CHAPTER - I

INTRODUCTION

India, with its wide variability of climate and soil, produces a variety of horticultural crops such as fruits, vegetables, tropical tuber crops, ornamental plants, medicinal plants, aromatic plants, spices and plantation crops like coconut, cashew-nut, cocoa, etc. India is considered the fruit and vegetable basket of the world. It being a home of wide variety of fruits and vegetables holds a unique position in production figures among many countries. It is the second largest producer of fruits after Brazil in the world with an annual production of 68.46 million tonnes from an area of 6.10 million hectares and contributes to more than 11.80 per cent of the world-wide fruit production (Kumar and Singh, 2010). It is also the second largest producer of vegetables next to China with an annual production of 118.60 million tonnes (Mehta and Chauhan, 1996).

The country is endowed with rich and diversified horticultural resource potential. This is possible because of agro climatic variations, enormous biodiversity, fertile soil and a large cultivable area. Indian agriculture has reached at the peak production level of various crops but the nutritional security is still a big question mark in front of all planners and researchers. Many fruits and vegetables are good source for the nutritional security. The ongoing economic reforms in India are likely to
result in structural changes in agriculture particularly in favour of fruit and vegetable crops, which has great potential to increase farm income as well as nutritional status of the citizens of the nation (Hall et al., 2001). India accounts for 16 per cent of world production of vegetables and 11 per cent of the world’s fruit production. It is the largest producer of mangoes (over 54 per cent), bananas (over 15 per cent), chillies, ginger, cauliflower, etc. (Kaul, 1998). The horticulture sector has witnessed a tremendous growth as a result of investment through National Horticulture Mission (NHM) and a number of other programmes (Singh and Toppo, 2010). The economic importance of fruits and vegetables has been increasing on account of increase in domestic as well as international demand for them. The result is a shift in cropping pattern in favour of fruits and vegetables and consequently an increase in their production and availability.

The potential of horticulture in raising farm income and employment through increasing agricultural production and value addition is well understood. Contribution of horticultural crops in agricultural GDP was around 28 per cent during the year 2005-06 (Vedamurthy and Pandey, 2010). Total export value of fruits and vegetables grew 41 per cent in the year 2009-10, i.e., to Rs.517330 over Rs.365915 of the year 2008-09 (http://www.livemint.com). The horticulture sector has been given a boost by enhancing its financial outlay from Rs.1000 crore in Eighth Five-Year Plan to Rs.1454 crore in
the Ninth Five-Year Plan and further to Rs.2105 crore in Tenth Five-Year Plan, which further increased to Rs.5650 crore. The proposed outlay for Eleventh Five-Year plan is Rs.10000 crore (http://planningcommission.nic.in/plans/planrel/11thf.htm). Fruits and vegetables contribute around 31 and 60 per cent of horticultural production respectively (Vedamurthy and Pandey, 2010). A comparison of the growth in gross value of output of various sub sectors of agriculture shows that growth in fruit and vegetable sector is higher than cereals. Per hectare value of output under fruits and vegetables is about Rs.86000, whereas for cereals this figure is just Rs.15000 (Chand et al., 2008).

Fruits and vegetables play an important role in agriculture and industrial economy. These crops, which are among the perishable commodities, are important ingredients of human diet. Fruits are one of the oldest forms of food known to human being. **In fact, Adam, the first man ate the apple, the ‘forbidden fruit’ of heaven.** There are many references to fruits in ancient literature. Vedas state that the fruits form the base of the food of Gods. According to Quran, the fruits like grape, fig, olive and pomegranate are gifts and heavenly fruits of Gods. Though fruits and vegetables formed an important item of food of people of older civilization, their real scientific importance as a source of some vital constituents of human health came into light recently. Moreover, in a country like India, where 20-40 per cent of the population
is vegetarian, the need of fruits and vegetables in our diet is evident. Almost all fruits and vegetables contain varying amount of food contents, such as carbohydrates, fats, proteins, vitamins, minerals, etc. While carbohydrates, fats and proteins can be derived from other foods like cereals, sugar, pulses and oil also, but vitamins and minerals are mainly obtained from fruits and vegetables.

