CHAPTER - I

INTRODUCTION

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**Introduction**:

Horticultural marketing is an important economic activity. Besides contributing to higher productivity and production, it influences the income of growers and contributions to the development of a horticultural economy. It opens up an efficient market system, marketing horticulture a reliable source of income. Simultaneously, horticultural marketing ensures the availability of produce a reasonable price to consumers. However, the perishable nature of certain horticultural commodities like fruit and vegetables introduces an element of risk and uncertainty in the economy. Here, growers have no option but to bring the produce to the market as soon as it is harvested. As a consequence, seasonal glut and corresponding low prices are a common phenomenon during the immediate post-harvest period.

The production and supply of fruits and vegetables is differently linked to soil, climate and season. The produce is, therefore, localized. Since the areas of consumption are largely concentrated in cities and towns, the goods have to be transported over long and short distances. Further, due to detective methods of picking, packing and transportation, a large proportion of fruits and vegetables deteriorate in transit. The extent of spoilage as sometimes as high as 5 to 50 percent (Horticultural marketing series No. 149.1995) all these aspects introduce certain special
elements in the marketing of horticultural crops. This makes the study of horticultural crops especially in relation to its marketing, a pertinent one.

Maharashtra is one of the leading states in the country in Horticulture Development. The diverse agro-climatic conditions of the state are very congenial for cultivation of various horticultural crops. The area under fruit crops which was 2.42 lakh hectares in 1990 has gone up to 6.13 lakh hectares in 2011. Similarly, the area under various vegetables, spice crops and floriculture has also increased substantially.

This is mainly due to the govt. policies like establishment of separate department of horticulture in 1981 and linking horticulture development with “Employment Guarantee Scheme” in 1990. Creation of various infrastructure facilities like establishment of horticulture nurseries, irrigation facilities also helped for horticulture development. With the expansion of area under horticulture, production of fruits has increased substantially. However the marketing of fruits could not be organized simultaneously.

At present markets are dominated by middlemen and they decide the prices of fruits. Unless the farmers form co-operative and open their sale outlets in urban areas, the exploitation from middlemen would not be reduced. The farmers in some areas have organized themselves and formed fruit producer’s co-operatives. The merchants do not have
knowledge of handling of produce. Transportation is more oriented towards quantitative basis rather than qualitative basis.

Timely availability of the transport is a matter of concern e.g. Jalgaon district is well known for banana cultivation. Wagon loads of bananas are transported to North India every day from Jalgaon. However, since the railway wagons are not specially designed for transport of fruits, great losses are incurred during April to June which are months of severe heat. Due to lack of cold chain, considerable losses are incurred in fruits and vegetables. Cold chains have been established in some limited areas of grapes. This has helped to increase shelf life, storage, transport and export of grapes. Due to lack of processing facilities, great losses occur in fruits and vegetables. It is therefore necessary to give thrust on processing of fruits and vegetables both in informal and organized sectors.

**Concept of Horticulture :**

Horticulture is tremendous industry composed of numerous commercial enterprises. Lot of raw material can be produced from horticultural crops. It contributes to health happiness and prosperity of the mankind. Horticulture is the applied science. It is defined as an expensive art and science of study of garden plants.

This term applied first in 17\(^{th}\) century. The word ‘**Hortus**’ means ‘**Garden**’ and ‘**Culture**’ means ‘**Cultivation**’. 
The cultivation of flowers, fruit, vegetables in small plots using intensive methods of farming, the most intensive form of horticulture is probably the cultivation of crops (Smith, 1979).

Horticulture is part of agriculture, which is concern with the garden crops. Thus the horticulture means cultivation of garden crops. India and Maharashtra, with its wide variability of location, climate, soil and other agro-climatic conditions has good potential for growing a wide range of horticulture crops, such as fruits, vegetables and plantation crops.

