary and secondary data were collected for this study in order to satisfy the objectives of the study.

3.2.1 Primary data

The primary data forms an important component of any research investigation. The data pertaining to the source of seed materials, fertilizers and plant protection chemicals, finance, technology, information, etc., along with production technology and marketing were collected from the farmers. Information pertaining to marketing channel, costs, and financial sources was collected from market intermediaries such as commission agents, wholesalers and retailers, through primary survey. Data was also collected regarding the

constraints faced by the farmers and the market intermediaries. Primary data was collected using a pre-structured questionnaire encompassing a number of variables which would help to arrive at the conclusions. The data was collected randomly covering two important vegetable Mandis (Bowenpally APMC and Gudimalkapur APMC) and one important fruit market (Gaddiannaram fruit market) in Hyderabad.

3.2.2 Secondary data

The study focusses on the aspects of financing and marketing of vegetables and fruits in the study area. Hence, the secondary data on share of various states in production of the selected vegetables and fruits, volumes and prices of arrivals of the selected fruits and vegetables was collected from Department of Horticulture, National Horticulture Mission data base, journals, published reports, websites, related govt. departments, research stations and records of the marketing societies.

3.3 Nature and sources of data

In order to achieve the objectives proper sample size and design are very important. The details regarding it are as follows:

3.3.1 Selection of the study area

Gudimalkapur and Bowenpally vegetable markets were selected for the study. These are the major vegetable markets where arrivals come from all over India. Generally vegetables come from Moinabad, Musheerabad, Chevella, Parigi mandals. Bangalore, Agra, Vijawada, Kurnool also supply vegetables to these markets. Gaddiannaram market was selected for fruits as it is a major fruit market in the state and has the presence of major wholesalers. All the selected markets are governed by the Agriculture Market Committees.

3.3.2 Selection of farmers

Thirty farmers who cultivate brinjal, okra and chilli were selected and about 20 farmers who cultivate mango, papaya and guava were selected from the farmers who were regularly selling their produce in the selected market yards.

3.3.3 Selection of intermediaries

A sample of 30 wholesale merchants, 30 retail merchants and 30 commission agents and 30 input dealers were selected randomly for gathering the data on vegetables from the two vegetable markets selected and a sample of 30 retailers, 30 commission agents were selected randomly for collecting the data on selected fruits from Gaddiannaram market.

3.4 Analytical techniques employed

Descriptive statistics were worked out for the data collected from primary and secondary sources and the results were tabulated. The constraints were analyzed using Rank Based Quotient Technique. The details of the analytical tools used is briefly discussed below.

3.4.1 Tabular analysis

The data collected was presented in tabular form to facilitate easy comparison. Simple tabular analysis was used for analysis of costs and returns of the farmers, marketing costs and margins of the intermediaries, financial details and the constraints faced by farmers and intermediaries for the data gathered through the questionnaire method. The data collected was subjected to statistical analysis.

3.4.2 Conventional Analysis

Simple percentages and averages were worked out to assess the general characteristics of sample farmers and intermediaries such as age, family size, land holding pattern, number of farmers following different marketing channels, financial sources and other financial needs.

3.4.3 Price Structure and Cost Analysis

3.4.3.1 Price Spread

Relevant information was collected from the stakeholders, viz. individual farmers, commission agents, wholesalers and retailers involved In the process of marketing of the vegetables and fruits. The difference between retail price paid by the consumer and that received by the grower for an equivalent quantity was defined as “Price Spread”. Marketing

costs and margins of different intermediaries engaged in moving the produce from the initial point of production ultimately to consumers were documented.

3.4.3.2 Farmers' Net Price:

The net price received by the farmers was estimated as a difference between gross prices received and sum of the marketing costs incurred, including the post-harvest losses at different stages of handling the produce. The farmers' net price was expressed mathematically as follows:

NPF = GPF - CF

NPF = Net price received by the farmers (Rs/qtl)

GPF = Gross price received by farmers or wholesale price received by the farmer (Rs/qtl)

CF = Cost incurred by the farmers during marketing (Rs/qtl)

3.4.3.3 Marketing Margins

The margins of market intermediaries include profits and returns, which is due from handling and storage. The general expression for estimating the margin of the intermediaries is given below.

Intermediaries margin = Gross price (sale price) – Purchase price (cost price) – Cost of marketing

3.4.3.4 Farmer's Share in Consumer's Rupee

Further, the farmer's share in consumer's rupee was calculated with the help of the following formula.

Fs = (Fp/Cp) X 100

Where,

Fs = Farmer's share in consumer's rupee (percentage),

Fp = Price received by the farmer (Rs/unit)

Cp= Price paid by the consumer (Rs/unit)

3.4.4 Rank Based Quotient (RBQ)

The constraints faced by the producers and their market intermediaries in marketing of vegetables and fruits were identified. The quantification of data was done by first ranking the constraints based on the responses obtained and then calculating the rank based quotient (RBQ) which is as follows:

$$R.B.Q = \frac{f_i\,(n+1-i)}{Nxn}$$

Where,

f_i= Number of respondents reporting a particular constraint under i_{th} rank.

N= Total number of respondents.

n= Total number of constraints identified.

3.5 Concepts and terms referred in the study

Marketing channel

The marketing channel represents the routes through which agricultural products move from producers to consumers. The length of the channel varied from commodity to commodity, depending on the quantity to be moved and the form of consumer demand.

Marketing costs

The expenses incurred by farmers and other agencies such as pre-harvest contractors, wholesalers and retailers for performing their functions in the movement of produce from the farmers to the final consumers.

Marketing margin

Marketing margin is conceptualized as the profit earned by various members involved in the marketing channel of the vegetables.

Price spread

Price spread is defined as the difference between the price received by the farmer and the price paid by the consumer expressed as a percentage to the latter.

Intermediaries

An intermediary is referred to a person/firm who offers intermediation services between two trading parties. Here the intermediaries are enablers in marketing produce between farmers and consumers. The intermediaries in marketing of agricultural commodities include post-harvest contractors, wholesaler, graders, retailers, etc.

Supply chain

Supply chain is defined as the transformation, processing, and movement of produce from the farmers, supported by the input suppliers and market intermediaries to the final users.

3.6 Samunnati Financial Intermediation & Services Pvt. Ltd.

Samunnati was established as a Non-Banking Financial Company in the year 2014. It is a company focused on agricultural value chains and aims to enhance the value of all players across the value chain, by providing financial intermediation, market linkages and advisory services. It works with farmers and farmer associations in securing adequate access to quality production inputs together with risk coping mechanisms for natural disasters shocks, establishes strong market linkages and relationships among various chain actors and farmer community organizations. It also provides advisory services on strategies to enhance the ability of smallholders and farmer community organizations to compete in agricultural product market by reducing cost of production, increasing yield and improving quality. It understands the local value chains, to develop selective customized financial solutions across the value chains and thus create vibrant local economies that are efficiently connected to mainstream financial markets. (Samunnati, 2016)

Chapter IV

RESULTS AND DISCUSSION

In accordance with the pre-determined objectives of the study, this chapter deals with the presentation and discussion of results that emerged from the research work. The main focus in this chapter is to discuss the major causes responsible for the outcomes observed in the investigation. This chapter is presented under the following heads.

4.1 Survey results related to selected fruits

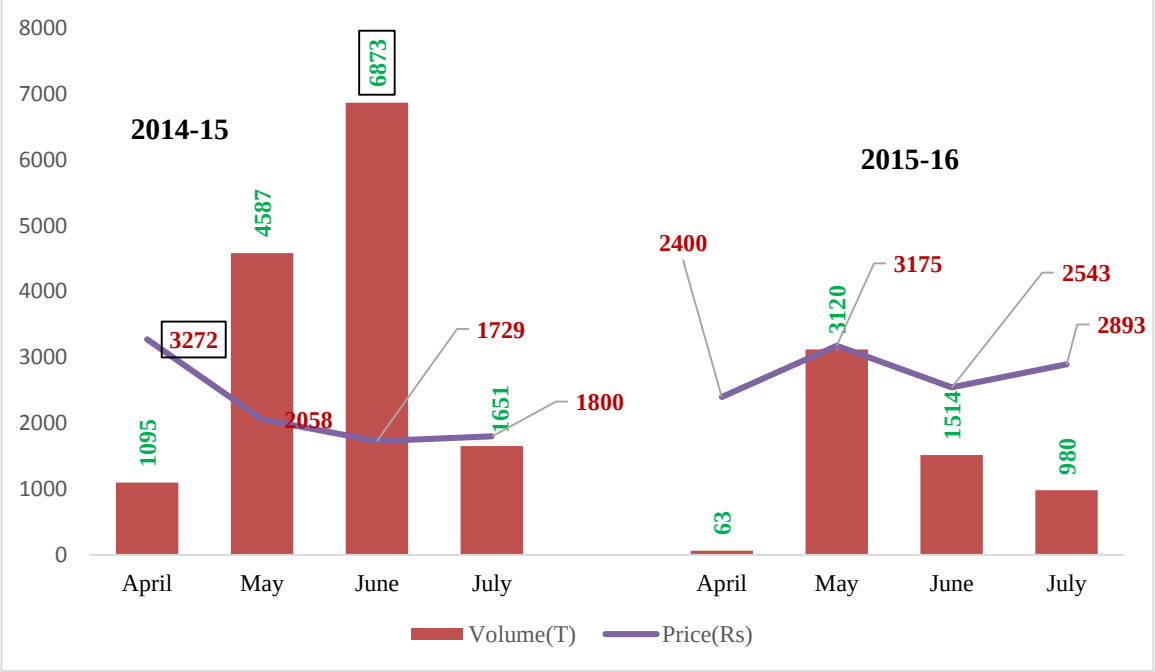
4.2 Survey results related to vegetables

4.1 Survey results related to selected fruits

4.1.1 Trends in wholesale prices and volumes of selected fruits in the selected market

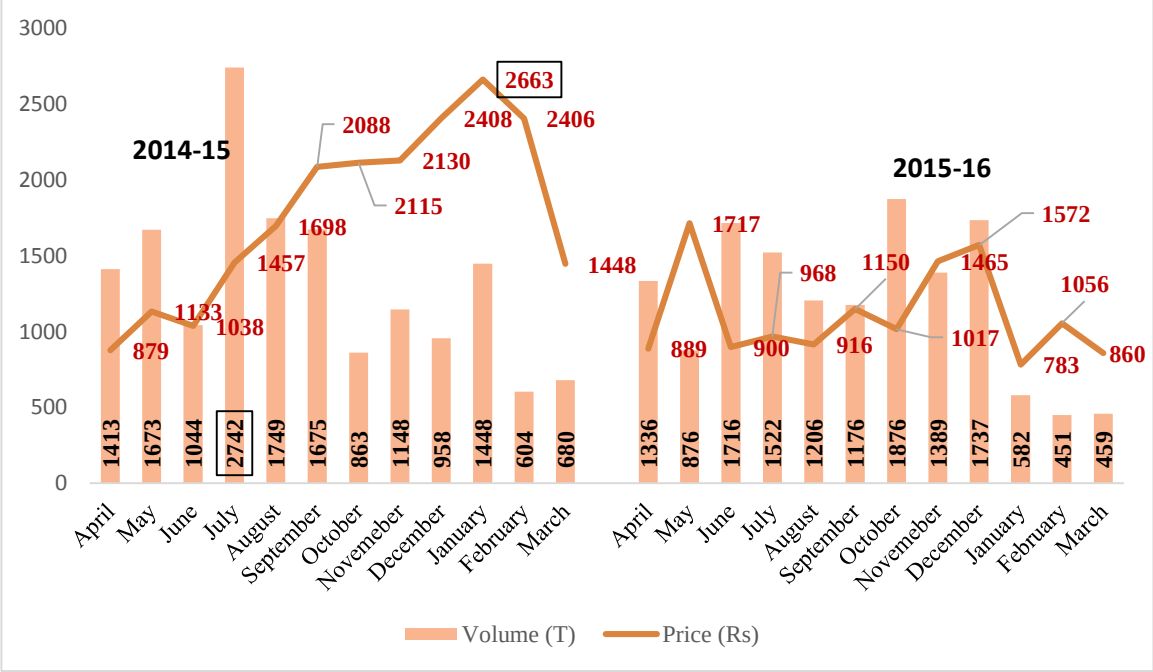
In this section, the trends in volumes and prices of the selected fruits in Hyderabad has been worked out. Data has been collected from the National Horticulture Board website. The analysis of trends helps us in knowing the variation of quantities and prices for the years 2014-15 and 2015-16, for the selected fruits mango, papaya and guava.

Figure 4.1 Trends in arrivals and prices of Mango in Kothapet market for 2014-16



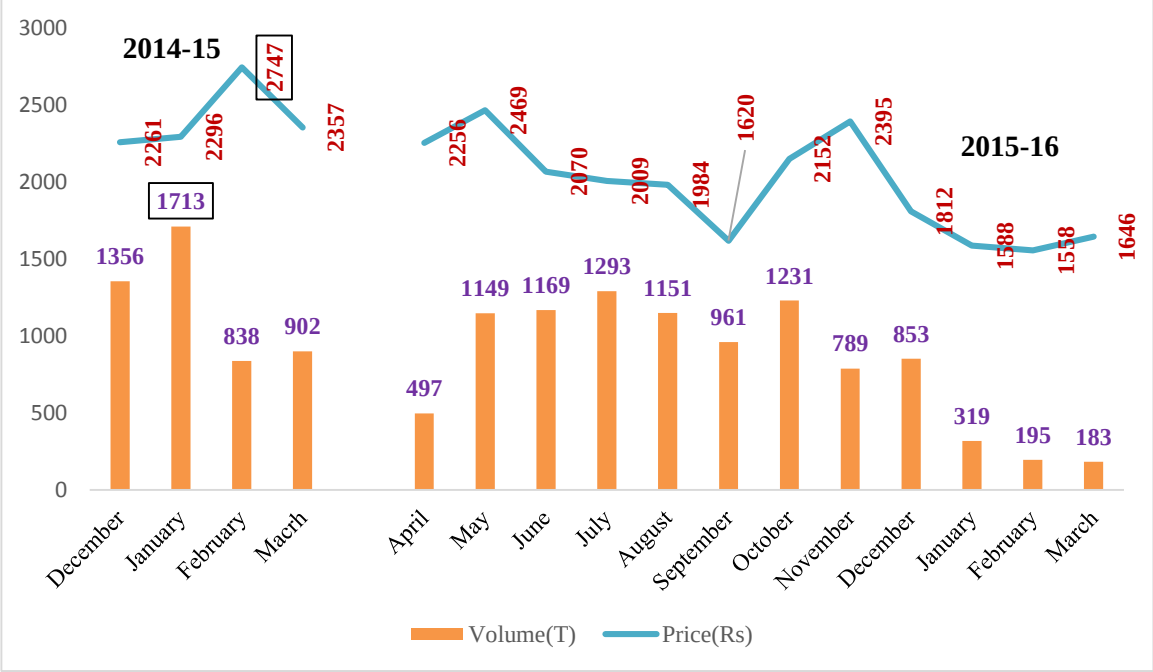
The figure 4.1 shows the annual arrivals of mango for the years 2014-15 and 2015-16. It can be observed that the arrival season of mango was only from April to July. The volumes arrived were highest in the month of June 2014 and the price was highest in the month of April 2014 for the year 2014-15. The volumes arrived were the lowest in the month of April 2015 and the prices were highest during May, 2015 for the year 2015-16.