The benefits of eating fruits and vegetables are many. Fruits are the excellent source of Vitamin A (which is good for hair and eyes), Vitamin C (helps in neutralizing free radicals), Potassium (which regulates blood pressure) and Magnesium (helps in relaxing muscles and protecting the heart against diseases). Some fruits like apple, orange, peach, pomegranate, guava, papaya, etc. are good source of fibers, which helps to regulate digestive system. Fruits are fleshy or pulpy in character and often juicy or sweet with good flavour. Fruits contain 75-90 per cent of water hence they are highly perishable. Dried fruits are good source of iron. Many fruits have important antioxidants and help the body constantly to clean up toxic waste. They boost our immune system and provide resistance against certain diseases. The reduction of a number of chronic illnesses, increased protection from cardiac problems and improved blood circulation are also listed among those benefits. They make the food attractive by their colour, texture and flavour.
Vegetables are plant parts. Different parts of plants vary in their water, protein, vitamin, mineral and carbohydrate contents. Green leafy vegetables are good source of folic acid and iron. Indian consumers prefer to prepare vegetables based food at home, although there is a gradual acceptance of processed foods. Expenditure on vegetables forms 11 per cent of total food expenditure in the rural India and 10.5 per cent in urban India. In the case of Punjab, rural consumers spend 9.3 per cent of total food expenditure on vegetables, while for urban consumers; the figure is 9 per cent (Singh et al., 2008). According to Indian Council of Medical Research (ICMR), a balanced diet should have a minimum 120 grams of fruits and 280 grams of vegetables per day. However, the average Indian diet during eighties had about 46 grams of fruits per day and 92 grams of vegetables, which has improved in recent years (Kaul, 1998). An increase in their consumption in recent years is visible particularly in urban areas on account of higher income. Besides their nutritive value, some fruits and vegetables possess remarkable medicinal properties and are used for curing various ailments. Fruits and vegetables are one of the most widely available sources of energy on this planet. Certain fruits and vegetables provide effective ingredients that remove toxins and improve the appearance of skin. Consumption of these fruits and vegetables can give a glowing skin and shiny healthy hair. Vitamin B6-rich fruits (banana, guava, date, etc.) are the healthiest and the cheapest means to curb stress.
In India, there is an overall increase in demand of fruits and vegetables, both in fresh and processed form. In addition, there is a wide diversification in the production pattern globally. Improved production technology such as hybrids/high yielding varieties, increased use of fertilizers and plant protection measures have brought spectacular increase in the production of fruits and vegetables. **It is not an exaggeration to say that there is no human being in the world who does not consume fruits and vegetables.**

Due to increasing commercial importance of horticultural crops, particularly fruits are now getting due importance in the national and international agenda. Horticulture industry has emerged as an important sector for diversification of agriculture and has established its creditability in improving farm income through increased productivity, generating employment and in enhancing exports besides providing household nutritional security. The focused attention on investment in horticulture during the last decade has been rewarding in terms of increased production and productivity of horticultural crops with manifold export potential. Diversification in the favour of fruits and vegetables is driven by hard economic factors. These crops are characterized by high productivity per unit area, higher returns, and easy adaptability to soil conditions. Vegetable crops are also the best compensator and maintainer of fertility of soil because they are not exhaustive crops and are very useful in the rotational system of the
farmers to maintain the fertility of the soil. Their role in improving the environment is an added advantage. The demand for fruits and vegetables has increased because of following reasons:

**India’s Burgeoning Middle-Class:** With the emergence of the middle class as majority and drastic changes in the demographic figures, mainly due to the substantial rise of the youth population by more than 50 per cent under the age of 35 years, has given the needed thrust to fresh fruit’s and vegetable’s consumption (Marimuthu, 2010).

**Demographical Changes:** Irrespective to the vast cultural and social diversity in India, majority of the population is vegetarian and fresh fruits and vegetables are consumed more widely.

**Health Awareness:** Due to the emergence of new diseases and improvement in the educational level, the demand for fresh fruits and vegetables has gone up among the population due to their disease prevention and health promoting properties.

**Increased Literacy:** Improvement in the education level backed with higher income and the awareness about fresh fruits and vegetables has indirectly led to higher demand and consumption of these crops.

