CHAPTER-IX
SUMMARY, CONCLUSIONS AND
POLICY RECOMMENDATIONS

Introduction:

India, with its wide variability of climate and soil, produces a large range and wide variety of fruits. Production of fruits in India witnessed a tremendous change in the last century. The change was brought about not only by technology such as green revolution but also through institutional intervention in delivering farm inputs and marketing of outputs. India holds second rank in the production of fruits after China. The trend towards healthier food consumption in India reflected in growing interest in the nutritive attributes of fruits. In India, rice and wheat comprise 70 per cent of agricultural produce by area, but less than 25 per cent by value. Government data shows that the consumption of wheat and rice has been declining around 1-2 percent in both urban and rural India, while the demand for fruits and vegetables has been rising by 2-3 percent annually. Fruit crops generate a higher income than wheat and rice. Yet, the land area dedicated to fruits has not increased. Farmers are less interested to grow fruit crops because of high care and efforts required in cultivation of fruit orchards, need to sell quickly due to perishable nature, price volatility and no minimum support price like wheat and rice.

Realizing the nutritive, environmental and economic importance of fruits, particularly in view of the present national strategy of bridging the demand-supply gap, this study is undertaken. The purpose of present study is to examine thoroughly the present system of marketing of fruits and problems faced by the growers in case of the marketing of their produce. The main objectives of the study are as follows.

1. To assess the area, production and productivity of fruits.

2. To examine the production and marketed surplus of fruits at farm level.
3. To examine the seasonal behavior of arrivals and prices of fruits.

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

5. To calculate the marketing costs, marketing margins and price spread in the marketing of fruits.

6. To identify the problems faced by the fruit growers in the marketing of fruits in Chandigarh fruit market.

7. To suggest measures for improving the system of marketing of fruits.

Present study deals with the marketing of fruits in Chandigarh. The selection of Chandigarh market was made because it is a big fruit market of apple, mango and kinnow. Three states namely Punjab, Uttar Pradesh and Himachal Pradesh were selected from where the produce enters in Chandigarh market. Two districts from Punjab, Uttar Pradesh and Himachal Pradesh states, each for each of the crop were sampled from the list of districts growing these crops having maximum area under the crops in the year 2010 when the study was planned. The present study was conducted on a sample of 240 farmers, 30 commission agents/traders/wholesalers and of 30 retailers. To achieve the objectives of this study both primary as well as secondary data have been used. Two well-designed and pre-tested questionnaires were used for the current study. Two questionnaire each were used, one was used to collect information from the farmers while the other from commission agents/wholesalers/retailers. Different issues of Statistical Abstracts and Department of Horticulture of respective states were the source for collecting the secondary data regarding total area, production, and yield of fruits in Himachal Pradesh, Punjab and Uttar Pradesh states as well as for different selected districts. Market Committee of Chandigarh was the source of data regarding market arrivals and prices. Appropriate statistical techniques/tools, i.e., time series analysis, regression analysis, correlation analysis, percentages and averages, etc. were applied to analyze the collected data.
Main Findings of the Study

The primary survey showed that all the growers live in the villages and majority of them are in the age group of 30-55 years. Most of the mango growers are uneducated and approximately 20 percent farmers are educated up to the metric level. Approximately 80 percent farmers of kinnow and apple crop are educated up to secondary level. It has been found that main irrigation source for apple crop is rain, for mango crop is tubewell and for kinnow crop is canal and tubewell. The growers of apple crop use bulls for the cultivation of land. Tractors are used for the cultivation of land by mango and kinnow growers. Farmers in the study areas hire labourers for plucking, cleaning, loading purposes, etc. The fertilizers/manures used to grow fruit crops are urea, 12-32-16 (NPK), cow dung, potassium, superphosphate and minor nutrient elements are copper sulphate and zinc sulphate. The insecticides/pesticides/fungicides like metasystox, sumithion, polythion, forate, endosulphar, diemithoete, thiodan, malathion, bavistin, M-45, diethene, blitox, caftaf, streptomycin sulphate are used for the protection of fruit crops from several diseases/insects. The study brings out that means of transport used by sampled farmers to bring their produce in Chandigarh fruit market are truck, cantor and pickup. All the farmers used hired means of transport.

The facilities provided to farmers in Chandigarh fruit market are covered sheds for fruits auction, light arrangement, drinking water arrangements, free parking for tractor trolleys. But, these facilities are inadequate as per the requirement of the market. Some other facilities that are available in the market are three eating outlets, rest house, bank, post office, fence, garbage disposal system, sweeping facilities, internal roads. The biggest problem of market is inadequate space and limited number of shop cum office for commission agents.