Horticulture is the Art, Science, Technology and Business of intensive plant cultivation for human use. It is practiced from the individual level in a garden up to the activities of a multinational corporation. It is very diverse in its activities, incorporating plants for food crops, fruits, vegetables, mushrooms, culinary herbs and non-food crops, flowers, trees and shrubs, turf-grass, hops, grapes, medicinal herbs. It also includes related services in plant conservation, landscape restoration, landscape and garden design/construction/maintenance, horticultural therapy, and much more. This wide range of food, medicinal, environmental, social products and services are all fundamental to developing and maintaining human health and well-being. A gardener is a person who tends to a garden and is therefore a horticulturist, but not all horticulturists are gardeners.¹
Importance of Horticultural Crops:

India is one among the many important fruits and vegetables producing countries of the world. It ranks third after, china and U.S.A. in production of horticultural crops. It is the words largest producer of mangoes and occupies second place among the banana and onion producing countries of the world. The recent break through in technology coupled with the converted and sustained efforts to augment the food production has transformed India to achieve self-sufficiency in food grains, However, India is yet to overcome the problems of malnutrition.

The need for meeting the minimum nutritional level of the diet of common man is assuming greater significance today viewed in this context, horticultural crops, i.e. fruits and vegetables assume more importance as a protective food as they provide much needed health supporting vitamins, minerals and also in improving the protein value in foods.

Besides their value in human consumption, horticultural crops play an important role in commerce, particularly in export trade and processing industry. Horticulture is now regarded as the largest sub-sector of agriculture producing high quality traditional and exotic fruits and vegetables. Employment opportunities offered by this sector are plenty to the form population engaged in production, transportation, processing and
marketing operations in addition to the entrepreneurs seeking self employment keeping in view of its importance much emphasis has been given to augment the production of horticultural crops in our national plans.

There are now many agricultural universities, research institutions and state department of horticulture directly engaged in fundamental and applied research producing new strains with good varietals characteristics. They run constantly adjusted training programmers for enterprising farmers motivating them to adopt modern technology and develop their skills in producing and preparing quality produce. To coordinate the activities further, very recently, a National Horticulture Board has also been established. This motivation has created a substantial degree of awareness and interest in the commercialization of horticultural corps both for domestic and international markets.

However, the current production of horticultural crop i.e. fruits and vegetables fall very much short of the minimum requirements. In order to improve the tempo of production, the growers are to be provided with enough incentive in terms of remunerative prices; efficient marketing systems not only help in profitably disposing of the produce but also at a minimum cost and with least wastage ensuring the grower a fair return for his labour. In its money value, in the large numbers of workers engaged
on it, in its ability to distribute purchasing power, in the impetus it gives for industrialization by fostering several auxiliary industries, in attracting population to the land and in feeding the people with a most healthful and essential food, horticulture development is to be demand as a major and essential plant for the economic progress and security every country.  

Summarizing the advantage of horticultural crops, it may be stated that, they supply better food, higher income, all the year round and occupation, a diversified system of living an aesthetic touch to the life and living, some stimulus to promote intelligence. Horticultural farming promotes the development of natural resources, yields higher returns from land, enhances the land values, creates a better purchasing power among the people and consequently adds to the general prosperity.

**Significance of Fruit and Vegetable Crops:**

Fruits and vegetables, which are among the perishable commodities, are important ingredients in the human dietaries. Due to their high nutritive value, they make significant nutritional contribution to human well-being. They are the cheaper and better source of the protective foods. If they can be supplied in 35 fresh or preserved forms throughout the year for human consumption, the national picture will improved greatly.
Vegetables and fruits are essential for a balanced diet and maintenance of good health. They are rich sources of protective elements like minerals, salts, vitamins and other chemical substances which protect the human body against a number of diseases. They are also important for neutralizing the acids produced during digestion of meat, cheese and other fatty foods. They provide valuable roughages promoting digestion (Vyas, 1994). Fruit tree farming being highly intensive and skillful enterprise; generate employment even for trained persons. It reduces soil erosion, silting of tanks and air pollution. Importance of fruits in human diet is well known that the man cannot live on cereals alone.