Figure 4.2 Trends in arrivals and prices of Papaya in Kothapet market for 2014-15 and 2015-16



It can be noticed that arrivals of papaya are here throughout the year in the markets of Hyderabad. The figure 4.2 shows the arrivals and prices of papaya for the years 2014-15 and 2015-16. It can be observed that the highest amount of volumes for the year 2014-15 arrived in the month of July 2014 and the highest price was observed in the month of January 2015 for the year 2014-15. The total arrivals were more in the year 2014-15 in comparison to the year 2015-16. In the year 2015-16 the arrivals were more during the June July and December months and arrivals were very less during February and March months. The prices were high during December and April months.

Figure 4.3 Trends in arrivals and prices of Guava in Kothapet market for 2014-16



From the analysis of trends in arrivals and prices it can be seen that prices are high when arrivals are high. The figure 4.3 shows the volumes and prices of guava for the years 2014-15 and 2015-16. The highest volume of arrivals were seen in the month of January 2015 and the highest price was observed in the month of February 2015 for the year 2014-15. There were no arrivals from April 2014 to November 2014. Hence the total arrivals were very low in the year 2014-15 compared to 2015-16. In the year 2015-16, arrivals were maximum in July.

4.1.2 Socio economic characteristics of the respondents (Farmers, Commission Agents and Retailers)

Socio-economic analysis presents a portfolio of the social and economic conditions of the respondents selected for the study. This will help to get a comprehensive view about the respondents.

4.1.2.1 Family size of the respondents

From the table 4.1 it is evident that most of the farmers (60 per cent) had a small family size with less than four members. Forty per cent of farmers had a medium family with four to five members in the family. There were no large families found among the respondents.

Table 4.1 Family size of the sample farmers

S.no	Family size (Number)	Farmers	
1.	Small (<4)	12	(60.00)
2.	Medium (4-5)	8	(40.00)
3.	Large (>5)	0	
	Total	20	(100)

* Figures in parenthesis indicate percentages

4.1.2.2 Size of land holdings of the sample farmers

The land holding of the farmers were categorised as small (1-10 acres), medium (10-20 acres) and large (more than 20 acres). The data was analysed and the results are presented in table 4.2.

Table 4.2 Size of land holdings of the sample farmers

S.no	Farm size (acres)	Farmers	
1.	Small (1-10)	15	(75.00)
2.	Medium (10-20)	3	(15.00)
3.	Large (>20)	2	(10.00)
	Total	30	(100)

* Figures in parenthesis indicate percentages

From the table 4.2 it can be inferred that most of the fruit farmers had small farm size less than 10 acres. Farmers having medium farm size and large farm size constituted 15 per cent and 10 per cent respectively.

4.1.2.3 Age group of the respondents

The age of respondents helps us to understand their experience and also the direction of decisions that would be taken by them. The details of age wise distribution of sample respondents are presented in table 4.3. Among the farmers, 40 per cent of them

were above 50 years of age, 30 per cent of the farmers were in the age group of 31-40 years and other 30 per cent of the farmers were in the age group of 41-50 years. There were no young farmers between 20-30 years.

In case of commission agents 50 per cent of them were above 50 years in age. Thirty three per cent were in the age group of 41- 50 years and only 16 per cent were in the age group of above 31-40 years. Among the retailers 33 per cent were in the age group of 31-40 years and another 33 per cent were in the age group of 41-50 years. Other 23 per cent were in the age group of 20-30 years followed by 10 per cent in the age group of above 50 years.

Table 4.3 Age group of the respondents

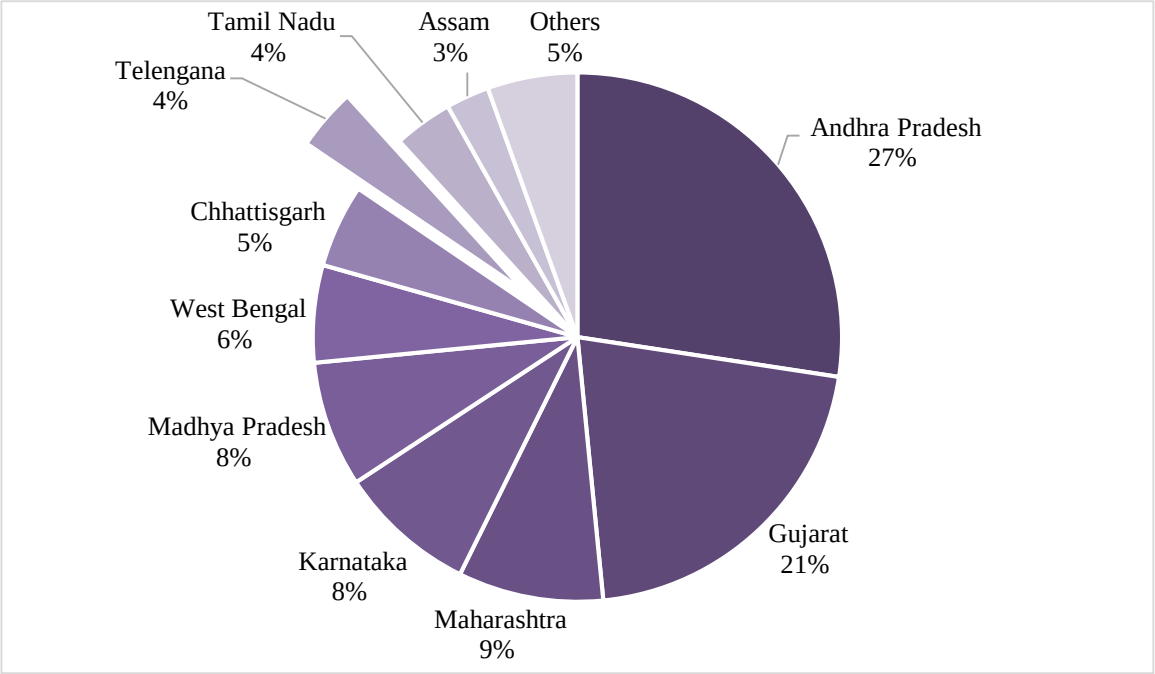
S.no	**Age Group (Years)**	**Farmers**	**Commission Agents**	**Retailers**
1.	20-30	0	0	7 (23.33)
2.	31-40	6 (30.00)	5 (16.66)	10 (33.33)
3.	41-50	6 (30.00)	10 (33.33)	10 (33.33)
4.	50 above	8 (40.00)	15 (50.00)	3 (10.00)
	Total	**30 (100)**	**30 (100)**	**30 (100)**

* Figures in parenthesis indicate percentages

4.1.3 Share of various states in total production

The share of various states in the production of selected fruits will help us in identifying the leading states and their contribution to the total production of the respective fruit. This will further aid in knowing the position of Telangana state with respect to other states.

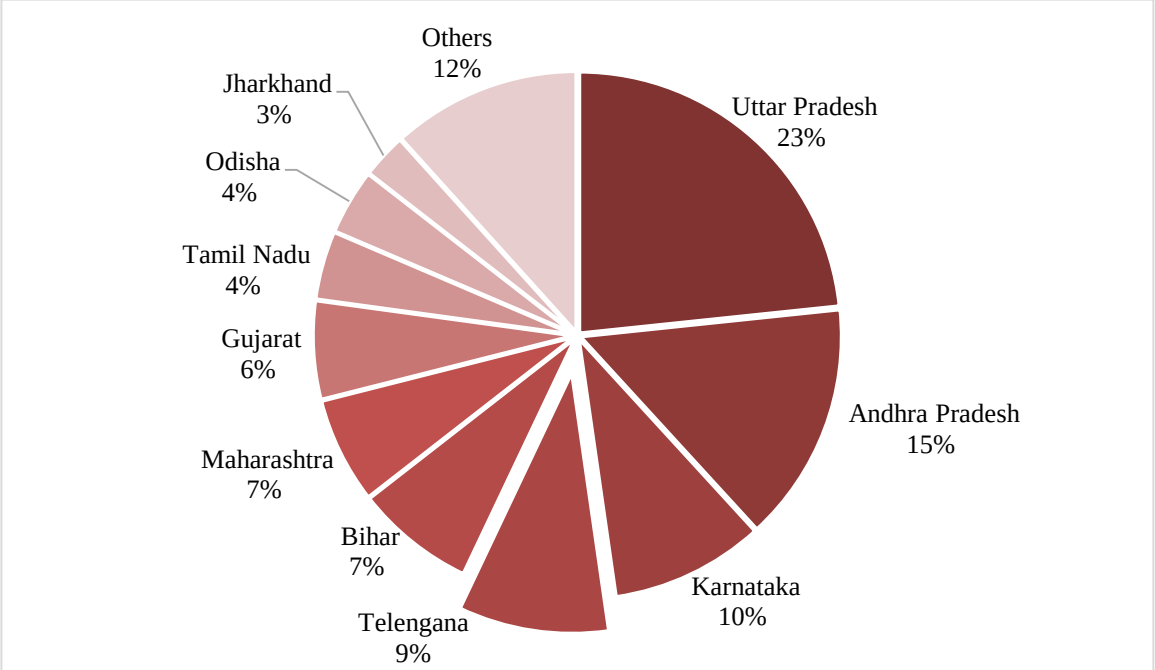
Fig 4.4 Share of various states in total production of Papaya -2013-14



(Source: Ministry of statistics and programme implementation. Horticulture-statistical year book India, 2016)

Figure 4.4 shows the share of various states in the total production of papaya in the country for the year 2013-14. Only two states, Andhra Pradesh and Gujarat contributed almost 50 per cent to the total production. Telangana state contributed 4 per cent to the total production with an area and production of 3000 ha and 212000 tonne respectively. The total area was 133,000 ha and production was 5639,000 tonne in India in 2013-14. (Ministry of statistics and programme implementation. Horticulture-statistical year book India, 2016)

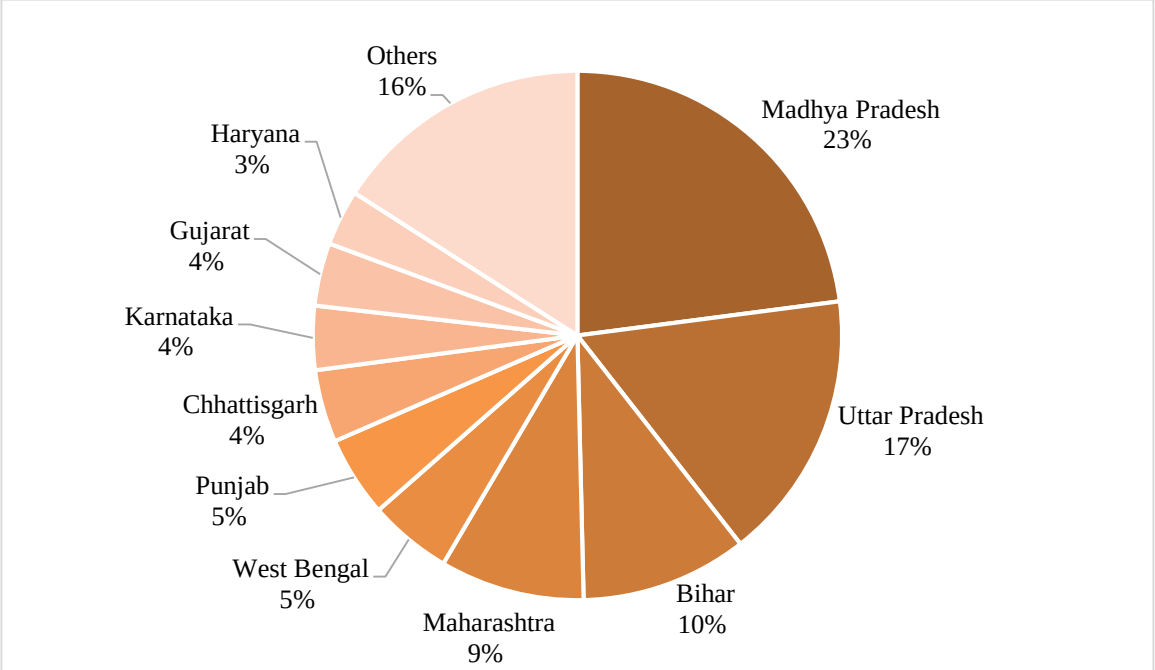
Fig 4.5 Share of various states in total production of Mango -2013-14



(Source: Ministry of statistics and programme implementation. Horticulture-statistical year book India, 2016)

Figure 4.5 shows that three states Uttar Pradesh, Andhra Pradesh and Karnataka contributed 50 per cent to the total production in the country. Telangana with an area of 190,000 ha and a production of 1717,000 tonne contributed nine per cent to the total production of the country and stood fourth among the various Indian states. The total area and production was 2516,000 ha and 18431,000 tonne respectively in 2013-14. (Ministry of statistics and programme implementation. Horticulture-statistical year book India, 2016)

Fig 4.6 Share of various states in total production of Guava -2013-14



(Source: Ministry of statistics and programme implementation. Horticulture-statistical year book India, 2016)

Figure 4.6 shows that Madhya Pradesh, Uttar Pradesh and Bihar contributed 50 per cent to the total production of India in 2013-14. The state of Telangana had an area of 6,000 ha and a production of 90,000 tonne in the year 2013-14. The total area under cultivation was 268,000 ha and production was 3668,000 tonne in the country in the year 2013-14. (Ministry of statistics and programme implementation. Horticulture-statistical year book India, 2016)

4.1.4 Cost of cultivation

The table 4.4depicts the various costs involved in the cultivation of the selected fruits-mango, papaya and guava. It can be seen that the total cost involved in production of

mango was Rs. 44700 while the net income was Rs. 252300 per hectare. Major costs involved were for planting material and farm yard manure. The cost of cultivation for Papaya was nearly Rs. 25700 and the net income was Rs. 526300 per hectare. The cost of cultivation for guava was Rs.61200 and the net income was Rs. 438800 per hectare.