Trends in Area, Production and Yield

The results of the research study reveals that the production growth performance of all fruits and of selected fruits, i.e., apple, kinnow and mango in Himachal Pradesh, Punjab and Uttar Pradesh states and selected districts are
mainly related with productivity, growth and area expansion. The production growth performance of apple crop in Himachal Pradesh state and Kinnor district is mainly due to increase in area rather than yield. The compound growth rates of production in Himachal Pradesh and Kinnor district are found to be 3.28 per cent and 7.65 per cent respectively. But, in Shimla district production growth performance of apple crop is observed to be mainly due to enhancement in yield rather than area. Here, compound growth rate of production, yield and area of apple crop in Shimla district are found to be 3.27 per cent, 2.33 per cent and 0.69 per cent respectively. Production growth performance of all fruits and kinnow crop in Punjab as well as its selected districts is mainly due to enhancement in yield rather than area, with one exception, i.e., kinnow crop in Ferozepur district, where yield played reverse role. In Punjab state the compound growth rate of production, yield and area of kinnow crop is observed to be 6.66 per cent, 4.23 per cent and 2.09 per cent respectively. The production of Kinnow in Hoshiarpur district increased at an annual compound growth rate of 5.44 per cent. Both area and yield played a positive role for this increase in the production, which is 1.16 per cent per annum and 4.23 per cent per annum respectively. The area under kinnow crop incredibly increased in Ferozepur district at the rate of 9.14 per cent per annum and yield at the rate of 4.47 per cent per annum. Resulting production increased at the rate of 14.0 per cent per annum. Production growth performance of all fruits and mango crop in Uttar Pradesh as well as in its selected districts is mainly due to enhancement in yield rather than area. The production of mango crop in Uttar Pradesh state, registered a growth of 7.15 per cent per annum. The area under mango fruit registered an increase at the rate of 0.23 per cent per annum and yield increases at the rate of 6.90 per cent per annum. The compound growth rates of area, production and yield in Unnao district of mango crop are estimated to be 1.62 per cent, 5.20 per cent and 3.51 per cent respectively. Here, 67.5 per cent of this increase in production is attributed to enhancement achieved in the yield and 31.2 per cent is attributed to expansion in area. In Lucknow district, the area under
mango decreased at the rate of 0.69 per cent per annum. But during the same period production and yield increased at the rate of 4.47 and 5.20 per cent per annum respectively. The enhancement in the yield is found to be solely responsible for production growth.

**Relationship between Production and Marketed Surplus**

The relationship between the production and marketed surplus has been pursued at micro level. It is based on a sample study, which consists of 240 farmers for mango, apple and kinnow crop. The computed results reveals that Mango, Apple and Kinnow crops are mainly produced for the sale in the market. The total production and retention of mango, apple and kinnow crops are found to be 90426 quintals and 1531 quintals respectively. The total marketed surplus is observed to be 88895 quintals, which is about 98.31 per cent of the produce. With respect to mango crop, out of the total production of 9081 quintals, 352 quintals is found to be meant for retention forming 3.87 per cent of the total production. The marketed surplus is found to be 8729 quintals, which is about 96.13 per cent of the produce. With respect to apple and kinnow crops, the percentage shares of the retention is found to be 1.83 and 1.24 while that of marketed surplus is 98.17 and 98.76 respectively. Marketed surplus of kinnow crop is greater than the marketed surplus of mango and apple crops. The per farm marketed surplus of mango, apple and kinnow crops is observed to be 109.11, 348.17 and 653.90 quintals respectively.

On overall basis, it can be concluded that marketed surplus of each crop depends upon its production. In other words, high production contribute to high marketed surplus. Findings confirmed the hypothesis that fruit production is meant for marketed surplus.

Regression analysis reveals that in the case of each fruit crop production coefficient is observed to be statistically significant and positively related with the marketed surplus. The operational area coefficient is also found to be positively related with the marketed surplus in the case of each fruit crop. The operational area coefficient is observed to be statistically
significant for each crop but increase is less than unity for kinnow and mango crop. The proportion of the area allocated to the crop is statistically significant and positively related with the marketed surplus in the case of kinnow, mango and apple crop but increase is less than unity in the case of mango crop.