Fruit and vegetables are essential for balance diet and good health. Nutritionists advocate at least 60 gm of fruits and 360 gm vegetable per capita per day in addition to cereals, pulses, egg etc. Fruit and vegetables are good sources of vitamins and minerals without which human body cannot maintain proper health and develop resistance to disease. They also contain pectin, cellulose which stimulates intestinal activities and energy giving substances like oils, fats and proteins. Most of the fruits have medicinal properties (Sabale, 1993).
Horticultural Zones of India:

India has diversified climates right from temperate to tropical climates. So, India has been divided into 3 horticultural zones\(^3\) they are:

I. Tropical Zone

II. Sub-Tropical Zone

III. Temperate Zone

I. **Tropical Zone** Entire South India below the Vindhya hills comes under this zone. This zone is again sub-divided into 3 sub-zones. They are:

1) Central tropical zone

2) Southern tropical zone

3) Coastal tropical humid zone

1) **Central tropical zone:** States of Maharashtra, Orissa, Southern part of Madhya Pradesh (Chattishgarh) and Telengana area of Andhra Pradesh comes under this zone. Fruit crops recommended: Mango, Cashew, Citrus, (Sweet Orange, Mandarin orange, and limes), Grape, Guava, Sapota, Banana, Sithapahal, Fig, Ber, Pomegranate, Jamun, and Jackfruit.

2) **Southern tropical zone:** Andhra Pradesh excluding Telengana, Tamilnadu, Kerala and Karnataka states comes under this zone. Fruit crops recommended: Mango, Coconut, Banana, Cashew, Sapota, Pineapple, Mangos teen, Breadfruit, Jackfruit, Sithapahal, Areca nut,
Rubber, Pepper, Turmeric, Clove, Nutmeg, Cocoa, Coffee, Citrus (Sweet Orange, Mandarin orange, and limes).

3) Coastal tropical humid zone: Areas covering all along the coast of different states of peninsular India up to about 160 km inside to the sea shore line. The climate will be always humid and warm. Temperature will not be mild in winter when compared to southern tropical zone. Fruit crops recommended: Coconut, Banana, Cashew, Jackfruit, Mango, and Pineapple.

II Sub-Tropical Zones: The area above the Vindhya hills comes under this zone. Occasionally frost occurs in this zone. This zone is sub-divided into TWO sub-zones basing on the direction. They are:

1) North-Western Subtropical zone: States like Rajasthan, Punjab, Haryana, Gujarat, Parts of Bihar, U.P, M.P and west Bengal comes under this zone. Fruit crops recommended: Litchi, citrus (sweet orange, mandarin oranges), dates, guava, Sapota, Papaya, phalsa, fig are some typical subtropical fruits grown but other tropical fruits like Mango, jack, banana can also be grown etc.

2) North-eastern sub-tropical zone: Areas like parts of UP, Bihar, West Bengal, Assam, Meghalaya, Manipur, Nagaland, Mizoram, Arunachal Pradesh, and Tripura. Fruit crops recommended: Litchi, Citrus (Sweet

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Orange, Mandarin oranges), Dates, Guava, Sapota, Papaya, Phalsa, Fig, Mango etc.

**III. Temperate Zone:** Areas comes in this zone are Jammu and Kashmir, Kulu, Katrain, Kangra valleys of Punjab, parts of Himachal Pradesh and kuman hills and also high altitude regions in South India-Nilagiris and Palani hills of Tamilnadu. This zone frequently experiences frosts. This zone is further sub-divided in to two sub zones based on elevation. They are:

1) **Higher elevation**, 2) **Lower elevation**

1) **Higher elevation:** Elevation ranges from 1500-2500 m MSL.

Fruit crops recommended: Apple, Pears, Walnut, Almond, Cherry and Strawberry etc.

2) **Lower elevation:** Elevation ranges from 1200-1500 m MSL.