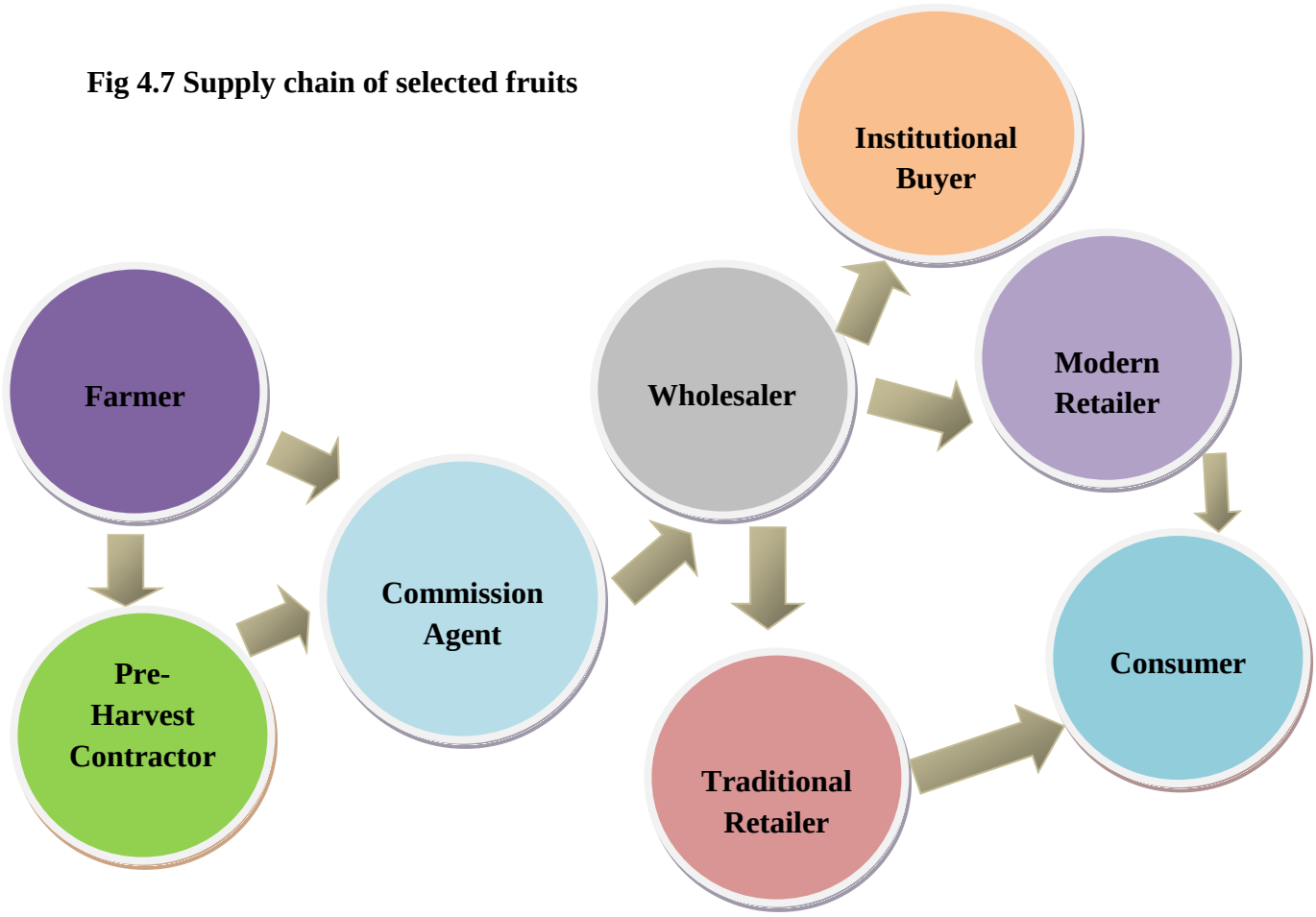
Table 4.4 Cost of cultivation of mango, papaya and guava (Rs/ha)

S.NO	Cost	Mango (Rs)	Papaya (Rs)	Guava (Rs)
1.	Land preparation cost	6000	1500	5000
2.	Planting material cost	10000	7000	20000
3.	Fertilizers Cost	5200	4500	10000
4.	Farm yard manure	10000	7500	12000
5.	Plant Protect Chemicals Cost	10000	1500	7000
6.	Electricity Cost	1500	1200	800
7.	Labour Cost	2000	2500	6400
8.	**Total Cost (Rs)**	**44700**	**25700**	**61200**
9.	Yield/ha (Tonne)	9	85	25
10.	Price/Tonne (Rs)	33000	6500	20000
11.	Gross Income (Rs)	297000	5,52,000	5,00,000
12.	**Net Income (Rs)**	**252300**	**526300**	**438800**

4.1.5 Supply chain and marketing channels

It was observed from the field survey that the supply chains followed were found to be the same for all the selected fruits. The maximum number of partners in the supply chain was six. Figure representing the same is as follows.

Fig 4.7 Supply chain of selected fruits



The marketing channel represents the routes through which selected fruits move from producers to consumers.

The following marketing channels have been identified from the supply chain for the selected fruits which were traded at the whole sale level in Gaddiannaram market

Channel-I

Farmer ⟶ Pre-Harvest Contractor ⟶ Commission Agent ⟶ Wholesaler ⟶ Traditional Retailer ⟶ Consumer

Channel-II

Farmer ⟶ Pre-Harvest Contractor ⟶ Commission Agent ⟶ Wholesaler ⟶ Modern Retailer ⟶ Consumer

Channel-III

Farmer → Pre-Harvest Contractor → Commission Agent → Wholesaler → Institutional Buyer

Channel-IV

Farmer → Commission Agent → Wholesaler → Traditional Retailer → Consumer

Channel-V

Farmer → Commission Agent → Wholesaler → Institutional Buyer

Channel-VI

Farmer → Commission Agent → Wholesaler → Modern Retailer → Consumer

Channel-VII

Farmer → Commission Agent → Wholesaler → Consumer

From the above channels we see that the farmers, pre-harvest contractors, the wholesalers and the retailers are the major players in the supply chain. In the supply chain of mango and guava, channel-I is the most prominent channel wherein the producers sell their produce to the pre harvest contractors who in turn sell it in the Gaddiannaram market yard through the commission agents. The commission agents charge four per cent commission for the produce sold. The pre-harvest contractors are preferred by the farmers because they will buy the produce at the farm gate and also the farmer gets himself free from the risk of price fluctuations.

The next preferred channel was channel-VI, where the farmer directly sold the produce to the wholesalers through the commission agents. The wholesaler then sold it to the modern retailer and thus the produce moved to the consumer from the modern retailer. The grading and sorting will be done by the wholesaler according to the criteria of the modern retailer. The produce that does not meet the quality standard will be returned by the modern retailer to the wholesaler.

Channel-VII was also identified as an important channel. Here the farmer sold the produce to the wholesalers through the commission agent and then the wholesalers sell it to the consumers. This channel had the least number of intermediaries among all the channels involved in selling the produce.

In the supply chain of papaya, channel-IV was the most preferred one where the farmers sold their produce to the wholesalers through the commission agents in the market yard and then the produce was bought by the consumers from the traditional retailers. The next preferred channel was channel-VII, while the least preferred channel was channel-I as the farmers did not prefer the post-harvest contractors for selling papaya.

4.1.6 Marketing costs and margins

The various costs involved in the marketing of produce i.e., labour costs, transportation costs, packing cost, wastage etc are studied here. The marketing margins of each player helps us to understand the profit that's comes in his pocket. This will be helpful in bringing desirable changes in the cost structures in the market yards for better price realisation by the players.

Table 4.5 Marketing costs under different channels for Mango (Rs/Q)

Particulars	**Channel I**	**Channel VI**	**Channel VII**
Producer			
Sorting	0	0	0
Packing	0	2	2
Transport	0	60	60
Weighing	0	50	50
Loading and unloading	0	30	30
Wastage	0	20	20
Commission paid	0	40	40
Subtotal	**0**	**202**	**202**
Price received by the farmer	**0**	**3200**	**3200**
Net profit for the producer	**0**	**2998**	**2998**
Price paid by Pre-harvest contractor			
Sorting	0	0	0
Packing and handling	2	0	0
Transport	70	0	0
Weighing	50	0	0
Loading and unloading	40	0	0
Market fee	0	0	0
Commission paid	40	0	0
Electricity	10	0	0
Shop Rent	0	0	0
Wages	50	0	0
Wastage	20	0	0
Subtotal	**282**	**0**	**0**
Price paid by the wholesaler	**3300**	**0**	**0**
Pre-harvester's margin	**3018**	**0**	**0**

Wholesaler			
Sorting	0	20	10
Packing and handling	5	10	5
Storage	0	0	0
Transport	0	40	0
Weighing	0	0	0
Loading and unloading	20	30	20
Market fee/shop rent	60	60	60
Wastage	0	10	5
Subtotal	**85**	**170**	**95**
Price paid by the traditional retailer/modern retailer	**3700**	**4000**	**0**
Wholesaler's Margin	**315**	**630**	**705**
Traditional Retailer			
Sorting	10	0	0
Packing and handling	10	0	0
Storage	0	0	0
Transport	30	0	0
Weighing	0	0	0
Loading and unloading	20	0	0
Market fee/shop rent	0	0	0
Wastage	20	0	0
Sub total	**90**	**0**	**0**
Retailer's Margin	**410**	**0**	**0**
Modern Retailer			
Sorting	0	60	0
Packing and handling	0	40	0
Storage	0	50	0
Transport	0	0	0
Weighing	0	0	0
Loading and unloading	0	0	0
Market fee/shop rent	0	50	0
Wastage	0	30	**0**
Total	**0**	**230**	**0**
Consumer's purchase price	**4200**	**4500**	**4000**
Modern Retailer's Margin	**0**	**270**	**0**
Producer's share in consumer's rupee (%)	**78.5**	**71.1**	**80**

The table 4.5 shows the various costs involved in marketing of mango through the various channels. It was observed that the producer's share in consumer's rupee was highest in channel-VII (Farmer- Commission agent- Wholesaler- Consumer). This was because of the less number of channel partners involved in this channel. The marketing costs were highest in channel-VI (Farmer- Commission Agent- Wholesaler- Modern Retailer- Consumer) i.e.,

Rs.602 followed by channel-I i.e., Rs.457 and channel-VII (Farmer-Commission Agent-Wholesaler-Consumer) i.e., Rs. 297.

Table 4.6 Marketing costs under different channels for Guava (Rs/Q)

Particulars	**Channel I**	**Channel VI**	**Channel VII**
Producer			
Sorting	0	2	2
Packing	0	5	5
Transport	0	30	30
Weighing	0	20	20
Loading and unloading	0	20	20
Wastage	0	10	10
Commission paid	0	40	40
Subtotal	**0**	**127**	**127**
Price paid by the wholesaler	**0**	**1350**	**950**
Producer's Margin	**0**	**1223**	**823**
Pre-harvest contractor			
Sorting	2	0	0
Packing and handling	5	0	0
Transport	30	0	0
Weighing	10	0	0
Loading and unloading	20	0	0
Market fee	0	0	0
Commission paid	40	0	0
Electricity	10	0	0
Shop Rent	0	0	0
Wages	0	0	0
Wastage	10	0	0
Subtotal	**127**	**0**	**0**
Price paid by the wholesaler	**1200**	**1350**	**0**
Pre-harvester's Margin	**1073**	**0**	**0**
Wholesaler			
Sorting	5	7	5
Packing and handling	2	5	2
Storage	0	0	0
Transport	40	70	40
Weighing	0	0	0
Loading and unloading	20	20	20
Market fee/shop rent	60	60	60
Wastage	10	20	10
Subtotal	**137**	**182**	**137**
Price paid by the traditional retailer/modern retailer	**1550**	**1800**	**0**

Wholesaler's Margin	**213**	**268**	**413**
Traditional Retailer			
Sorting	2	0	0
Packing and handling	5	0	0
Storage	0	0	0
Transport	30	0	0
Weighing	10	0	0
Loading and unloading	20	0	0
Market fee/shop rent	0	0	0
Wastage	10	0	0
Sub Total	**77**	**0**	**0**
Traditional Retailer's Margin	**373**	**0**	**0**
Modern Retailer			
Sorting	0	20	0
Packing and handling	0	10	0
Storage	0	50	0
Transport	0	50	0
Weighing	0	0	0
Loading and unloading	0	30	0
Market fee/shop rent	0	50	0
Wastage	0	30	**0**
Total	**0**	**240**	**0**
Modern Retailer's Margin	**0**	**260**	**0**
Consumer's purchase price	**2000**	**2300**	**1500**
Producer's share in consumer's rupee (%)	**60**	**43.47**	**63.33**

The table 4.6 shows the costs incurred by the various supply chain partners in marketing of guava. It is observed that the producer's share in consumer's rupee was the highest in channel-VII (Farmer- Commission Agent- Wholesaler- Consumer). The total marketing cost was highest in channel- VI (Farmer- Commission Agent- Wholesaler- Modern Retailer- Consumer) i.e., Rs. 549 followed by channel-I (Farmer- Pre-harvest Contractor- Commission Agent- Wholesaler- Traditional Retailer- Consumer) i.e., Rs. 341 and in channel-VII it was Rs. 264.