**Seasonality of Market Arrivals and Prices**

The fluctuating characteristics of agricultural prices enter directly in the decision frame of farmers, both in production and marketing decisions. Different fruits are grown in different seasons and their harvesting time is also different. Due to perishable by nature, fruits have to disposed of immediately after the harvesting. Apple harvesting starts from July to October and it is in peak from August to September. However, apple remains in the market throughout the year as apple can be hold in cold stores for few months. It is observed that small farmers sold their produce earlier due to low holding power than big farmers. Apples are graded according to fruit size, colour and quality. On the basis of fruit size, apples are graded manually or by machines. The marketing season of kinnow starts from November and closes by March end. The market arrivals during the month of November are low and peaked during the period December to March. Since kinnow is a perishable commodity, its shelf life is limited and it cannot be stored for longer period. Hence, the arrival of kinnow are over in the period of six months only. Harvesting season of mango is from March to July. Marketing arrivals are low in March and April, peak from May to July. Mango is highly perishable fruit and it cannot be stored. Hence, the arrival of mango are over in the period of five months only. Mango has to dispose of immediately after harvesting unless it will rote. The relative weights of year-wise arrivals for fruit crops are computed for peak, mid and lean periods. When the year-wise data have been examined, the weights of peak period are more in the case of kinnow and mango than apple fruit. The response of product prices to month wise arrivals is such that prices of the produce also influenced by the size of market, variety and quality of the produce other than the arrivals. During the peak month of arrivals, i.e., August, the index of monthly prices is calculated to be 103.69. This is due to
the fact that prices are affected to some extent, by the quality of fruit and size of the market other than arrivals in Chandigarh market being a big and distant market. This market act as a platform for traders of many states who come down to Chandigarh during peak season so as to trade in apple fruit in bulk orders. So, prices do not fall much even when supplies went up. So far kinnow is concerned the index of monthly prices is observed to be low in November month (153.65) because of low quality of fruit in the beginning and its peak is observed in the month of April, i.e., 261.21. During the peak month of arrivals, i.e., February, the index of monthly prices is observed to be 192.55 due to increase in demand because of sunny weather. In the case of mango, the index of monthly prices is found to be low in June month (199.12) when arrivals are found at peak level due to dashehri variety and its peak is observe in the month of may, i.e., 283.79 due to the Safeda variety of mango.

The results of correlation analysis, reveal that the negative relationship between the month-wise market arrivals and prices is true for all the fruit crops and for all years. Our results confirm that the price and arrivals are moving in the opposite direction. An increase in one resulted in the decrease of other correspondingly. This may be due to the fact that farmers sold their produce immediately after harvesting period for lack of storage facilities at production areas. Correlation coefficients of monthly arrivals and prices of apple is statistically significant in all the years except the year 2009, when coefficient value is observed to be 0.46. In the case of kinnow crop correlation coefficients are insignificant in all the years. Due to the reason that there are fluctuations in demand and change in the quality during the different months of the year. As far as mango is concerned coefficients are significant except the year 2008 and 2010, when the value is 0.35 and 0.28. The year-after-year existence of inverse relation between price and market arrivals implicitly assumes that prices are increasing over time, i.e., there are positive price expectations. Thus, there prevails inverse relationship between market arrivals and prices. These results confirm our hypothesis.
Marketing Costs, Marketing Margins and Price Spreads through Different Channels.

Findings of the study regarding the marketing channels reveal that five important marketing channels prevails in the Chandigarh fruit market.

**Channel-I** Producer-Commission agent/Local wholesaler-Retailer-Consumer.

**Channel-II** Producer-Pre-harvest contractor-Commission agent/Local wholesaler-Retailer-Consumer.

**Channel-III** Producer-Commission agent/Local wholesale-Retailer-Consumer.

**Channel-IV** Producer-Local Traders-Commission agent/Local wholesaler-Retailer-Consumer.

**Channel-V** Producer-Pre-harvest contractor-Commission agent/Local wholesaler-Retailer-Consumer.

For the marketing of apple crop first three channels are operating in Chandigarh market. But, the most common marketing channels used by apple farmers is channel-I. In the case of mango crop channel-I, Channel-II, Channel-IV and Channel-V are prevailing in the Chandigarh market. But, the most common channel used by mango growers is Channel-II. As far as kinnow crop is concerned, the growers sell their produce through channel-I, channel-II and channel-III. But, the most common channel used by kinnow growers is channel-II.

The results of study on marketing costs, margins and price spreads reveal that there are large number of intermediaries who operate between the producer and consumer, resulting into a wide gap between the producer and consumer price of these commodities. The share of the producer in the consumer rupee in the case of Apple is 53.98 per cent, 52.94per cent and 55.02 per cent after incurring costs equivalent to 14.77 per cent in channels I, II and III respectively. This variation in the percentage share may be due to the difference in the number of agencies working in a channel. The price spread (marketing costs and margins) was 46.02 per cent, 47.06per cent and 44.98 in
three channels respectively which is very high. Of the three channels in the marketing of Apple the farmer received the highest share in channel III.

The share of the producer in the consumer’s rupee in the case of mango is observed to be 47.14 per cent, 47.22 per cent, 49.92 per cent and 47.14 per cent in channels I, II, III and IV respectively. This variation in the percentage share may be due to the difference in the number of agencies working in a channels. The price spread (marketing costs and margins) is estimated to be 52.86 per cent, 52.78 per cent, 50.08 per cent & 52.86 per cent in four channels respectively. Of the four channels in the marketing of Mango the farmer is receiving the highest share in channel III. The producer incurred no marketing cost in channel I, II and IV as he sold the produce directly to pre-harvest contractor or to the local trader. But, in channel-III producer incurred cost of Rs.467.66 per quintal, which is equivalent to 13.36 percent of the consumer’s rupee. In the case of Kinnow crop, the share of the producer in the consumer’s rupee is observed to be 46.25 per cent, 49.65 per cent and 50 per cent in channels I, II and III respectively. This variation in the percentage share may be due to the difference in the number of agencies working in a channel. The price spread (marketing costs and margins) are found to be 53.75 per cent, 50.35 per cent and 50 per cent in three channels respectively. Of the three channels in the marketing of Kinnow the farmers received the highest share in channel III. The marketing cost incurred by producer found to be similar in channel II and III,i.e., Rs. 285 per quintal which is 14.25 per cent of the consumer’s rupee.