**Trade Liberalization:** As a result of trade liberalization, the fresh fruits and vegetables are available almost through out the year from one or the other production pockets at reasonable prices and desirable quality in sufficient amount.
India has tremendous potential for increasing production of fruits and vegetables. Manifold efforts have been made to increase their production level. The cultivable area assigned to fruits and vegetables, and production of these crops in the country have been increasing year after year during the Post-Green Revolution period and the country is heading towards another revolution in the form of ‘Golden Revolution’. The international trade in fruits and vegetables has expanded rapidly. The number of commodities as well as number of varieties produced and traded has drastically increased during the past 25 years. Main fruits grown in India are apple, mango, banana, citrus, lemon, litchi, orange, papaya, pomegranate, etc. The area under fruits in the country has increased from 4.01 million hectares in the year 2001-02 to 6.10 million hectares in the year 2008-09, whereas its production increased from 43.00 million tonnes in the year 2001-02 to 68.47 million tonnes in the year 2008-09 (http://mospi.nic.in). The main vegetable crops grown in India are potato, onion, chilly, brinjal, peas, tomato, cauliflower, cabbage, etc. Vegetable crops can generate higher profits and incomes than staple crops because the value of these horticultural products per unit area is higher than the value of staple crops. Major vegetable producing states in India are Jammu & Kashmir, Himachal Pradesh, and hilly regions of north U.P., West Bengal, Gujarat, Punjab, Bihar and Orissa. The area under vegetables has increased from 6.16 million hectares in the year 2001-02 to 7.98 million hectares in the year 2008-
09, while the production has increased from 88.62 million tonnes during the year 2001-02 to 129.07 million tonnes during the year 2008-09 (http://mospi.nic.in). The value of export of fresh fruits and vegetables has increased several times, i.e., from Rs.317 crore in the year 1991-92 to Rs.3659.16 crore in the year 2008-09. Mangoes, grapes, banana, onion, potato, chillies, and cauliflower are major export earning commodities. India exports fresh vegetables to Bangladesh, UAE, Pakistan and Nepal; dried and preserved vegetables to Russia, France, USA and Germany.

Punjab is a progressive agriculture state and a unique example of agricultural led development model, which has been in forefront of agriculture in India. A variety of fruits and vegetables are grown in different districts of Punjab, which can be marketed with advantage in rest of India. Kinnow, mango, malta, lemon, guava, ber and jamun are the main fruits grown in Punjab. During the year 2008-09, the total area and production of fresh fruits in Punjab were 64799 hectares and 1182884 metric tonnes respectively which increased to 67554 hectares and 1365063 metric tonnes during the year 2009-10 (Punjab Horticulture Department, Chandigarh). Main vegetable crops grown in Punjab are potato, tomato, chillies, peas, cauliflower, etc. Being labour intensive, vegetable production also offers better employment opportunities for rural masses especially women. In Punjab, fruit and vegetable crops are generally grown in open fields; therefore, the cost of
cultivation is lower as compared to protected cultivation followed in the western countries. The total area and production of vegetables in Punjab increased from 178412 hectares and 3372468 metric tonnes during the year 2008-09 to 183346 hectares and 3521556 metric tonnes respectively during the year 2009-10 (Punjab Horticulture Department, Chandigarh).

Punjab state is one of the important fruit and vegetable crops growing state. Agriculture of Punjab state has undergone many changes since the advent of Green Revolution. Agriculture slowly shifted from subsistence to commercialized one. Increase in production due to high yielding varieties made wheat-paddy rotation quite popular in Punjab. During the starting few years of Green Revolution, the economy of Punjab prospered with this rotation. But as the time passed wheat-paddy rotation had resulted in various problems related to soil, such as increased salinity and nutrient deficiency. The excessive use of fertilizers for increasing yield also affected the natural fertility of the soil. Due to the above stated reasons, the diversification of agriculture was needed to get rid of various problems. Fruits and vegetables are considered to be one of the most important components in the diversification planning. As a result, the area and production of fruits and vegetables in the state has been increasing. Another reason for increase in area and production of fruits and vegetables in Punjab is that recently, the consumption pattern has shifted in favour of fruits and vegetables. The upward
mobility of income classes and increasing need for convenience and hygiene is driving demand for perishables, and processed fruits and vegetables. This trend is expected to increase the demand for fruits and vegetables in future as evidenced by high-income elasticity of demand. Nowadays children are administered with vitamin tonics, medicines and tablets to fulfil their nutritional requirements. Instead, they may be given more vegetables in raw form, soups, juices and cooked food. Improved nutrition through increased intake of fruits and vegetables will necessitate a considerable increase in the production of fruits and vegetables, which, in turn demands an increase in the area under cultivation and production of vegetables. In addition, the export of fresh as well as processed fruits and vegetables offers a solid source of foreign exchange to the exchequer.