Table 4.7 Marketing costs under different channels for Papaya (Rs/Kg)

Particulars	**Channel IV**	**Channel V**	**Channel VII**
Producer			
Sorting	0	0	0
Packing	1	1	1
Transport	2.3	2.3	2.3
Weighing	0	0	0

Loading and unloading	0.2	0.2	0.2
Wastage	1.22	1.22	1.22
Commission paid	0.26	0.26	0.26
Subtotal	**4.98**	**4.98**	**4.98**
Price paid by the wholesaler	**9.5**	**10.2**	**9.5**
Producer's Margin	**4.52**	**5.22**	**4.52**
Wholesaler			
Sorting	0.2	0.5	0.2
Packing and handling	0	0.3	0
Transport	0	0.42	0
Weighing	0	0	0
Loading and unloading	0.2	0.33	0.2
Market fee	1.0	1.0	1.0
Commission paid	0	0	0
Electricity	0.3	0.3	0.3
Shop Rent	0.5	0.5	0.5
Wages	0	0	0
Wastage	1.0	1.2	1.0
Subtotal	**3.2**	**4.55**	**3.2**
Price paid by the retailer	**20**	**0**	**0**
Wholesaler's Margin	**7.3**	**17.25**	**10.3**
Traditional Retailer			
Sorting	0.5	0	0
Packing and handling	1.0	0	0
Storage	0	0	0
Transport	0.75	0	0
Weighing	0	0	0
Loading and unloading	0.2	0	0
Market fee/shop rent	0	0	0
Wastage	0.5	0	0
Subtotal	**2.95**	0	**0**
Consumer's purchase price	**25**	0	**23**
Retailer's Margin	**2.05**	**0**	**0**
Institutional buyer's purchase price	**0**	**32**	**0**
Producer's share in consumer's rupee (%)	**38**	**31.8**	**47.5**

The table 4.7 shows the costs of various players in marketing of papaya. It was seen that the producer's share in consumer's rupee was maximum in channel VII (Producer- Commission Agent- Wholesaler-Consumer). This was because of the shorter channel length. The lesser the number of intermediaries the more will be the producer's share in consumer's rupee. The marketing costs were highest in channel-IV i.e., Rs.11.13 followed by channel-V (Farmer-Commission agent-wholesaler-Institutional Buyer) and channel-VII (Farmer-Commission Agent-Wholesaler-Consumer)

i.e., Rs.9.53 and Rs. 8.18 respectively. The wholesaler's margin was Rs. 7.3, Rs. 17.25 and Rs. 10.3 in channel-IV, channel-V and channel-VII respectively. The wholesaler realised the highest profit by selling to the institutional buyers.

4.1.7 Sources of finance to the supply chain players

All the players of the supply chain need finance for their enterprise to run. There are both formal and informal sources of finances available to the farmers as well as other partners of the supply chain. The formal sources of finance for the farmers are banks and informal sources are mostly money lenders.

The other intermediaries i.e., the commission agents and the retailers have banks-both private and public serving as formal sources of finance and friends and family serving as the informal sources of finance.

Table 4.8 Sources of finance to the farmers

S.no	Nature of Source	Category	Average Amount Borrowed (Rs)	Rate of Interest per Annum	Repayment Period (Years)	Documents Required
1.	Formal	Banks	125000	12	2.2	Bank pass book Adhaar Card Land documents and MRO office stamp paper
2.	Informal	Money Lenders	50000	60	3	Nil

The table 4.8 shows the different sources of finance available to the farmers. The average amount borrowed from the formal and informal sources was Rs.125000 and 50000 respectively. The informal sources were preferred only in case of emergencies as 70 per cent of the farmers were dependent only on banks for their financial needs. The vast difference in the interest rates between the banks and money lenders makes the farmers to look for other formal sources of finance at lower interest rates.

Some of the banks that were serving the farmers are Sangameshwara Grameena Vikas Bank, Andhra Bank and State Bank of India

Table 4.9 Sources of finance to the commission agents

S no.	Nature of Source	Category	Average Amount Borrowed (Rs)	Rate of Interest per Annum	Repayment Period (Years)	Documents Required
1.	Formal	Banks	150000	11	2	Bank pass book Adhaar card IT returns Licence Shop ownership papers
2.	Informal	Hand Loans	50000	24	1	Nil

The table 4.9 shows the financial borrowing sources of the commission agents. The average amount borrowed by the commission agents from formal and informal sources is Rs. 150000 and Rs. 50000 respectively. With an average annual turnover of 3crores, the commission agents are equally dependent on both the sources for fulfilling financial needs. HDFC, ICICI and Bank of Baroda are few banks which are serving the commission agents in the market.

Table 4.10 Sources of finance to the retailers

S.no	Nature of the Source	Category	Average Amount Borrowed (Rs)	Rate of Interest per Annum	Repayment Period (Years)	Documents Required
1.	Formal	Banks	100000	11	1	Pass Book Land Documents Title DD Adhaar Card MRO Office paper
2.	Informal	Hand Loans	50000	24	1	Nil

The table 4.10 shows the sources of finance available to the retailers. The retailers are mostly dependent on informal sources of finance though the rate of interest is high because of the cumbersome paper work involved in the formal sources. Most (per cent) of them are not educated enough to understand and fulfil the requirements of formal lending.

4.1.8 Challenges faced by various supply chain partners

There are varied challenges faced by the supply chain partners involved in fruit supply chain. The data regarding financial and marketing challenges faced by the commission agents and retailers have been collected and tabulated. This will help us to know the major constraints faced by them and required changes can be made by the policy makers to make the supply chain more profitable for all the partners. Identifying the financial challenges will help in better understanding the gaps in meeting the financial needs and thus help in designing the financial products accordingly.

Table 4.11 Financial challenges faced by the fruit retailers

S.No.	Particulars	Rank					R.B.Q	Overall Rank
		I	II	III	IV	V		
1.	Inadequate credit	9	8	6	3	4	69.6	1
2.	Inadequate subsidy	0	8	0	7	15	45.3	4
3.	High interest rate on loan	6	5	8	2	9	57.9	3

4.	Insufficient repayment time	0	0	8	10	12	37.3	5
5.	Difficulty in documentation work	10	6	6	3	5	65.03	2

The various financial challenges faced by the retailers of fruits were listed and ranked according to Rank Based Quotient. It was found that inadequate credit availability was the most basic constraint for retailers. The retailers also found difficult in documentation work which restricted them from opting for formal financial sources. High rates of interest on the loan, insufficient subsidy and insufficient repayment time were the other major constraints faced by the retailers.

Table 4.12 Marketing challenges faced by the fruit retailers

S.No.	Particulars	Rank					R.B.Q	Overall Rank
		I	II	III	IV	V		
1.	Lack of storage facilities	5	3	9	8	5	56.5	4
2.	Price fluctuations in the market	7	2	9	8	4	59.8	2
3.	Transportation problem	9	4	6	3	8	61.9	1
4.	Hammali Problem	6	6	8	0	10	58.6	3
5.	Wastage	0	5	8	9	8	46.6	5

The various marketing challenges faced by retailers of fruits are listed and rank is given by Rank Based Quotient method. It was found that transportation problem was ranked first followed by price fluctuations in the market and hammali problem. However, lack of storage facilities in the market and wastage were the other constraints faced by retailers in marketing of fruits.

Table 4.13 Financial challenges faced by the fruit commission agents

S.No.	Particulars	Rank					R.B.Q	Overall Rank
		I	II	III	IV	V		
1.	Inadequate credit	7	5	7	5	6	61.2	2
2.	Inadequate subsidy	2	5	9	8	6	52.5	4
3.	High interest rate on loan	0	0	5	10	15	33.0	5
4.	Insufficient repayment time	5	2	9	10	4	54.9	3
5.	Difficulty in documentation work	10	8	8	4	0	75.9	1

The various financial challenges faced by the commission agents were listed and ranks were given based on rank based quotient method. Among the various constraints, difficulty in documentation work was ranked first followed by inadequate credit. Inadequate credit and insufficient repayment time were ranked second and third constraints respectively. Inadequate subsidy and high rates on interest were the other major constraints for the commission agents.

Table 4.14 Marketing challenges faced by the fruit commission agents

S.No.	Particulars	Rank					R.B.Q	Overall Rank
		I	II	III	IV	V		
1.	High competition	9	7	5	5	4	67.2	3
2.	Fluctuation of prices	6	3	8	6	7	59.6	4
3.	Risk of quality	15	6	7	1	1	81.9	1

4.	Wastage	5	3	2	10	10	47.9	5
5.	Less commission fee	7	8	9	9	7	78.9	2

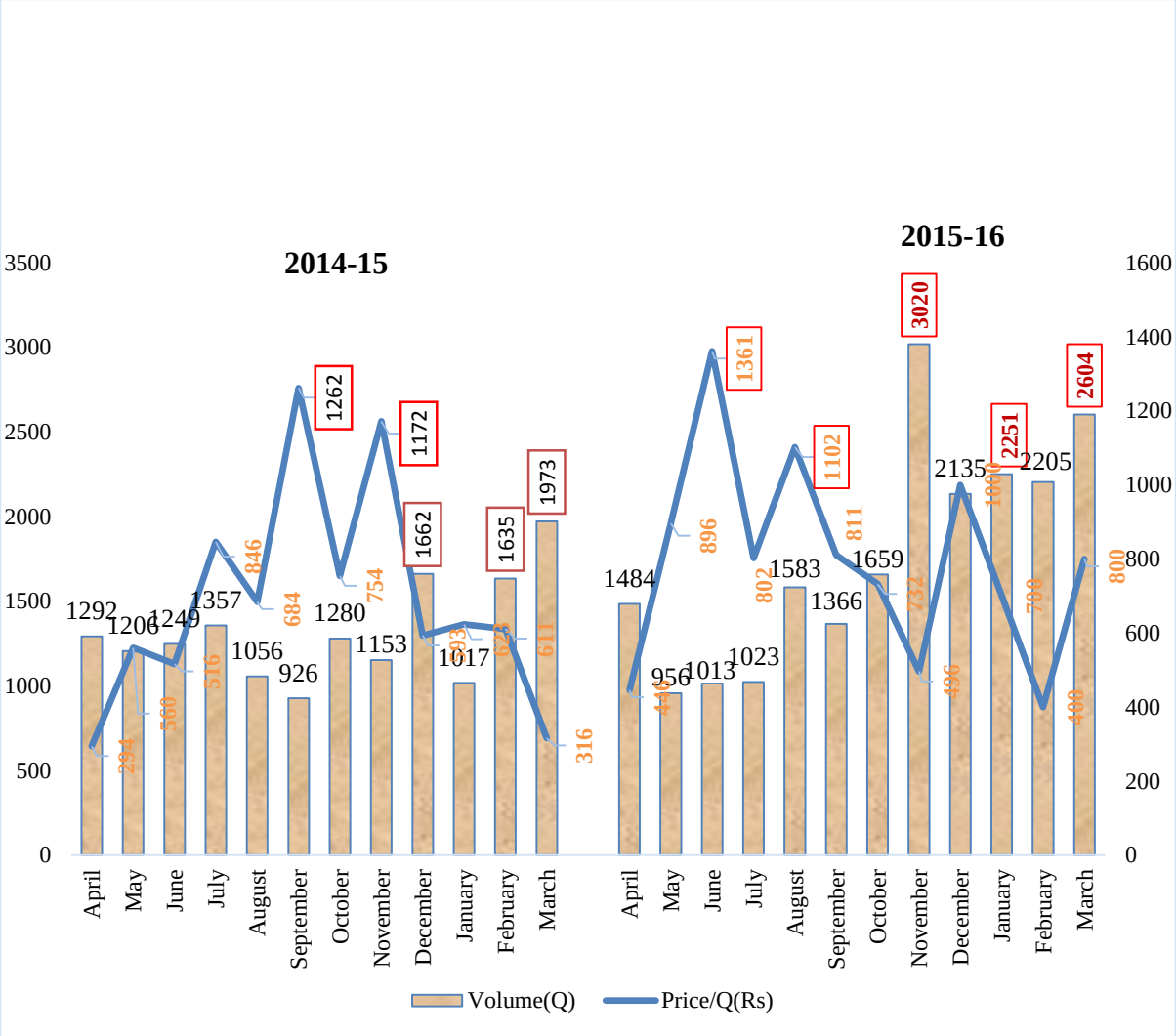
The various challenges faced by the commission agents in marketing of fruits were listed and ranked based on Rank Based Quotient. It was see that risk of quality was the major constraint faced by the commission agents in the market. The next challenge was the less amount of commission fee that was given to commission agents by the producer as there exists Following this was the high competition in the market among the commission agents due to the presence of many commission agents. Challenge of wastage was less when intense compared to other challenges.