The study further brings out that the total costs incurred at producer's level are the highest in the case of apple, i.e., Rs. 709 per quintal followed by mango Rs. 467.66 and kinnow Rs. 285 per quintal. Total costs incurred at wholesaler’s level are the highest in the case of apple, i.e., Rs. 231 per quintal followed by mango Rs. 164.50 per quintal and kinnow Rs. 95.2 per quintal. Total costs incurred at retailers level are highest in the case of mango, i.e., Rs. 300 per quintal followed by apple Rs. 297 per quintal and kinnow Rs. 147 per quintal. The net sale price per quintal of fruits earned by the producers in the
case of apple is observed to be Rs. 2591 in channel-I, Rs. 2541 in channel-II and Rs. 2641 in channel-III; for kinnow Rs. 925 in channel-I, Rs. 993 in channel-II and Rs. 1000 in channel-III and for mango Rs. 1650 in channel-I, Rs. 1700 in channel-II, Rs. 1747.34 in channel-III and Rs.1650 in channel-IV. The average margin per quintal of fruits earned by the commission agent/local wholesaler is observed to be Rs. 400 in the case of apple, Rs. 300 for mango and Rs. 150 for kinnow. The average margin per quintal of fruits earned by the retailer is found to be Rs. 518.50, 250 and 430 in the case of apple, kinnow and mango respectively.

Similarly, the percentage margin over producer’s price also depicts that as the number of intermediaries in the marketing channel increases, the difference between purchaser’s price and producer’s price increases. In the case of apple crop, the percentage margin at producer’s level is observed to be 109.51 per cent through channel-I. When one more functionarie i.e. pre harvest contractor involved, the margin becomes 117.10 per cent and 108.69 per cent when commission agent/local wholesaler acts as a retailer also. For kinnow crop, the percentage margin at producer’s level is found to be 101.41 per cent, 116.22 per cent and 100.00 per cent through channel-I, channel-II and channel-III respectively.

For mango crop, the percentage margin at producers level is 100.30 per cent, 112.12 per cent, 112.12 per cent and 111.76 per cent through four channels respectively. Table 7.11 depicts that, the percentage margin at producer’s level is very high i.e. above 100 per cent. Due to lack of direct channel and the intervention of large number of middlemen in the marketing process of different fruits.

**Production and Marketing Constraints**

The cultivation of fruits in the selected districts of different states is affected by many factors like, low yield of fruit crops, high care and effort to develop fruit orchard and lack of fixed income etc. As a result of which, farmers do not get adequate economic returns and a very little incentive to improve their farm
management. The problems faced by producers and sellers during production and marketing of fruits are discussed below:

**Production Constraints**
The main production related constraints faced by fruit growers in selected districts are:

**High Care and Effort:** As the interviewed farmers, viewed that wheat and rice require less care and effort to grow than fruits. Fruit orchard needs higher care and effort to develop. An average orchard take four to five years for bearing fruit and required continues look after throughout the year regarding growth and plant protection from the disease. Due to, high efforts farmers are not willing to bring more area under the cultivation of fruits.

**Alternate Bearing Pattern of Fruit Orchards:** The other major constraint faced by the farmers at production level in the study area is the alternative bearing pattern of fruit orchards. Kinnow trees, generally after attaining an age of 10-12 years show the tendency of alternate bearing. Bearing an economical crop in alternate years is known as alternate or biennial bearing. The year in which the crop is heavy, is known as 'on' year, and the following years when the crop is lean or there is no crop is known as 'off' year. This tendency is very much associated with vegetative flush and its maturity. During the 'on' year, the size of fruits is smaller comparatively to the few fruits obtained on the lean or off year. Thus the fruit value is decreased. Positive results have been obtained from thinning of fruits, supplying adequate amount of nutrients and spraying with hormone such as Planofix. Mango does not bear a good crop every year and tends to follow alternate bearing pattern. However, there is no effort to minimize irregular bearing by adopting suitable cultural practices, like open canopy management, pruning, adequate manuring, etc.

**Duplicate Pesticides in the Market:** The interviewed farmers are facing the problem of diseases and pests on apple, mango and kinnow crop. As per the study conducted, the common opinion among the farmers is that the fungicides and insecticides available in the market are not effective and liable to rectify the problem. So, it is common conception that the pesticides
prevailing in the market are not genuine. The monitoring authorities are also responsible for this grim situation by fruit growers.