**Horticulture Scenario in India:**

Horticulture in a broader sense is the science of growing and management of fruits, vegetables, ornamental, aromatic and medicinal plants, spices, plantation crops, their processing, value addition and marketing. Horticulture accounts for about 13.08 percent of gross cropped area (192.79 million hectares) in the country and contributes around 30 percent to Indian Agricultural GDP. Its share is about 37 percent of the total exports of agricultural commodities.
Rising incomes and growing consumer interest in a variety of fresh fruits and vegetables year-round is stimulating international trade in horticulture. India has several advantages in the sector. It is one of the world’s biggest producers of horticultural products. The production costs are less than half of those in other parts of the world. Despite these advantages, India’s share in the global market is insignificant it accounts for only 1.7 percent of the global trade in vegetables and 0.5 percent in fruits. India is the second largest producer of fruits and vegetables contributing 10 percent and 14 percent respectively in the world fruit and vegetable production.

Horticulture sector received focused attention from 7th five year plan onwards, as a result, there has been not only sustained increase in production of horticulture crops but hi-tech horticulture also been recognized as a commercial proposition.

In fact horticulture sector provided opportunity for crop diversification resulting in the increased income from the land and also the nutritional security. The benefit of area expansion in horticulture in clusters supported by post-harvest management infrastructure has percolated down to even small and marginal farmers, a number of whom contribute to the export of horticulture produce too.
### Table No 1.1
Trend of Horticultural Production in India

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Year</th>
<th>Area (Million ha)</th>
<th>Production (Million Ton)</th>
<th>Productivity (Mt/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2001-02</td>
<td>16.6</td>
<td>145.8</td>
<td>8.8</td>
</tr>
<tr>
<td>2</td>
<td>2002-03</td>
<td>16.3</td>
<td>144.8</td>
<td>8.9</td>
</tr>
<tr>
<td>3</td>
<td>2003-04</td>
<td>19.2</td>
<td>153.3</td>
<td>8.1</td>
</tr>
<tr>
<td>4</td>
<td>2004-05</td>
<td>18.4</td>
<td>166.9</td>
<td>9.1</td>
</tr>
<tr>
<td>5</td>
<td>2005-06</td>
<td>18.7</td>
<td>182.8</td>
<td>9.8</td>
</tr>
<tr>
<td>6</td>
<td>2006-07</td>
<td>18.4</td>
<td>191.8</td>
<td>9.9</td>
</tr>
<tr>
<td>7</td>
<td>2007-08</td>
<td>20.2</td>
<td>211.2</td>
<td>10.5</td>
</tr>
<tr>
<td>8</td>
<td>2008-09</td>
<td>20.7</td>
<td>214.2</td>
<td>10.4</td>
</tr>
<tr>
<td>9</td>
<td>2009-10</td>
<td>20.9</td>
<td>223.1</td>
<td>10.7</td>
</tr>
<tr>
<td>10</td>
<td>2010-11</td>
<td>21.8</td>
<td>240.4</td>
<td>11.0</td>
</tr>
<tr>
<td>11</td>
<td>2011-12</td>
<td>22.6</td>
<td>249.5</td>
<td>11.0</td>
</tr>
</tbody>
</table>

Source: NHRDF Report, 2012

During the last five decades the production and productivity of horticultural crops have increased manifold. Area, production and productivity trend of horticultural crops is shown in Fig. 1. As could be seen, the total area under horticulture in 2010-11 stands at, a 39.6 percent increase compared to the 1991-92 figures of 8.4 million ha. and production stands at 137.9 million tons registering 2.43 times higher than the base period figures. The productivity of horticultural crops increased from 7.5 tons/ha in 1991-92 to 11.05 tons/ha in 2011-12. The increased
production of horticulture crops is the resultant of increase in both area and productivity. The current level of 249.46 million tons during 2011-12 was added with 57.7 million tons, which is 30 percent higher than production achieved during 2006-07.

*Figure 1.1: Trend of Horticultural Production in India*

Increasing urbanization throws upon new challenges and opportunities in the form of urban horticulture. It is a multifaceted issue concerning not only urban landscaping but also relates to issues like maximizing returns from unit area of land under horticultural crops, nutritional horticulture and livelihood security etc.