4.2 Survey results related to vegetables

4.2.1 Trends in wholesale prices and volumes of selected vegetables in the selected market

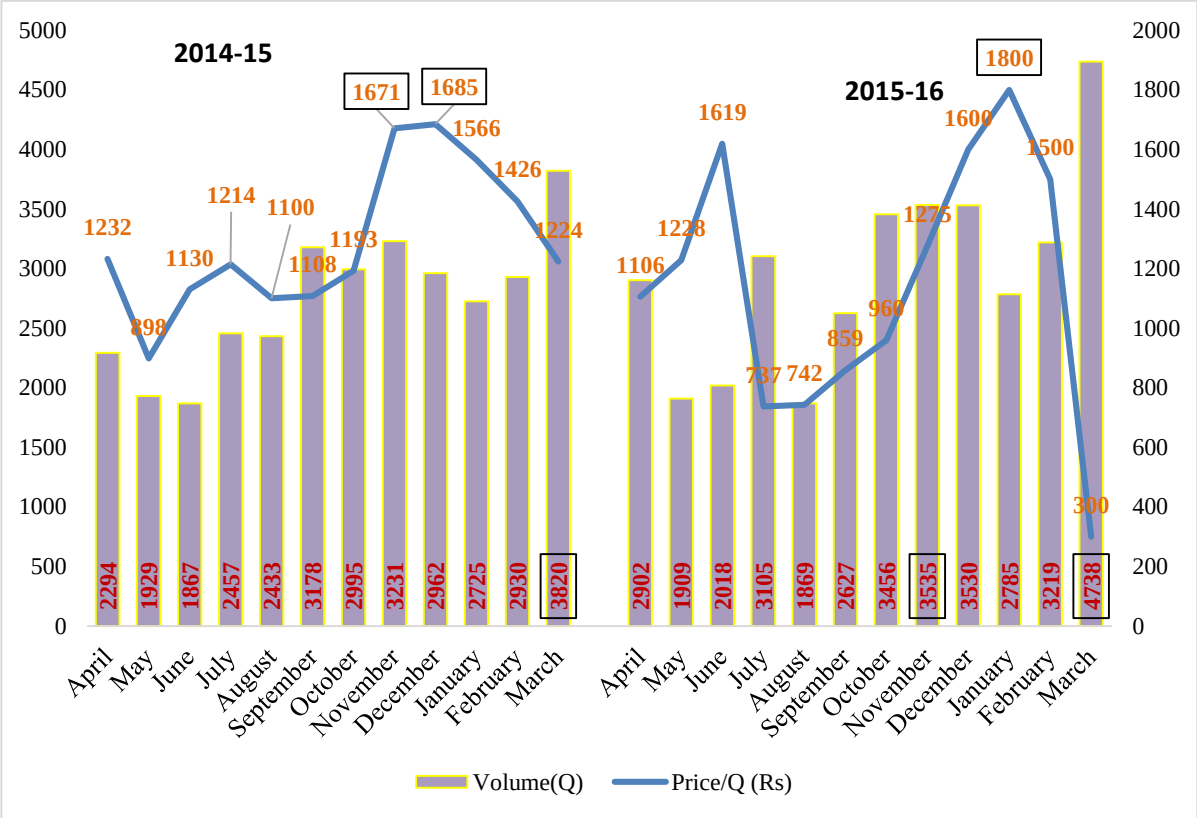
In this section, the trends in volumes and prices of the selected vegetables in the Gudimalkapur market has been worked out. Data has been collected from the market committee of the respective market yard. This helps us in understanding the variation in trends in arrivals and prices in the two years i.e., 2014-15 and 2015-16.

Figure 4.8 Trends in arrivals and prices of Brinjal at Gudimalkapur market 2014-15 and 2015-16



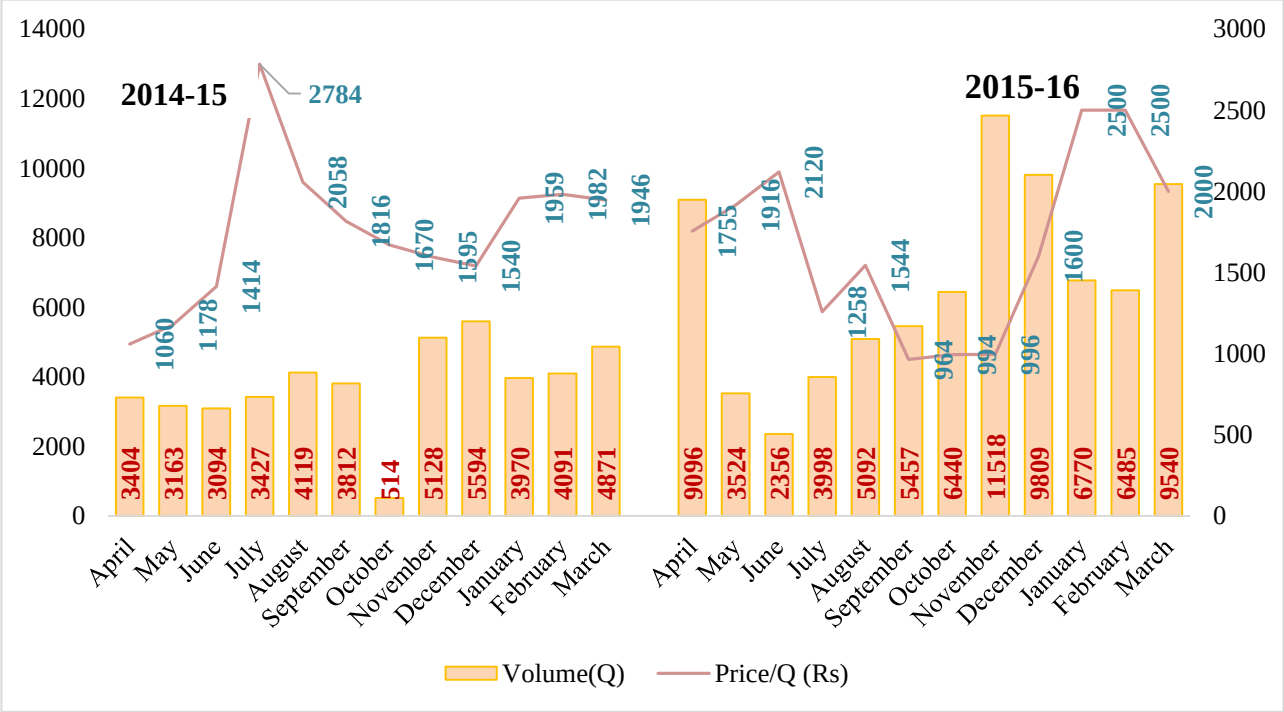
From the figure 4.8, it is evident that the trend in prices had increases and decreases during 2014-15 and 2015-16. In 2014-15 the arrivals were highest in the months of March, December and February respectively. But the prices were very high during the months of September and November. In 2015-16, the arrivals were highest during the months ;of November, March and January while the prices were high during the months of June and August. However, the year 2015-16 had more arrivals compared to 2014-15 i.e., 21299 Q and 15806 Q respectively. The maximum volume arrived was 3020 Q in November 2015 and the highest price was observed in June 2015 i.e., Rs. 1361/ Q.

Figure 4.9 Trends in arrivals and prices of Okra at Gudimalkapur market 2014-15 and 2015-16



The Figure 4.9depicts the volumes and price fluctuations of Okra in Gudimalkapur market from 2014 to 2016. It can be observed that the arrivals of Okra were highest in March 2015-16 followed by March 2014-15 and November 2015-16 respectively. When prices over the years are compared it is observed that the highest per quintal price was in the month of January 2015-16 followed by December and November 2014-15. The total arrivals accounted for 32821Q and 35693Q respectively in 2014-15 and 2015-16.

Figure 4.10 Trends in arrivals and prices of Green chilli at Gudimalkapur market 2014-15 and 2015-16



The Figure 4.10 shows the arrivals and prices of Green chilli in Gudimalkapur market during 2014-16. The volumes were highest in November 2015-16 followed by December and March 2015-16. The prices were highest in July 2014-15 followed by January and February 2015-16.The volume of arrivals almost doubled in 2015-16 in comparison to 2014-15 and the volumes were 45187 Q and 80085 Q respectively.

4.2.2 Socio economic characteristics of the respondents (Farmers, Commission Agents and Retailers)

Socio-economic analysis presents a portfolio of the social and economic conditions of the respondents selected for the study. This will help to get a comprehensive view of the respondents.

4.2.2.1. Family size of the respondents

From the table 4.15 it is evident that most of the farmers (40 per cent) had a medium family size with four to five members. 33.34 per cent of farmers had a small family with less than four members and only 26.6 per cent farmers had a large family of more than 5 members.

Table 4.15 Family size of the sample farmers

S.no	**Family size (Number)**	**Farmers**	
1.	Small (<4)	10	(33.34)
2.	Medium (4-5)	12	(40.00)
3.	Large (>5)	8	(26.66)
	Total	30	(100)

* Figures in the parentheses indicates percentages

4.2.2.2 Size of land holdings of the sample farmers

The land holding of the farmers were categorised as small (less than 2 acres), medium (2 – 5 acres) and large (more than 5 acres). The data was analysed and the results are presented in table 4.2.

Table 4.16 Size of land holdings of the sample farmers

S.No	**Farm size (acres)**	**Farmers**	
1.	Small (<2)	13	(43.33)
2.	Medium (2-5)	10	(33.34)
3.	Large (>5)	7	(23.33)
	Total	30	(100)

* Figures in parenthesis indicate percentages

From the table 4.16, it can be inferred that most of the vegetable farmers had small farm size of less than 2 acres. Farmers having medium farm size and large farm size constituted 33.34 per cent and 23.33 per cent respectively. Farmers mostly used only few guntas (40guntas=1 acre) of their land for each vegetable. Thus, they were able to grow variety of vegetables in small farm size also.

4.2.2.3 Age group of the respondents

The age of respondents helps us to understand their experience and also the direction of decisions that would be taken by them. The details of age wise distribution of sample respondents are presented in table 4.17. Among the farmers, 40 per cent of them were in the age group of 31- 40 years, 33 per cent of the farmers were in the age group of 41- 50 years, 16 per cent of the farmers were in the age group of 20-30 years and only 10 per cent of the farmers were above 50 years of age. In case of commission agents 50 per cent of them were in the age group of 41- 50 years and 33 per cent were in the age group of above 50 years. There were no young commission agents of between 20 to 30 years age. Among the wholesalers, young age group of 20 to 30 years was dominant with 50 per cent respondents falling under this category while other age groups had few wholesalers only. The retailers were maximum in the age group of 20-30 years and 41 to 50 years followed by the age groups 31- 40 years and 50 years and above.

Table 4.17 Age group of the respondents (Farmers, Commission agents and Retailers)

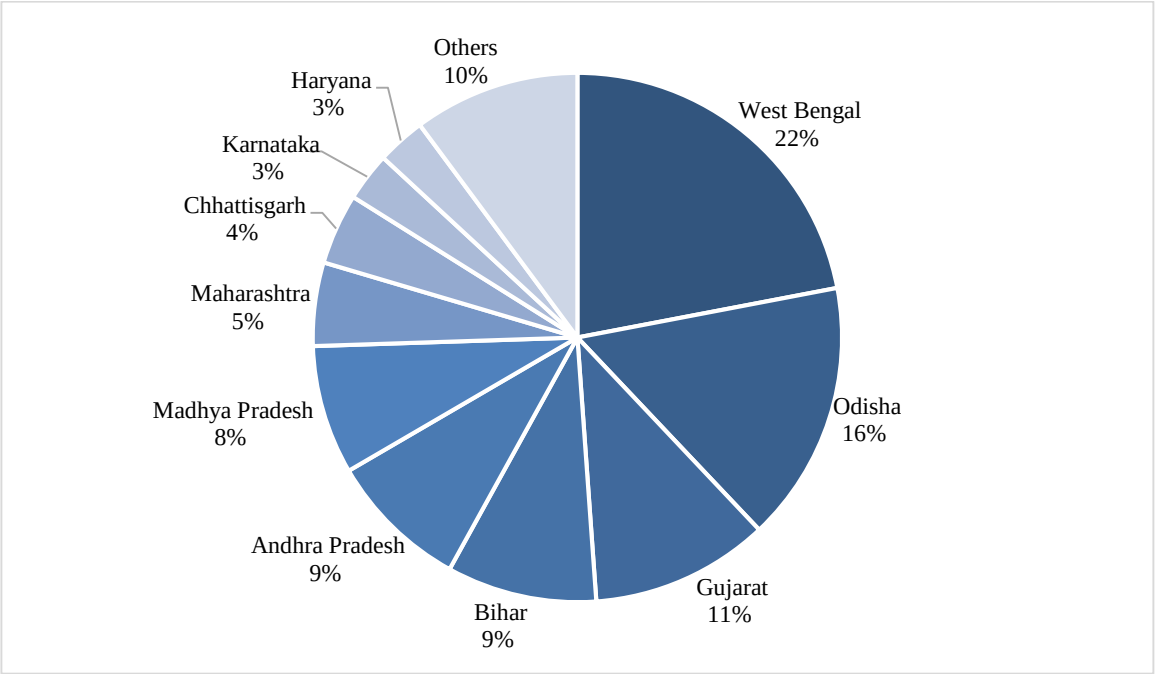
S.No	Age Group (Years)	Farmers		Commission Agents		Wholesalers		Retailers	
1.	20-30	5	(16.66)	0		15	(50.00)	10	(33.33)
2.	31-40	12	(40.00)	5	(16.66)	7	(23.33)	5	(16.66)
3.	41-50	10	(33.34)	15	(50.00)	5	(16.66)	10	(33.33)
4.	50 above	3	(10.00)	10	(33.34)	3	(10.00)	5	(16.66)
	Total	**30**	**(100)**	**30**	**(100)**	**30**	**(100)**	**30**	**(100)**

* Figures in parenthesis indicate percentages

4.2.3 Share of various states in total production of the selected vegetables

The share of various states in the production of selected vegetables throws a light on the major states producing the respective vegetable. The scenario in the state of Telangana will also be known. This will help in further improving the production of the vegetables and strengthening the supply chain.