**High Investments and Long Gestation Period:** The high capital cost involved in establishing an orchard, or rejuvenation of existing old unproductive plantation poses serious constraint in the area expansion under fruit crops. The situation becomes more difficult in view of the large number of small holdings devoted to these crops which are essentially owned by weaker section, who have no means to invest, nor can afford to stand the burden of credit even if available. Added to this, the long gestation period of the horticultural crops like mango plant takes seven to eight years, apple takes ten to eleven years and kinnow takes four to five years, coming to the economic bearing age. This calls for liberalized credit facilities in easy installments for repayment in the form of soft loans to small and marginal farmers to be introduced if the benefits of the horticulture industry are to be fully exploited. High cost of inputs and lack of enough incentives for the production of high quality varieties, product diversification, value addition, etc., also hinder the fruit crops development.

**Marketing Constraints**
The main marketing related constraints faced by producers/sellers in Chandigarh market are:

**Lack of Proper Grading and Packaging:** It has been observed in the field survey that well graded and properly packed fruits fetch more prices than ungraded. In the case of mango and apple crop some produce is bring in open or in gunny bags which fetch very low price. Same produce is packed and sorted by retailer who get more price. It is also found that during the peak season of apple and mango there is a huge shortage of wooden and egg tray boxes. Farmers often pay high prices due to shortage of packing material in the peak. Which adversely affect the marketing of these fruits. Some of the small orchardists complained that packing material is not available on credit.

**Long Chain of Middlemen and Malpractices:** It has been found during the survey that there is a long chain of middlemen such as pre-harvest contractors, local traders, commission agents, wholesalers, retailers, etc. are
involved in the marketing of fruits in Chandigarh fruit market. Huge margins are kept by these middlemen before reaching the produce to the ultimate consumers. During the survey various malpractices have also been found. During the peak season of apple, mango and kinnow main functionary in the markets, the commission agents, are generally in league with the buyers, and cheat the farmers by hidden auction. Malpractices become more frequent when farmers are poor, less educated and have small volumes to sell. Commission agents not only cheat farmers they also cheat the market committee of Chandigarh by not paying the actual market fee on the produce they sell. Hence, both farmer and consumer are suffering due to these practices.

**Price Volatility:** Fruits experience a much higher degree of price volatility than grains. Part of the reason for this is the high level of mismatch between demand and supply of fruits found during the study. Another reason is the inefficiency of markets in matching supply and demand in different parts of the country. And of course, their inherent perishability and lack of a cold chain is an additional worry. Moreover, there is no minimum support price fixation by the government in case of fruits. Only Himachal Pradesh government have announced a meager, minimum support price for apple, i.e., Rs 6 per Kg.

**Less Price Paid by Fruit Processing Industry:** During the course of study it is found that the two multipurpose juicing centers set up in Hoshiarpur and Ferozepur districts of Punjab to help kinnow farmers are flopped. In the first year the operation of Hoshiarpur unit processed 4000 tonnes kinnow for Tropicana. The next year, Tropicana did not evince interest saying kinnow from Pakistan were cheaper. Farmers did not ready to sell their produce at the lower prices. To the kinnow farmer, the inability of factories to procure the fruit is unexplainable. On the other hand Himachal Pradesh government successfully running the three fruit processing plants in the state with a processing capacity of 20000 MT. H.P government buying apple from growers at minimum support price of Rs. 6 per kg which is very less as compared to market price. In Lucknow and Unnao district there is no fruit processing industry found, which
use mango as raw material to make the useful products like pickle, chutney and murabba.

**Government Policies**

In order to remove the major constraints, government has taken many measures to improve the production and marketing of fruits like, development of infrastructure, proper allocation of funds in research and development, to invent new varieties of fruit plants and for better orchard management techniques. The main motive of these schemes are to remove constraints in production and marketing of fruits. The main state sponsored schemes and centrally funded schemes are discussed in this section:

**State Funded Schemes**

**Establishment of Punjab Agro Juices Limited (PAJL):** Punjab agro juices limited was established in February 2006 by the government of Punjab, a special purpose vehicle to implement two multi fruit and vegetables processing units in Punjab. This scheme is launched specially for the kinnow growing belts. One of these plants is located in village Jahankhelan, district Hoshiarpur while the second one is located in village Allamgarh, near abohar, district Ferozepur. The company has been setup with the objective to add value to horticulture crops of Punjab and proved the farmers with an opportunity to sell their produce at competitive rates. The capital outlay of the project is Rs 841.10 million, out of which Rs. 500 million have been contributed by rural development fund, Rs. 101.70 million through government grants and balance Rs. 239.40 millions through long term loans by Indian overseas bank, Ludhiana. PAJL plants set up with cutting edge innovative technology are capable of handling and processing a variety of fruits specially kinnow. The critical plant and machinery of the plant has been procured from CFT SPA, a leading international food engineering company.