Today horticultural crops cover about 25 percent of total agricultural exports of the country. The corporate sector is also showing greater interest in horticulture. A major shift in consumption pattern of
fresh and processed fruits and vegetables is expected in the coming century. There will be greater technology adoption both in traditional horticultural enterprise as well as in commercial horticulture sector. Diversification and value addition will be the key words in the Indian horticulture in the 21st Century. India’s major exports include onions, mango pulp, fresh mangoes, dried walnuts, fresh grapes. India’s biggest export markets are South Asian and Middle East countries.

However, of late the emergence of South East Asian countries like Vietnam and Thailand in the Hi-tech horticulture poses a challenge to India’s supremacy in the traditional crops. Poor transport infrastructure, inadequate storage facilities, and a fragmented supply chain are eroding India’s advantage as a low cost producer. Poor logistics lead to delays and wastage and weaken farmers’ incentives to improve quality. India’s international transportation costs are 20-30 percent higher than comparable countries and its marketing chain does not enjoy economies of scale. Many of these deficiencies are due to restrictions on domestic and foreign competition. Fundamental weaknesses in infrastructure can be remedied by creating the environment for private investment and undertaking the necessary public investment.
One of the World Bank report lists the following three major factors that are undermining India’s potential for reaching supermarkets across the globe.

- The high costs of getting agricultural produce from farm to market erode any advantage the Indian farmer enjoys by virtue of being a cheap producer.

- The existence of a huge gap between the stringent health, safety, and quality standards required by foreign governments and buyers, especially in the richer countries and the weak standards and assessment mechanisms in India.

- Pernicious forms of trade protection in horticulture such as those that discriminate against efficient delivery, quotas that impose harsh tariffs on imports above certain low levels and a system of special safeguards that is a source of considerable uncertainty for successful exporters.

Among the 8 different groups of the horticulture sector, fruits and vegetables as a group form the single largest sub-sector accounting for about 78.4 percent of the area and over 92 percent of the total production of the sector. The horticulture production has shown quantum jump in the recent plans over the preceding plans. The area and production in the year 2011-12 are an increase of 20.8 percent and 36.5 percent respectively,
over that in the previous plan period ending in the year 2005-06. This is suggestive of a productivity led growth than the area led one. During the last decade, horticulture sector as a whole has registered a compound growth of over 6 percent. The increase in the production was more significant in fruit and vegetable crops. Besides fruits and vegetables a significant increase of 57.6 percent is seen in flower production; 128.5 percent increase in the production of cut flowers in the year 2005-06, which is suggestive of the emergence of a third sub-sector of horticulture due to increase in demand of flowers in the urban and per-urban areas.\textsuperscript{4}

Horticulture research in India is about five decades old. Systematic research on fruit, vegetable and ornamental crops began in 1954 with the initiation of independent institutions and programmes. The research agenda is designed relevant to national plans and priorities for the horticulture development.

Today research and developmental activities for horticultural crops are being carried out through institutions and programmes under the aegis of Indian council of agricultural research, state agricultural/horticultural universities, department of agriculture and co-operation, ministry of agriculture, non-governmental organizations. Research system in horticulture is now geared to provide necessary technological support to the expanding horticulture industry in the country.
Role of Horticultural Crop in Human Nutrition:

From human nutrition point of view horticulture is most important to our daily living. Many of the horticulture crops and their products find place in our meals and diet. Human body requires vitamins, minerals, proteins, energy etc. for its health. All these are supplied by horticultural crops. Fruits and vegetables are the chief sources of vitamins, minerals, carbohydrates, fats, proteins etc. Fruits and vegetables are recognized as protective foods as they are necessary for the maintenance of human health.

Vitamins: These are the important constituents of fruits and vegetables and are indispensable part of human diet. Although required in very minute quantities, they are absolutely essential for the maintenance of health. The deficiency of any vitamin from the diet for considerable period may lead to diseased state or disorder conditions. Fruits and vegetables supply several vitamins.

Calcium: It is essential for development of bones regulation of heartbeat, controlling blood clots.

Sources: Fruits- Acid lime, Orange, Fig, Dried apricots, wood apple etc. Vegetables Cabbage, greens, beans, carrot, onions, peas, tomatoes, agati, and spinach drumstick leaves etc.
**Iron:** It is required for production of hemoglobin and it is constituent of red blood corpuscles. Its deficiency causes anemia, smooth tongue, pale lips, eyes and skin and frequent exhaustion.