Despite the tremendous production potential and increased demand for fruits and vegetables, the share of Punjab state in national fruit and vegetable production is very low. This is due to its diverse climatic conditions. The extremely low temperature is recorded in the months of December and January; and extremely high temperature is recorded in the months of May and June. The amount of rainfall in Punjab is also irregular. It ranges between 250mm-1000mm. Besides this, the soil of the state is deficient in Nitrogen, Phosphorus and Potassium (NPK). The fertility of the soil is found to be medium to low. The other major reason for less area under fruits and vegetables is that
basically Punjab is a cereal producing state. The new farming technology introduced in the state during mid 1960s increased the production and productivity of cereals particularly of wheat and rice. Both these crops taken together had occupied about 97 per cent of the total cropped area of the state during the year 2004-05 among all cereals. The other reasons for less area under fruits and vegetables are the problem of water logging in south-western districts (Fazilka, Muktsar, Bathinda, Mansa, etc.), stable yield from wheat and rice crops, assured price for both these cereal crops under the public procurement programme and inadequate marketing and processing infrastructure. Low education level of farmers coupled with poor technical training available to them, long gestation period particularly in the case of fruits, poor quality of seeds and other planting material available adversely affected the yield of fruits and vegetables, and thereby returns to the farmers.

Moreover, storage facilities for fresh fruits and vegetables are also inadequate. The total capacity of cold stores in Punjab is approximately 4 lakh tonnes, which is sufficient to store only 12 per cent of the produce. The expected increase in the production of horticulture produce by the year 2012 would require additional cold storage capacities. According to a study by Punjab Agriculture University (PAU), it is estimated that for storing 20 per cent of the produce, 1300 cold stores each of 1000 metric tonnes capacity are required. On the other
hand, fruits cannot provide assured returns to the farmers on the account of their perishable nature and forces of demand and supply.

The present system of marketing is not conducive to the interest of the producers and consumers. The inefficient marketing system results into wastage and rotting of these perishable commodities, low returns to producers and high prices to the consumers. It is full of number of malpractices. The existence of large number of middlemen aggravates the problem even more. Moreover, the prices of fruits and vegetables are generally higher in consuming markets as compared to the producing markets. Farmers are scared of the uncertainties of the market. Middlemen, who exploit both the consumers and producers, dominate the market. The auction system is an eyewash and non-transparent. The commission agents are the buyers themselves who sell the produce to the retailers and rehriwalas. The contract system of sale of these crops has hurt the interests of fruits and vegetables growers by giving them low returns of their crops. The farmer’s share in consumer’s rupee stands very low. Any increase in retail price is reflected in higher share of middlemen through wide profit margins rather than high prices paid to the producer-seller. Also, due to too many intermediaries, the sale and distribution procedure has become so complex that growers do not know the right place and right time to market the produce. The marketing of fruits and vegetables in the state as a whole is on the mercy of middlemen, private traders and pre-harvest contractors due to the
absence of well-organized co-operatives and regulated markets. Loss in quantity and quality during transport is also one of the major problems in marketing of fruits and vegetables. The arrivals and prices of these crops are also unpredictable. In short, the present method of handling and marketing of fruits and vegetables is insufficient and unsatisfactory. Additionally, there is an evasion of market fee and rural development fund (RDF) at a large scale in the fruits and vegetables markets of the state.