**Subsidy on Domestic Marketing and Export of Fruits and Import of Planting Material:** To encourage the export of fruits from Punjab, PAGREXO
has been providing subsidies for various functions during the course of export and import. Subsidy on waxing/grading is 50 percent of the cost of waxing/grading of kinnow, 50 percent on pre-cooling cum cold storage of fruits and 25 percent subsidy on non-wooden packing material of all fruits and vegetables, inland cost of freight for all fruits and inland freight cost of frozen fruits. Subsidy on export of fruits is 30 percent on packing material, 30 percent of inland cost of freight up to airport and/or sea port for fruits and including frozen, processed and de-hydrated products. Subsidy for partial load is 30 percent of air freight and sea freight cost, subject to a maximum of Rs. 10/- per kg for Asian countries and 25/- per kg for other countries for all fruits. Subsidy of on import of seed and plantation material for horticultural corps is 50 percent of the landed cost in India including cost of planting material and freight. All the above subsidies would be available for produce of Punjab only.

**Government of Himachal Pradesh Procure Apple under the Market Intervention Scheme:** To help the farmers during the peak season and during the high production year. Government has announced the ‘Minimum support price’ for the apple crop under the market intervention scheme. Under this scheme Himachal Pradesh Agro Marketing Federation (HIMFED) and Himachal Pradesh Marketing and Processing Corporation (HPMC) would purchase the apple crop from selected market yards. Both agencies would procure apple at a minimum support price of Rs. 6 per Kg from farmers registering an increase of 75 paisa per kg during the year 2012. This scheme can help farmers to dispose of their small size apples.

**Fruit Processing Units under Department of Horticulture Himachal Pradesh:** To encourage the processing of fruit crops government has established 8 fruit canning units, functioning in department of horticulture in different districts viz; Naubahar (Shimla), Nagrota bagwan (Kangra), Shamshi (Kulu), Khaulakuan & Rajgarh (Sirmour), Nihal (Bilaspur), Reckong peo (Kinnaur) and Rajpura (Chamba) of the state. For the manufacture of various kind of products, marketable surplus of fruits are purchase by these units as per the requirement from the designated agencies under MIS and or from the
growers at lowest rates quoted by the orchardists. The fruit products prepared at these 8 units are made available at very competitive prices through factory sale outlets. Further to ensure the quality of the products manufactured and sold by the department, a quality control and product standardization laboratory has been established in the directors of horticulture Naubahar and Shimla for testing product for physical, chemical and microbiological analysis.

**Agri-Export Zones in Uttar Pradesh:** Four AEZs have been established for promotion of mango and potato exports. MOU for setting up these zones was sign between APEDA and the state government. Farmers have been identifying and training programme were organized on pre and post harvest management. One mango pack house each at Rehmankhera, Lucknow and Saharnpur have been established to facilitate the export of mango and brand promotion of U.P mango with the brand of Nawab with the financial help of APEDA, these AEZs will be further strengthen and export promotion will be facilitated.

**Centrally Sponsored/Funded Schemes**

**Rashtriya Krishi Vikas Yojna (RKVY):** RKVY has been launched by the government of India during the year 2007-08. Under this scheme, the need felt projects for horticulture development, based on the district plans are proposed for approval, by the state level sanctioning committee (SLSC) of RKVY as state horticulture plan for inclusion into RKVY yojna. Under this scheme Rs. 18.25 crores has been sanctioned to setup permanent perishable cargo centre, Amritsar. The most important strategic programme introduced in the 11th five year plan is RKVY with an outlay of Rs. 25000 crores. It gives more flexibility and incentives to the states to spend more on agriculture sector. Funds approved to Punjab state under this scheme to provide financial assistance for horticulture activities in Moga, Barnala, and Ropar district is Rs. 148.65 lakh, strengthening of agriculture research PAU Rs. 2000.00 Lakhs, project for certifying of citrus nurseries against plant pathogens Rs. 61.69 Lakhs, production of disease free fruit and vegetable crops with use of agrochemical Rs. 200 lakh during the year 2011. Funds approved for agriculture diversification to Uttar Pradesh state (DASP) is Rs. 9000 Lakh. Himachal
Pradesh state got a funds of Rs. 500 Lakh for water harvesting and minor irrigation. Rs. 30.62 Lakh for strengthening and upgrading of fruit plant nutrition labs.

**Ministry of Food Processing Industries (MFPI) has Launched a New Centrally Sponsored Scheme. National Mission on Food Processing (NMFP):** During 12th plan (2012-17) the basic aim of NMFP is decentralization of implementation of ministry schemes, which lead to substantial participation of state governments/UTs. This scheme will be implanted as a new centrally sponsored scheme in all the states, in the ratio of 75:25 (govt. of India and states) except for north eastern states, where the ration would be 90:10. All the UTs would be funded on 100 percent grant basis. The main objective of the scheme is to increase the level of processing, reduction of wastage, value addition, enhance the income of farmers as well as increase exports, there by resulting in overall development of food processing sector. The scheme envisages financial assistance to food processing units in the form of grant in aid at the rate of 25 percent of the cost of plant and machinery and technical civil works subject to a maximum of Rs. 50.00 Lakhs in general areas and 33.33 percent subject to maximum of 75 lakhs in difficult areas such as Himachal Pradesh and Jammu & Kashmir, etc.