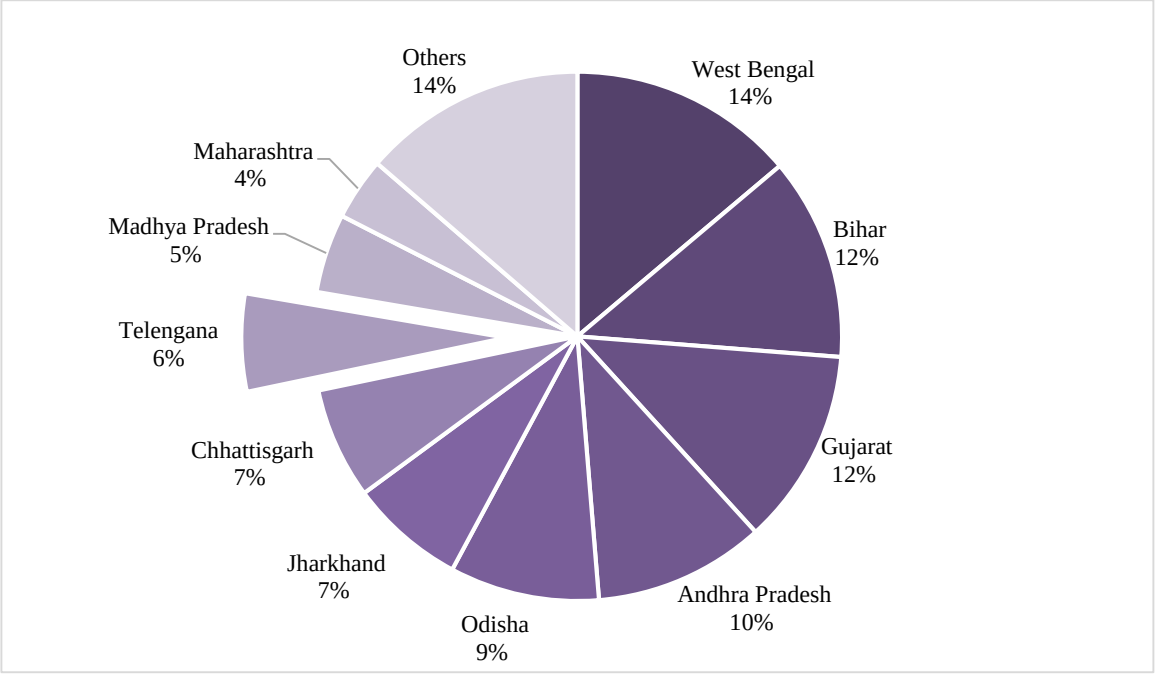
Fig 4.11 Share of various states in total production of Brinjal-2013-14



(Source: Ministry of statistics and programme implementation. Horticulture statistical year book India, 2016)

West Bengal, Odisha and Gujarat contributed 50 per cent of total production in 2013-14. The area and production of Brinjal in Telanagana was 15,000 ha and 302000 tonnes respectively in 2013-14. Thus, it stood 13th in area and 11th in production among the Indian states. There was a total area of 711,000 ha and 13557,000 tonne production in the country during 2013-14. (Ministry of statistics and programme implementation. Horticulture-statistical year book India, 2016)

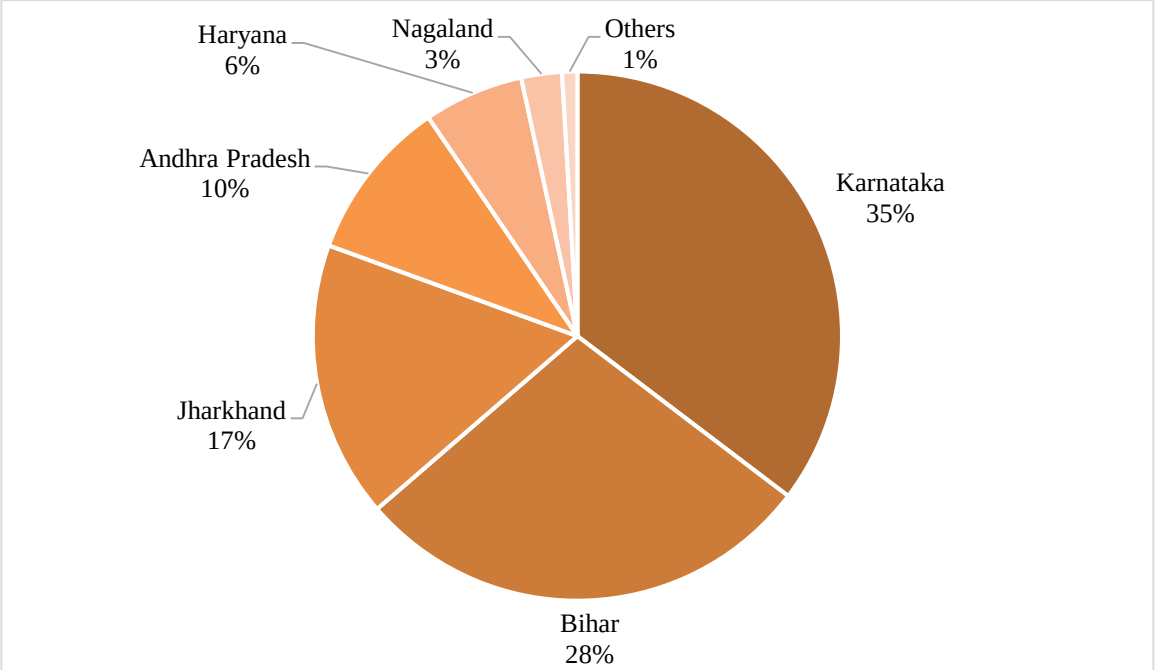
Fig 4.12 Share of various states in total production of Okra -2013-14



(Source:Ministry of statistics and programme implementation. Horticulture-statistical year book India, 2016)

The four states i.e., West Bengal, Bihar, Gujarat and Andhra Pradesh contributed 50 per cent of total production of Okra in the country in the year 2013-14.The area of cultivation under Okra in Telanagana was 25,000 ha and it contributed 6 per cent to the total production of Okra in the country in 2013-14. The total area under cultivation was 532,000 ha and production was 6346,000 tonne in India for the year 2013-14. (Ministry of statistics and programme implementation. Horticulture-statistical year book India, 2016)

Fig 4.13 Share of various states in total production of Green Chilli -2013-14



(Source: Horticulture statistics division, Department of Agriculture Cooperation & Farmers Welfare, 2015)

The figure 4.13 shows that the states Karnataka and Bihar collectively contributed to more than 60 per cent of the total Green Chilli production in the country. Four states of the country Karnataka, Bihar, Jharkhand and Andhra Pradesh contributed 90 per cent of the total production in 2013-14. The state of Telanagana had an area of 0.55 lakh ha and a

production of 1.71 lakh MT in Kharif 2014. (National conference for Kharif campaign, 2015)

4.2.4 Cost of cultivation of selected vegetables

The table 4.5 indicates the cost of cultivation of the selected vegetables- Brinjal, Okra and Green Chilli. It can be seen that the cost for labour is the highest for all the three vegetables. The price paid to the commission agents is also high in all the three crops. The costs towards electricity and land preparation were the least.

The total cost involved in the production of Brinjal, Okra and Green Chilli was Rs. 143336, Rs. 94567 and Rs. 144676 respectively.

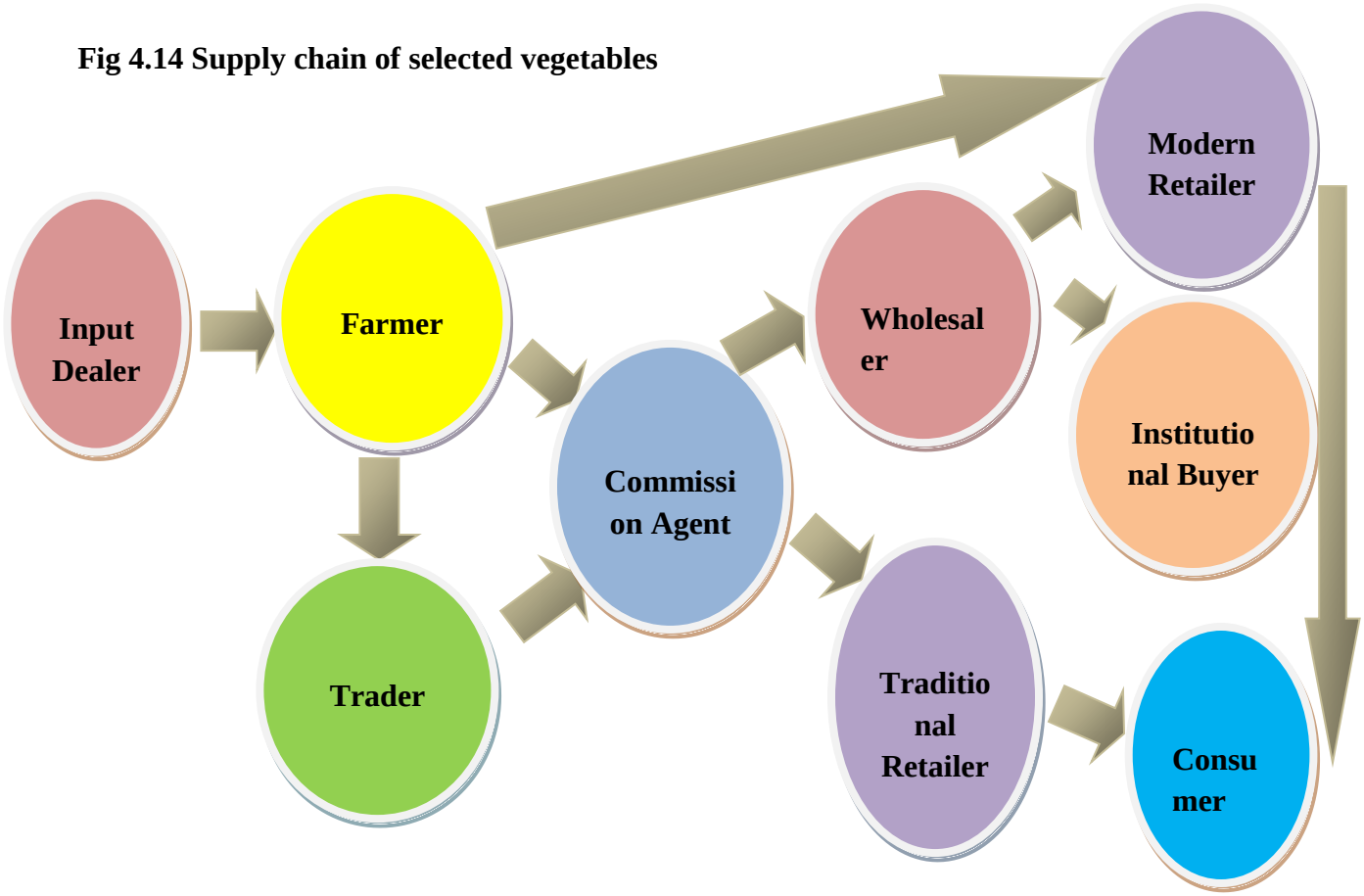
Table 4.18 Cost of cultivation of Brinjal, Okra and Green Chilli per acre

S.no	Cost	Brinjal	Okra	Green Chilli
1	Land preparation cost	3000	3000	3000
2	Seedlings Cost	4400	8001	6300
3	Fertilizers Cost	7686	6898	8936
4	Plant Protect Chemicals Cost	18300	7500	3910
5	Electricity Cost	150	180	180
6	Labour Cost	68400	39600	91000
7	**Total Cost (Rs)**	**101936**	**65179**	**113326**
8	Yield/acre (Q)	180	168	165
9	Price/Quintal (Rs)	1025	1400	1500
10	Gross Income (Rs)	184500	235200	247500
11	**Net Income (Rs)**	**82564**	**170021**	**134174**

4.2.5 Supply chain and marketing channels of the selected vegetables

It was observed that all the three vegetables had the same marketing channel. The maximum numberof players in the supply chain were eight. The supply chain of these vegetables from the inputs supplier till they reach the final consumer is represented in the figure 4.14.

Fig 4.14 Supply chain of selected vegetables



The following marketing channels were identified for the selected vegetables:

Channel-I

Farmer → Trader → Commission Agent → Wholesaler → Traditional Retailer → Consumer

Channel-II

Farmer → Trader → Commission Agent → Traditional Retailer → Consumer

Channel-III

Farmer → Commission Agent → Traditional Retailer → Consumer

Channel-IV

Farmer → Trader → Commission Agent → Wholesaler → Modern Retailer Consumer

Channel- V

Farmer → Commission Agent → Wholesaler → Consumer

Channel-VI

Farmer → Commission Agent → Wholesaler → Institutional Buyer

Channel-VII

Farmer → Modern Retailer → Consumer

From the above channels, channel-III was the most preferred channel by the farmers. In this the produce was brought to the market and sold by the commission agents at the producer's quoted price to the retailers operating in the market yard itself. There is no sorting and grading done at the producer's level or by the commission agents. Sorting and grading is done by the retailer according to his requirements of sale. The retailers purchase the produce on credit from the commission agents and the payment is done on the day succeeding the day of the purchase.

In the channel-VI, the produce from farmers through the commission agent is sold to the wholesalers who purchase the produce in bulk and sell it to institutional buyers who are major hotel chains, restaurants and hostels. The reason for preferring these buyers are the higher prices that the wholesaler gets. However, maintaining the quality of the produce is a major constraint in this channel.

In the channel-VII, the farmer sells his produce to the collection centres of the modern retail outlets. They are informed about the requirements a day before and

accordingly the farmers' take their produce. The produce is sorted and graded at the collection centre and the produce which does not meet the quality standards is returned to the farmers. Maintaining the quality of the produce is the major constraint of the farmer. Sometimes, the produce is also returned if the arrivals exceed the requirement at the retail outlet. Left with no choice, the farmers should sell the returned produce at a lower price.

4.2.6 Marketing costs and margins

Costs incurred by the producer and other market intermediaries for various activities like packing, sorting, grading, weighing, market fees, loading and unloading etc are studied under the marketing costs. These are calculated as averages of the sample data and are expressed per quintal of the produce. Besides costs, the margin received by each intermediary in the supply chain is also calculated.