Relevance of the Study

Punjab is emerging as one of the leading states in the field of horticultural crops especially fruits and vegetables. Manifold efforts have been made to increase their production. Besides, it is equally important to have an efficient marketing system, so that the producers get appropriate returns for their produce and consumers get them at reasonable prices. Therefore, there is an urgent need to examine in detail, the present system of production and marketing of fruits and vegetables in Punjab. The efforts made by the government to improve the marketing system have improved the efficiency and helped in increasing the producer's share in consumer's rupee in the case of foodgrains to a great extent but a very little has been done to improve the production and marketing efficiency for fruits and vegetables. The present study is an attempt in this direction. An effort has been made to examine in detail the trends in area, production and productivity of fruits and
vegetables. Further, the behaviour of arrivals and prices of these crops, various functionaries involved in the marketing of the produce, marketing margins, costs and price spreads, etc. have also been studied. The study has also identified the constraints in the production of fruits and vegetables, and problems faced by the growers in the case of marketing of their produce. The present study also suggests some strategies to increase the production of these crops and to improve the existing marketing system. As there is a vast potential for the production of fruits and vegetables in Punjab, therefore, the study would be very useful for the state of Punjab.

**Scope of the Study**

Structurally, a research study on the production and marketing of fruits and vegetables must delve into production aspects, marketing aspects, processing and manufacturing aspects. Owing to non-availability of published data of processing and manufacturing units, the processing and manufacturing aspect of analysis has been excluded. The present study is consequently structured in two parts:

**Part-I** deals with production economics.

**Part-II** covers marketing economics.

**Objectives**

The main objectives of the study are as follows:

1. To assess the area, production and productivity of fruits and vegetables.
2. To examine the marketed surplus of fruits and vegetables at farm level.

3. To judge the seasonal behaviour of arrivals and prices of fruits and vegetables.

4. To find out alternative marketing channels in the marketing of fruits and vegetables.

5. To assess the marketing costs, marketing margins and price spreads in the marketing of fruits and vegetables.

6. To identify the constraints/problems faced by the fruits and vegetables growers during the process of production and marketing.

7. Finally, to suggest policy measures for improving the production and marketing of fruits and vegetables.

**Hypotheses**

**(A) Dealing with Production Economics**

1. Stable, rather than risky returns, from a crop have a positive influence on the area under crop.

2. Technological advancement has a positive impact on the area, production and productivity of a crop.

**(B) Dealing with Marketing Economics**

1. Market arrivals are the sum total of marketed surplus from its catchment areas.

2. Marketed surplus is positively correlated with scale of
production.

3. There is an inverse relationship between market arrivals and market prices.

4. The distance between the producer price and the consumer price is the indicator of exploitation of the producer.

5. Non-legal marketing practices abound in fruits and vegetables marketing.

**Limitations of the Study**

The limitations of the present study may be summarized as follows:

1. The study is limited to three fruits and three vegetables.

2. It is purely based on the responses obtained from the farmers. Though every care has been taken to get the accurate information, even then the authenticity of the responses given by the farmers cannot be verified, as most of them are illiterate. Therefore, the responses obtained have been considered to be precise and true, and used for analysis and interpretation as such.

**Chapter Scheme**

The study is organized into nine chapters. The relevance of the study, objectives, scope and hypotheses are elaborated in this introductory chapter, i.e., Chapter-I. An attempt has been made in Chapter-II to review earlier literature in the field of production and marketing of fruits and vegetables. Such a review is essential to make a plan for the present study. Chapter-III explains the methodology used in
the present work. Chapter-IV concentrates on trends in area, production and productivity. Chapter-V deals with production and marketed surplus. An attempt has also been made to explain the relationship between marketed surplus and market arrivals. Pattern and seasonality behaviour of arrivals and prices of fruit and vegetable crops is dealt with in Chapter-VI. Chapter-VII examines the alternative marketing channels, marketing margins, costs and price spreads. Chapter-VIII is devoted to the constraints in production and marketing of fruits and vegetables, and the government policies regarding fruit and vegetable sector are also explained. The concluding chapter, Chapter-IX summarizes the main findings of the study and also highlights the policy recommendations for improvements in the production and marketing system of fruits and vegetables.