**Providing Plastic Crates for Marketing to the Fruit Growers under RKVY:**
Under, this scheme Punjab Mandi board has purchased 2 lakh plastic crates for distribution to the fruit growers at 50 percent subsidy. The cost of each plastic create is about Rs. 212 which means the farmers will get this plastic crates at the rate of Rs. 106. Each grower is provided 100 pieces of plastic creates, which will accommodate nearly 30-40 kgs of fruits. This will help the farmers for proper handling of delicate fruits to the markets. Plastic crates produce does not spoiled. The fruits remain fresh consumer prefer to take fruit which is preserved in plastic containers. The plastic crate will last for three years.
Conclusions, Policy Implications and Recommendations

In view of the findings of this study, various sets of new policies will be needed. The study of growth trends of area, production and yield of fruits reveals that the production growth performance of fruit crops, i.e., of kinnow and mango in Punjab and Uttar Pradesh states as well as their selected districts (except Ferozepur district) was mainly due to enhancement in yield rather than area. Whereas in the case of apple crop in Himachal Pradesh state and in kinnor district yield revealed reverse role in explaining production behaviour. Here area was found to be major contributing factor for production growth performance. But, in Shimla district again yield revealed a positive role due to some technological advancement achieved in this crop. It may be noted that though in Himachal Pradesh state area played a positive role in production growth, in the case of apple crop but land is a natural resource and fixed in its supply. Therefore, expansion of area cannot be ascertained, as land is a limiting factor of production. Hence, it is very much necessary to raise the yield level to meet the growing demand of fruits in India. At the national level and at the state level, maximum research is on hybrid and environmental resistant varieties of cereals, pulses and cotton etc. with very little emphasis on developing transgenic varieties with staggered production. Due to perishable nature and lack of long time storage there is need of developing processing and canning technology of fruits. Along with it, proper marketing infrastructure and adequate price is equally important so that the farmers may adopt fruit planting in crop diversification scheme.

On the basis of these findings it may be inferred that there is a need to enhance yield of all the fruits especially of apple crop in kinnor district of Himachal state as cultivation of this crop in kinnor has a good potential and kinnor variety has a good demand in India. For this it is recommended that government should create awareness among the growers about the launched schemes of re plantation of orchards, so that old low yielding root stocks of apple can be replaced with high yielding varieties. Apple fruit productivity is adversely affected by hail storms and high temperature. It is difficult to control
the temperature but hail storms affect can be reduced by providing anti hail nets to apple growers at subsidies rates, as net protected trees are safe from hail storms. Therefore, it is reason that government should provide crop insurance to the growers against adverse weather conditions. For mango and kinnow crop again yield advancement is very important. Mango yield can be increased through pruning immediately after the harvest followed by adequate manuring, judicious irrigation and effective plant protection measures. For increasing kinnow yield it is recommended that plucking of the fruits should be at proper time. Similarly there should be a proper orchard management and efforts should be made to rejuvenate the old orchards through new plantations. Further, as has been observed in the study that the some pesticides, insecticides and fungicides available in the market are not effective and liable to protect the crop from diseases. Taking all this in view, it is recommended that government should take measures to control the spurious fungicides/pesticides prevailing in the market and impose huge fine who cheats the farmers by providing them poor quality pesticides, insecticides and fungicides. Moreover, productivity can also be increased with apiculture. Farmers should be encouraged for apiculture (bees keeping) because bee will act as a pollinator and consequently will be quantum jump in the yield of the fruit crops, besides the additional income to the farmers from the honey. Although, yield advancement of mango and kinnow crop is very much crucial for production growth but, efforts may be made to expand some area under these crops as both Punjab and Uttar Pradesh states have good potential for these crops and it can be economically viable alternative to the existing crop cultivation like wheat and rice.

As far as production and marketed surplus are concerned, the computed results reveals that selected fruit crops are primarily produced for the market and retention is very low. Fruit crops are retained mainly for home consumption. Further, the results revealed that marketed surplus has a positive relationship with size of the holdings, i.e., with increase in the size of holdings there is an increase in the marketed surplus. The regression analysis
provided ample evidence of the same, i.e., larger scale of production contributes to larger marketed surplus. Similarly, larger operational area and proportion of the area allocated to the crop contributes to larger marketed surplus. In view of the findings of this study, it has been felt that there is a need to increase the production of the crop. Increase in the operational area/size of farm as well as proportion of the area allocated to the crop is equally important for increasing marketed surplus.