Table 4.19 Marketing costs under different channels for Brinjal (Rs/Q)

Particulars	**Channel III**	**Channel VI**	**Channel VII**
Producer			
Sorting	0	0	0
Packing	10	10	10
Transport	15	15	10
Weighing	10	10	0
Loading and unloading	20	20	0
Wastage	5	5	20
Commission paid	41	41	0
Subtotal	**111**	**111**	**40**
Price received by the farmer	**950**	**900**	**1000**
Net returns to farmer	**839**	**789**	**960**
Price paid by wholesaler			
Sorting	0	20	0
Packing and handling	0	10	0
Transport	0	30	0
Weighing	0	0	0
Loading and unloading	0	10	0
Market fee	0	0	0
Commission paid	0	0	0
Electricity	0	7	0

Shop Rent	0	25	0
Wages	0	10	0
Wastage	0	10	0
Subtotal	0	**122**	**0**
Price paid by the retailer/institutional buyer	**0**	**1350**	**0**
Wholesaler's Margin	**0**	**328**	**0**
Traditional Retailer			
Sorting	3	0	0
Packing and handling	5	0	0
Storage	0	0	0
Transport	0	0	0
Weighing	0	0	0
Loading and unloading	20	0	0
Market fee/shop rent	30	0	0
Wastage	5	0	0
Subtotal	**63**	0	**0**
Price paid by the consumer	**1250**	0	**0**
Traditional Retailer's Margin	**217**	0	**0**
Modern Retailer			
Sorting	0	0	20
Packing and handling	0	0	10
Storage	0	0	0
Transport	0	0	8
Weighing	0	0	5
Loading and unloading	0	0	0
Market fee/shop rent	0	0	56
Wastage	0	0	30
Subtotal	0	0	**151**
Consumer's purchase price	**1250**	**0**	**1300**
Modern Retailer's Margin	**0**	**0**	**149**
Producer's share in consumer's rupee (%)	**76**	**66.6**	**77**

The table 4.19 shows the costs incurred by the various supply chain partners in marketing of Brinjal. It was observed that the producer's share in consumer's rupee was highest in channel-VII (Farmer- Modern Retailer- Consumer). The costs in channel-VI (Farmer-Commission Agent- Wholesaler- Institutional Buyer) were the highest i.e., Rs. 233 followed by channel-VII (Farmer- Modern Retailer- Consumer) and channel-III (Farmer-Commission Agent- Traditional Retailer- Consumer) i.e., Rs. 191 and Rs. 174 respectively.

Table 4.20 Marketing costs under different channels for Okra (Rs/Q)

Particulars	**Channel III**	**Channel VI**	**Channel VII**
Producer			
Sorting	0	0	5
Packing	5	5	10
Transport	22	22	30
Weighing	20	20	0
Loading and unloading	20	20	10
Wastage	3	3	7
Commission paid	40	40	0
Subtotal	**110**	**110**	**35**
Wholesaler's/ Traditional Retailer's purchase price	**3300**	**3000**	**3400**
Net Returns to Farmer	**3190**	**2890**	**3365**
Price paid by Wholesaler			
Sorting	0	3	0
Packing and handling	0	5	0
Transport	0	40	0
Weighing	0	20	0
Loading and unloading	0	30	0
Market fee	0	0	0
Commission paid	0	0	0
Electricity	0	10	0
Shop Rent	0	40	0
Wages	0	30	0
Wastage	0	10	0
Subtotal	**0**	**188**	**0**
Institutional Buyer's purchase price	**0**	**3500**	**0**
Wholesaler's Margin	0	**312**	**0**
Traditional Retailer			
Sorting	0	0	0
Packing and handling	2	0	0
Storage	0	0	0
Transport	0	0	0

Weighing	20	0	0
Loading and unloading	10	0	0
Market fee/shop rent	0	0	0
Wastage	5	0	0
Subtotal	**37**	0	**0**
Traditional Retailer's Margin	**463**	**0**	**0**
Modern Retailer			
Sorting	0	0	20
Packing and handling	0	0	30
Storage	0	0	25
Transport	0	0	40
Weighing	0	0	20
Loading and unloading	0	0	10
Market fee/shop rent	0	0	50
Wastage	0	0	30
Subtotal	0	0	**225**
Consumer's purchase price	**3800**	**0**	**4000**
Modern Retailer's Margin	**0**	**0**	**375**
Producer share in consumer rupee (%)	**86.8**	**85.71**	**85**

The table 4.20 shows the costs incurred by the supply chain partners in marketing of Okra through various channels. The producer's share in consumer's rupee is found to be more or less same in all the three channels i.e., around 85 per cent. The costs incurred through channel-III (Farmer-Commission Agent- Traditional Retailer-Consumer) was the lowest i.e., Rs. 147 followed by the cost incurred in channel-VII (Farmer-Modern Retailer-Consumer) which was Rs. 260 and the costs incurred in channel-VI (Farmer-Commission Agent-Wholesaler-Institutional Buyer) were the highest i.e., Rs. 298.

Table 4.21 Marketing costs under different channels for Green Chilli (Rs/Q)

Particulars	**Channel III**	**Channel VI**	**Channel VII**
Producer			
Sorting	0	0	0
Packing	2	2	3
Transport	30	30	20

Weighing	20	20	0
Loading and unloading	20	20	13
Wastage	1	1	5
Commission paid	40	40	0
Subtotal	**113**	**113**	**41**
Purchase price of the Traditional Retailer/Wholesaler/Modern Retailer	**2100**	**2000**	**2200**
Net Returns to Farmer	**1987**	**1887**	**2159**
Price paid by Wholesaler			
Sorting	0	7	0
Packing and handling	0	3	0
Transport	0	40	0
Weighing	0	0	0
Loading and unloading	0	20	0
Market fee	0	0	0
Commission paid	0	0	0
Electricity	0	10	0
Shop Rent	0	30	0
Wages	0	10	0
Wastage	0	4	0
Subtotal	**0**	**124**	**0**
Institutional Buyer's Purchase price	**0**	**2300**	**0**
Wholesaler's Margin	**0**	**176**	**0**
Traditional Retailer			
Sorting	0	0	0
Packing and handling	0	0	0
Storage	0	0	0
Transport	0	0	0
Weighing	10	0	0
Loading and unloading	10	0	0
Market fee/shop rent	40	0	0
Wastage	3	0	0
Subtotal	**63**	**0**	**0**
Traditional Retailer's Margin	**437**	**0**	**0**
Modern Retailer			
Sorting	0	0	7
Packing and handling	0	0	10
Storage	0	0	12
Transport	0	0	20
Weighing	0	0	3
Loading and unloading	0	0	2.5
Market fee/shop rent	0	0	50
Wastage	0	0	5
Subtotal	**0**	**0**	**109.5**

Consumer's purchase price	**2600**	**0**	**2650**
Modern Retailer's Margin	**0**	**0**	**340.5**
Producer share in consumer rupee (%)	**80.7**	**86.9**	**83**

The table 4.21 shows the costs incurred by the supply chain partners in the marketing of Green chilli. It was observed that the producer's share in the consumer's

rupee was highest in the channel-VI (Farmer-Commission Agent- Wholesaler-Institutional buyer) i.e., 86.9 per cent followed by channel-VII (Farmer-Modern Retailer-Consumer) i.e., 83 per cent and the lowest was seen in channel-III (Farmer-Commission Agent-Traditional Retailer-Consumer) i.e., 80.7 per cent. The Costs among the channels was highest in channel- VI i.e., Rs. 237 followed by channel-III i.e., Rs. 176 and lowest was seen in channel-VII i.e., Rs. 150.

4.2.7 Sources of finance to the supply chain players

This section deals with the various sources of finance available to the farmers and other players in the supply chain. This would help in knowing the various sources of finance available and the amount required by the various players. Simple averages have been used to find out the amount and rate of interest incurred by various players. There are both formal and informal sources of lending available to the farmer and other supply chain intermediaries. The farmers are usually dependent upon banks and gold financing corporations for their formal sources of finance. Commission agents and money lenders form the informal sources of finance to the farmers.

The other intermediaries are also dependent upon banks as their formal source and money lenders, relatives and daily financers form the informal sources of finance.

Table 4.22 Sources of finance to the farmers

S.no.	Nature of Source	Category	Average Amount Borrowed (Rupees)	Rate of Interest per annum	Repay ment Period (years)	Documents required
1.	**Formal**	Banks	50000	12.72	2.2	Pass Book Land Documents Title DD Adhaar Card MRO Office stamp paper
		Gold Finance	90000	18	1	Gold Address Proof KYC Norms
2.	**Informal**	Commission Agents	50000	72	1	Nil

		Money Lenders	30000	81.25	1	Land Papers Gold

The table 4.22 shows that the farmers borrow an average amount of Rs. 70,000 from the formal sources and an average amount of Rs. 40,000 from the informal sources. 35 per cent of the farmers preferred only banks for their financial requirements while 22 per cent of the farmers preferred gold finance and 18 per cent farmers preferred both bank and gold finance for their financial requirements. The rest 25 per cent of farmers preferred multiple sources to fulfil their financial needs.

The formal and informal sources of finance had a vast variation with respect to the rate of interest. The rate of interest had a difference of almost 60 per cent between banks and commission agent and almost a variation of 70 per cent with respect to money lenders.

Table 4.23 Sources of finance to the commission agents

S.no	Nature of Source	Category	Average Amount Borrowed (Rupees)	Rate of Interest per annum	Repayment Period (years)	Documents required
1.	**Formal**	Banks	600000	12	4	Bank Pass Book Shop Documents Licence Adhaar Card IT Returns
2.	**Informal**	Money Lenders	50000	36	1	Nil
		Relatives	300000	Nil	1	Nil

The table 4.23shows the various sources preferred by the commission agents to fulfil their financial needs. It can be observed that an average amount of Rs. 600000 is borrowed from the formal sources while an average amount of Rs.175000 is borrowed from

the informal sources. About 65 per cent of the commission agents prefer both banks and money lenders for their financial needs and 35 per cent of commission agents prefer multiple sources of finance.

The variation in the interest rates charged by the formal sources and informal sources is not very high as in the case of farmers. There is a variation of 24 per cent between the interest rate charged by banks and that charged by the money lenders.

Table 4.24 Sources of finance to the wholesalers

S no.	Nature of Source	Category	Average Amount Borrowed (Rupees)	Rate of Interest per month	Repayment Period (years)	Documents required
1.	**Informal**	Daily financers	100000		1	Nil
		Relatives	300000	Nil	1	Nil

The table 4.24 shows the borrowing structured preferred by the wholesalers. It was observed that the wholesalers do not depend upon any formal sources for their financial needs. The informal sources include daily financers and relatives. The average amount borrowed is Rs. 200000. The wholesalers are highly dependent on the daily financers who levy very high interest rates.

Table 4.25 Sources of finance to the retailers

S.no.	Nature of Source	Category	Average Amount Borrowed (Rupees)	Rate of Interest per annum	Repayment Period (years)	Documents required
1.	**Formal**	Banks	100000	21	2	Bank Pass Book Adhaar Card

						Collateral
2.	**Informal**	Daily Financers	10000		3months	Nil

The table 4.25 shows the borrowing structure of the retailers. The retailers mostly prefer informal sources for meeting their financial requirements. It was found that the retailers were not comfortable with the procedures followed by the banks to access loans. The average amount borrowed by the retailers both from formal and informal sources is Rs. 200000.

4.2.8 Challenges faced by various supply chain partners of the selected vegetables

The financial and marketing challenges faced by the retailers and commission agents are presented in the following tables.

Table 4.26 Financial challenges faced by thevegetable retailers

S.No.	Particulars	Rank					R.B.Q	Overall Rank
		I	II	III	IV	V		
1.	Inadequate credit	5	9	9	7	0	71.3	1
2.	Inadequate subsidy	1	10	10	3	6	57.9	5
3.	High interest rate on loan	4	9	9	4	4	63.2	3
4.	Insufficient repayment time	3	0	12	10	5	65.3	2
5.	Difficulty in documentation work	7	7	7	0	9	61.0	4

The various financial challenges faced by the vegetable retailers were worked out and ranks were given based on rank based quotient method. Inadequate credit with the retailers was ranked first among the various constraints. Insufficient repayment period was ranked second followed by high rate of interest on the loan taken. Difficulty in

documentation work and inadequate subsidy were the other constraints faced by the vegetable retailers.

Table 4.27 Marketing challenges faced by the vegetable retailers

S.No.	Particulars	Rank					R.B.Q	Overall Rank
		I	II	III	IV	V		
1.	Lack of storage facilities	2	2	10	8	8	46.9	5
2.	Price fluctuations in the market	3	8	7	6	6	57.3	3
3.	Transportation problem	7	5	9	2	7	60.6	2
4.	Hammali Problem	9	4	4	9	4	47.6	4
5.	Wastage	6	3	9	8	4	61.6	1

Among the marketing challenges, high amount of wastage as ranked first among the retailers. Followed by this was the transportation problem and price fluctuations in the market. Hammali problem and lack of storage facility were the other marketing challenges faced by the vegetable retailers.

Table 4.28 Financial challenges faced by the vegetable commission agents

S.No.	Particulars	Rank					R.B.Q	Overall Rank
		I	II	III	IV	V		
1.	Inadequate credit	3	3	9	9	3	50.0	5
2.	Lack of subsidy	7	2	10	7	4	59.9	3
3.	High interest rate on loan	5	6	7	8	4	58.6	4
4.	Insufficient repayment time	10	3	3	10	4	62.6	2
5.	Difficulty in documentation work	7	9	9	3	5	68.3	1

The various financial challenges faced by the commission agents in the vegetable markets were listed and rank was given according to rank based quotient method. Difficulty in documentation work was ranked first among the various challenges. Insufficient repayment time and lack of subsidy were ranked second and third respectively. High interest rate on the loan taken and inadequate credit were among the other financial challenges.

Table 4.29 Marketing challenges faced by the vegetable commission agents

S.No.	Particulars	Rank					R.B.Q	Overall Rank
		I	II	III	IV	V		
1.	High competition	1	10	6	5	8	52.3	3
2.	Fluctuation of prices by the producer	9	9	8	3	1	74.6	1
3.	Risk of quality	4	4	5	7	10	48.9	5
4.	Wastage	5	3	4	10	8	50.3	4
5.	Less commission fee	7	3	7	10	3	67.0	2

The various marketing challenges faced by the commission agents in the vegetable markets were listed and ranked according to rank based quotient. The fluctuations of prices by the producer was the major constraint. Less commission fee and high competition among the agents were ranked second and third respectively. High amount of wastage and risk of quality were the other major challenges.