Sources: Fruits-Custard apple, Guava, Pineapple, Straw berry, Grape, Black currents, dried dates etc. and vegetables like Carrot, Drumstick leaves, beans and agati etc.

**Phosphorous:** It is essential for maintaining the moisture content of tissues and for development of bones.

Sources: Fruits-Guava, Grape, Jackfruit, Passion fruit, Orange and vegetables like Carrot, Chili, Drumstick leaves, Beans, cucumber and onion.

**Proteins:** These are bodybuilding foods. These are essential for growth of the body. The deficiency of proteins in the body causes retarded growth and increases susceptibility to diseases and causes lethargy.

Sources: Fruits- Most of the fruits is low in proteins except Guava and Banana. Vegetables like peas and beans are rich in proteins.

**Enzymes:** These are required for controlling several metabolic activities in the body. Sources: Papaya-Papain and Pineapple-Bromelin. Fiber and roughages (Cellulose and pectin): Fruits and vegetables supply roughages these are required for digestion and prevention of constipation.
Sources: Fruits contain low content of fiber. Guava and Anola are better sources compared to other fruits. Leafy vegetables are rich in fibred content. 

**Horticultural Products-Marketing Scenario in India:**

Marketing of agricultural products is different and more challenging than many of the industrial products. The marketing of horticultural products that too of the fruit and vegetable is more challenging because of the perishability, seasonality and bulkiness and consumption habits of the Indian consumers. Indian consumer demands fresh fruit and vegetable. The main stakeholders in marketing chain from growers to consumers are wholesalers, retailers and other middlemen. It is necessary to focus on marketing of fruit and vegetable from the point of all the stakeholders from growers to consumers.

Marketing efficiency not only helps in increased production and per capita consumption, but also contributes to economic development of the country. Fruit and vegetable marketing deals with all the activities, agencies, and policies involved in the procurement of fruit and vegetable inputs by the farmers and the movement of fruit and vegetable from the farm to consumers.

The fruit and vegetable marketing system is a link between the farm and consumers. It involves all the functional aspects of market
namely pre and post-harvest operations, assembling, sorting, grading, storage, transportation and distribution. There has been concern in recent years regarding the efficiency of marketing of fruit and vegetable. High and fluctuating prices and availability of quality produce are matters of concern from the point of consumers. Only a small share of consumer rupee reaching the farmers is another major concern in marketing of fruit and vegetable. India has a huge opportunity to become a leading global food supplier, if only it has the right marketing strategies and of course, agile, adaptive and efficient supply chain.

India has a vast diversity in production, with several religious and sub-cultural groups, different food habits and cultural. As a result, it has huge and vibrant domestic market, too. While China is currently the largest fruit and vegetable producers with 34 percent of global production, India’s share in the global exports of vegetables is only 1.7 percent and in fruits an inadequate 0.5 percent. China, Thailand and Turkey account for 58 percent of developing countries exports of processed fruit and vegetable, though the share of developing countries as a whole in the export of processed products is 36 percent.
Supply Chain Management in Horticulture Products:

A supply chain is a group of business linked together. It is one of the important marketing functions. Supply chain management may be defined as an integrative approach to dealing with the planning and control of materials flow from to suppliers to end-users.

In the present scenario, farmers are not receiving the right price for their produce in the market. Even the major share of price that the consumers pay also goes to middlemen. Always it is not true that the middlemen eat up all the profit, often it is the inefficient. Supply chain that costs middlemen, consumers and more dearly the farmers. Supply chain management is a modern paradigm for improving competitiveness by co-ordinating different stakeholders. By promoting co-ordination among several stakeholders, supply chain management enables each of them to develop beyond what would have been possible if they were on their own a individual stakeholders.

Supply chain management connects the participants that can reduce costs, improve customer service, develop the organizational knowledge base, increase efficiency within the organization and create barriers for the entry of competing organizations. As a result of the continuing trends of expanding product variety, increased outsourcing and continuous advances in information technology, managing supply chains effectively
is a complex and challenging task. A myriad of potential relationship combinations exist among supply chain members that can be analyzed in terms of how they partner or develop collaborative linkages with one another.