The **study of arrival and prices** showed that produce comes from the selected production area of Himachal Pradesh, Uttar Pradesh and Punjab states, in the Chandigarh fruit market. From the analysis it has been found that the fruit arrivals are largely seasonal and this is accompanied with variation in prices. But, the month to month price variations are relatively small because the prices to some extent are affected by the size of the market, variety and quality of the produce in Chandigarh market, being a big and distant market. The higher prices were observed during the beginning and at the end of the season, the average wholesale prices comparatively fell down during peak season of arrivals. The low price in the peak marketing season adversely affect the income of the fruit growers. It is found that due to immediate need of money, perishability of the produce, seasonally and bulkiness, farmers sold their produce in the post harvest period at low prices. It is recommended that to give the good returns to the producers, government should develop cold storage facilities near production areas and aware farmers about how to store their produce, to overcome the glut in the markets. A good transportation system from production area to consumption area is immediate need. Railway linkage in Chandigarh fruit market can play important role in timely and cheaper transportation options to the growers. As seen in Azadpur fruit market Delhi, where fruit market is linked with railway line. Encouraging Export of fruits can also reduce the glut like situations in the production areas. Refrigerator van transportation from fruit growing areas to distant fruit markets can reduce the post-harvest losses, due to perishable nature of fruits. Well planned processing industries should be established near production
areas. However, study found that two ultra modern kinnow juice plants in Hoshiarpur and Ferozepur districts are flopped due to poor planning of the state government of Punjab. Leasing out to private player like Tropicana is not a solution to run these plants as state government has tried earlier. It is recommended that big companies should be entered in the operation of these industries. Big companies like Wall mart have a long vision of agro industry like contract farming, retailing stores, sound finance & infrastructure network etc. In all, a proper distribution between all major distant markets can reduce the glut in peak season and give good returns to the farmers.

The analysis of the **marketing margins, costs and price spreads** revealed that due to the intervention of middlemen in the marketing process, producer’s share in consumer’s rupee is low and share of these intermediaries is high. At the same time, the share of the marketing cost beared by the farmers at the market level is very high. In view of the findings of the study it has been recommended that government should strengthen and streamline the arrangements for enforcement and inspection to ensure a regulated system of open auctions, trading practices and margins of intermediaries. During the course of study it has been found that Himachal Pradesh state is doing good for the interest of farmers by giving MSP for apple and entry of big company, i.e., Adani agri fresh limited, which is providing good prices to the farmers at farm level. But still lot have to be done to evade middlemen from apple trade. It is recommended that government should encourage more private players by providing land and subsidies for infrastructure. On the other hand, Punjab and Uttar Pradesh states are not doing well to save the interest of fruit growers. By examining the situation it is recommended that Punjab and Uttar Pradesh government should fix MSP of kinnow and mango crop like Himachal Pradesh. Both states should bring FDI in fruit retailing. FDI will set up food stores that have farm-to-retail chain, procurement will be made directly from the farmer and will also provide seeds and new technology to the farmers. The chain of middlemen, which takes away a chunk of the profits, will be replaced by a single entity and farmer will gain from higher prices and
consumer from lower prices. Further, it is suggested that an attempt should be made to strengthen the marketing system by organizing co-operative marketing societies particularly for small farmers.

The study also highlighted that farmers of selected districts of Himachal Pradesh, Uttar Pradesh and Punjab states, are facing several production constraints, such as high investment and long gestation period, lack of hybrid varieties, financial difficulties, high care and efforts involved in cultivation of fruits, problem of diseases, risk of crop failure, small size of land holding, lack of proper orchards management and duplicate pesticides etc. To achieve the goal of crop diversification and increase in production of fruits, government should provide cheap credit to setup new and to upgrade old orchards. There should be a provision of crop insurance in case of natural calamities like drought, hail storm etc.

Regarding marketing constraints, it has been found that the problems faced by the farmers during the market of their produce in Chandigarh fruit market are, long chain of middlemen and malpractices, transportation problems, price volatility, poor marketing infrastructure. To improve the marketing process, the level of market intelligence should be increased so that farmer can sell their produce at favourable prices. Setting up of grading and waxing plants in the producing areas would help the farmers to take their produce to the distant markets for better prices without incurring any heavy cost. The existing facilities like auction space, parking, size of market are not sufficient as per the requirement of the city. So, modern terminal market is the immediate need of Chandigarh city. However, it was proposed by the Chandigarh administration to establish a terminal market in sector-39, at over 50 acres land. The Modern Terminal Market envisage to provide market services such as electronic auction facility, cold storage facility, temperature controlled warehouse, ripening chamber, sorting, grading, washing and packing lines, material handling equipment, banking services including settlement of transactions, etc and non market services such as Business Centre services, Kissan Ghar, Catering and Restaurant services and other
services such as Retail Shops, Petrol Pump etc. Centre government and Chandigarh administration should implement the proposed model of the modern terminal market immediately.