Chapter V

SUMMARY AND CONCLUSIONS

5.1 Summary and Conclusion

In this chapter, a brief summary of the research work done along with the findings and suggestions are presented. This study was taken up with the following objectives to provide Samunnati with useful data and findings through which the company can design financial products and interventions for all the levels of fruits and vegetables supply chains in Hyderabad.

- To study the trends and patterns of arrival of the selected fruits and vegetables in major markets of Hyderabad.
- To analyse the various supply chain channels of selected fruits and vegetables in the study area.
- To estimate the financial needs of various players in the supply chain and document the problems in accessing finance.
- To suggest suitable intervention points and a mechanism to finance the supply chain partners.

Agriculture is the primary occupation of rural India and it is the backbone of the Indian economy. Indian agriculture is characterised by low productivity due to various reasons. The problem of low productivity would be aggravated in the absence of proper interventions. Finance is one such tool which can help in checking this problem. The need for credit has increased substantially post the green revolution era. Credit by institutional agencies also protects exploitation by the local money lenders.

In order to achieve the predetermined objectives of the study, the data was collected from the farmers, retailers and commission agents through a structured questionnaire. The major findings of the study are given below.

Major findings of the study

Socio-economic profile of the respondents

The analysis revealed that most of the fruit cultivating farmers surveyed had a small family size of less than four members. Majority of the farmers surveyed came under the category of small farmers, with land holding between one to ten acres. Maximum numbers of the farmers were under the age group of above 50, while a good number of farmers were in the age group of 41-50 and 31-40. In case of vegetable cultivating farmers who were surveyed, majority had medium family size of four to five members, were small farmers, with land holding between one to ten acres. Maximum numbers of the farmers were under the age group of 31-40, while a good number of farmers were in the age group of 41-50.

Maximum number of the fruit commission agents were under the age group of above 50, while the maximum number of the fruit traders surveyed were under the age group of 31-40 and 41-50. In case of vegetables, majority of the commission agents were under the age group of 41-50 and the retailers were equally more in the age group of 20-30 and 41-50

Trends in wholesale prices and volumes of selected fruits and vegetables in the selected markets

Among the selected fruits, arrival season of mango started in the month of April and ended in June. The arrivals and prices were high in the year 2014-15 compared to the year 2015-16. The highest arrivals of mango were noticed in June 2014 and highest price was noticed in April 2014.

The arrivals of papaya were highest in the month of July 2014 and the highest price was observed in the month of January 2015 for the year 2014-15. The total arrivals were more in the year 2014-15 as compared to the year 2015-16.

The highest arrivals of guava were seen in the month of January 2015 and the highest price was observed in the month of February 2015 for the year. The total arrivals were very low in the year 2014-15 compared to 2015-16. It can be concluded that prices are high when arrivals are high.

The highest arrivals of brinjal were noticed in November 2015 and the highest price was noticed in June 2015. The arrivals were highest during the months of November, March and January while the prices were high during the months of June and August. However, the year 2015-16 had more arrivals of brinjal compared to 2014-15.

The highest arrival of okra was seen in March 2016, followed by March 2014-15 and November 2015-16, while the highest prices were noticed in January 2016 followed by December and November 2014-15.

The volumes of chilli were highest in November 2015-16 followed by December and March 2015-16. The prices were highest in July 2014-15 followed by January and February 2015-16.The volume of arrivals almost doubled in 2015-16 in comparison to 2014-15.

Share of various states in total production of fruits and vegetables

In case of papaya, Gujarat and Andhra Pradesh are the highest contributors. The two states Gujarat and Andhra Pradesh together contribute 50 per cent of the total papaya production. Telangana state contributed 4 per cent to the total production with an area and production of 3000 ha and 212000 tonne respectively.

In case of mango, Uttar Pradesh was the highest contributor in total production of mango followed by Andhra Pradesh. Telangana with an area of 190,000 ha and a production of 1717,000 tonne contributed nine per cent to the total production of the country and stood fourth among the various Indian states.

In case of guava, Madhya Pradesh was the highest producer followed by Uttar Pradesh. Madhya Pradesh along with Uttar Pradesh and Bihar together contribute 50 per cent of the total production. Telangana had an area of 6,000 ha and a production of 90,000 tonne.

West Bengal was the highest producer of brinjal followed by Odisha. The area and production of Brinjal in Telanagana was 15,000 ha and 302000 tonnes. Thus, it stood 13th in area and 11^{th} in production among the Indian states.

The highest producer of okra was West Bengal followed by Bihar and Gujarat. The area of cultivation under Okra in Telanagana was 25,000 ha and it contributed 6 per cent to the total production of Okra in the country

Karnataka was the highest producer of chilli followed by Bihar. These two states together contribute 60 per cent of the total chilli production of the country. The state of Telanagana had an area of 0.55 lakh ha and a production of 1.71 lakh MT.

Costs and returns of fruits and vegetables.

The cost involved in the production of mango in one hectare was Rs. 44700, while the income was Rs. 252300. For papaya the cost of cultivation was Rs. 25700 per hectare and the income was Rs. 526300 per hectare. In case of guava, the cost of production was Rs. 61200 per hectare and the income was Rs. 438800 per hectare.

The total cost involved in the production of Brinjal, Okra and Green Chilli was Rs. 143336, Rs. 94567 and Rs. 144676 respectively. While the income was Rs. 82564, 170021 and 134174 for brinjal, okra and chilli respectively.

Supply chain and marketing channels of fruits and vegetables

Seven marketing channels have been identified, which are listed below

Channel-I

Farmer → Pre-Harvest Contractor → Commission Agent → Wholesaler → Traditional Retailer → Consumer

Channel-II

Farmer → Pre-Harvest Contractor → Commission Agent → Wholesaler → Modern Retailer → Consumer

Channel-III

Farmer → Pre-Harvest Contractor → Commission Agent → Wholesaler → Institutional Buyer

Channel-IV

Farmer → Commission Agent → Wholesaler → Traditional Retailer → Consumer

Channel-V

Farmer → Commission Agent → Wholesaler → Institutional Buyer

Channel-VI

Farmer → Commission Agent → Wholesaler → Modern Retailer → Consumer

Channel-VII

Farmer → Commission Agent → Wholesaler → Consumer

Among the mentioned marketing channels for mango and guava, channel-I was the most prominent channel wherein the producers sell their produce to the pre harvest contractors who in turn sell it in the Gaddiannaram market yard through the commission agents. The next preferred channels were channels VI and Channel-VII. In case of papaya, channel-IV was the most preferred one where the farmers sold their produce to the wholesalers through the commission agents in the market yard and then the produce was bought by the consumers from the traditional retailers. The channel VII was next preferred channel for papaya.

In case of vegetables, the marketing channels identified one:

Channel-I

Farmer → Trader → Commission Agent → Wholesaler → Traditional Retailer → Consumer →

Channel-II

Farmer → Trader → Commission Agent → Traditional Retailer → Consumer

Channel-III

Farmer → Commission Agent → Traditional Retailer → Consumer

Channel-IV

Farmer → Trader → Commission Agent → Wholesaler → Modern Retailer → Consumer

Channel- V

Farmer → Commission Agent → Wholesaler → Consumer

Channel-VI

Farmer → Commission Agent → Wholesaler → Institutional Buyer

Channel-VII

Farmer → Modern Retailer → Consumer

The most preferred channels of farmers for vegetables are channel III, channel VI and channel VII.

Marketing costs and margins for fruits:

The consumer's purchase price for mango was Rs. 4200, 4500 and 4000 through the Channel I, Channel VI and Channel VII respectively. Producer's share of mango was 78 Per cent for Channel I, 71.1 per cent for channel VI and 80 per cent for Channel VII. Channel VII was the most efficient channel for the farmers as it contributed the highest share for them.

In case of guava, the consumer purchase price through channel I was Rs. 2000 and for channel VI it was Rs. 2300 for channel VII, the price was Rs. 1500. Producer's share through channel I was 60 per cent, 43 per cent through channel VI and 63 per cent through channel VII. The most efficient channel for farmers was channel VII.

In case of papaya, the consumer purchase price through channel IV was Rs. 25 and Rs. 23 for channel VII. Producer's share through channel IV was 38 per cent, 32 per cent through channel V and 47 per cent through channel VII. The most efficient channel for farmers was channel VII.

Marketing costs and margins for vegetables:

The consumer's purchase price for brinjal was Rs. 1250 and 1300 through the Channel III and Channel VII respectively. Producer's share of brinjal was 76 per cent for Channel III, 66 per cent for channel VI and 77 per cent for Channel VII. Channel VII was the most efficient channel for the farmers as it contributed the highest share for them.

The consumer's purchase price for okra was Rs. 3800, 2890 and 4000 through the Channel III, Channel VI and Channel VII respectively. Producer's share of okra was 87 per cent for Channel III, 86 per cent for channel VI and 85 per cent for Channel VII. Channel III is the most efficient channel for the farmers as it contributes highest share for them.

In case of chilli, the consumer purchase price through channel III was Rs. 2600 and it was Rs. 2650 for channel VII . Producer's share through channel III was 81 per cent, 87 per cent through channel VI and 83 per cent through channel VII. The most efficient channel for farmers was channel VI.

Sources of finance

In case of farmers cultivating fruits, the average amount borrowed from the formal and informal sources was Rs.125000 and 50000 respectively. The informal sources were preferred only in case of emergencies as 70 per cent of the farmers were dependent only on banks for their financial needs. The vegetable farmers borrowed an average amount of Rs. 70,000 from the formal sources and an average amount of Rs. 40,000 from the informal sources.

The fruit commission agents borrowed 150000 and Rs. 50000 through formal and informal sources of finance respectively. The vegetable commission agents, borrowed on an average amount of Rs.600000 from the formal sources while an average amount of Rs.175000 was borrowed from the informal sources.

The fruit retailers were mostly dependent on informal sources of finance though the rate of interest was high because of the cumbersome paper work involved in the formal sources. The vegetable retailers also mostly preferred informal sources for meeting their financial requirements. It was found that the retailers were not comfortable with the procedures followed by the banks to access loans.

The institutional sources of finance were preferred by the majority of supply chain players.

Challenges faced by various supply chain partners

For fruit retailers, inadequate credit was the biggest financial challenge followed by difficulties they face in the documentation works for getting a loan, while the biggest marketing challenge for fruit retailers was transportation problem followed by price fluctuations.

For vegetable retailers also, inadequate credit was the biggest financial challenge followed by inadequate repayment time. Wastage was the biggest marketing challenge faced by vegetable retailers followed by problems of transportation.

The most difficult challenge faced by fruit commission agents was difficulties in the documentation work followed by inadequate credit at their disposal. The major marketing challenge for them was risk of quality followed by less commission fee.

In case of vegetable commission agents, difficulty in the documentation work was the biggest financial challenge and same was stated by the fruit commission agents, followed by insufficient repayment time. The major marketing challenge was the price fluctuation followed by less commission fee.

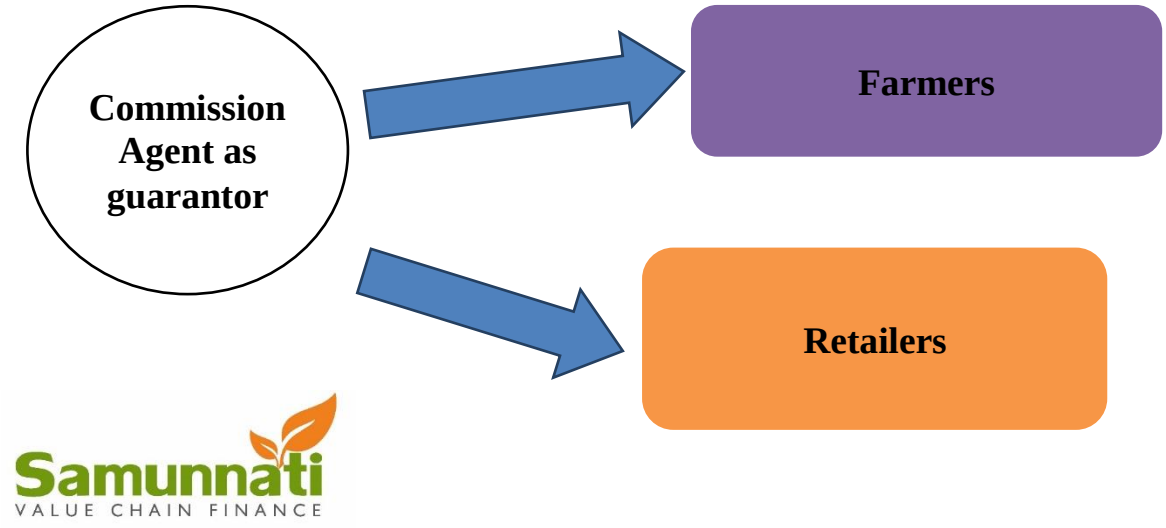
5.2 Suggestions

The following models have been suggested to the company for their financial intervention in the selected markets. The commission agents can be financed directly or they can be taken as guarantor for financing farmers and retailers.

Model-I

Commission agent can be financed directly by Samunnati. The present rate of interest is 11-12 per cent. Even though Samunnati provides higher interest rates, commission agent can get bulk margin in turn by using the finance for more number of farmers and retailers.

Model-II



Commission agent can be taken as a guarantor for financing retailers and farmers. Retailers who depend upon the daily financers have very high interest rate. The retailers were also of the opinion that they could increase their business by 25per cent if they get more finance. This factor can be used and monthly finance can be provided instead of daily finance. This would help them in repayment and it would be beneficial to the company in getting the returns.

Farmers would also benefit in getting finance as it would bring more transparency in operations because commission agent would also become more cautious as he would be answerable to the company.

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