Supply chain helps to give quality products to the consumers. In order to satisfy the consumers from the quality front, all players in the supply chain have to understand the relationship between customer satisfaction and the quality parameters that the customers are interested in the supply chain, generally the flow of information is opposite to the direction of flow of material. In order to make supply chain more efficient, it is necessary to make the flow of information bidirectional. The generation of demand or an activity at one end flows down the supply chain till it reaches the root from where the basic flow of material begins. This information flow activates all the intermediaries’ nodes it passes through on its way down the chain.

The nature of supplier-customer relationships can be described by several attributes, such as the level of co-operation, the type of information shared among supply chain actors, the time horizon of the relationship, the formality of co-operation and the degree of flexibility. The level of vertical integration is the extent to which the firms own the supply chain from raw materials to distribution.7
Supply chain management practices today are indeed proactive and co-operative that requires joint forecasting and planning, information sharing, joint inventory management and joint control to eliminate wastes throughout the supply chain and enhance the customer service for the purpose of obtaining a competitive advantage. An efficient supply chain drives consumer satisfaction, industry profitability and facilitates reasonable return to the farmers. Supply chain involves much more than simply the logistics of moving the product along the chain.

**Fresh Produce (Fruit and Vegetables) Supply Chain:**

Fresh produce is mostly procured at various collection centers located close to the farms in the producing regions. Most of the procurements done locally i.e. close to the city being services both to minimize transit time in order to preserve freshness as well as reduce cost. However, some commodities need to be procured in relatively far off places (i.e. regionally e.g. potatoes, or nationally e.g. apples or even imported e.g. exotic fruits and vegetables) due to availability / seasonal constraints. Hence, these could be sourced at Mandis (wholesale markets) from traders / agents (cold stores) or bulk importers.8

From the sourcing point the material is moved to Central Processing Center in normal (ambient) or reefer vehicles. Depending on the type of produce and the ambient temperatures,
The Central Processing Center (CPC) carries out the following activities:

- Receipts
- Weighment
- Sorting Grading of Produce
- Check Quality
- Cut Vegetables Processing
- Ripening
- Create Standardization
- Bar Coding
- Scanning
Supply Chain for Small and Marginal Farmers in India: - Three tire machinery of supply chain for small and marginal farmers in India first State level, second District level and third Village level.

Figures 1.3: Supply Chain for Small & Marginal Farmers in India.
Targeted Annual Growth Rate for 12th Five Year Plan Period:

A. Targeted growth rate for horticulture sector has been worked out with main considerations of nutritional security and our capacity and preparedness to achieve the same keeping in view the SWOT Analysis.

B. Population projections made by Registrar General of Census, Government of India have been taken in to account for the purpose of calculating per capita gross availability of fruits and vegetables. However, for the purpose of calculation of per capita net availability of fruits and vegetables, PHM losses to tune of 25 percent and deduction of 5 percent for export and processing purpose is applied.

C. With above presumptions in place, it is targeted to achieve recommended level of per capita net availability of fruits and vegetables i.e. 120 gm and 280 gm per capita per day as recommended by Indian Institute of Nutrition during 12th plan period. For this purpose, growth rate of 6.5 percent per annum is targeted for 12th plan period in view of the fact that the Country must have enough surpluses to develop its exports market on sustainable basis.
D. It is noteworthy that our country has recorded a growth rate of 4.4 percent in respect of fruits production and 5 percent per annum in vegetable production during the year 2010-11 and the same has been taken into account for calculation of base production levels at the beginning of 12th plan period. However, a higher growth rate of 6 percent for fruits and 7.5 percent for vegetables has been targeted during 12th plan period.

**Figure : 4**

Targeted Growth Rate for 12th Plan and Estimated Growth Rate for 11th Plan Period
Table 1.2
Crop Category Wise Projected Production of Horticulture Produce and Average Annual Growth Rate (Production in Million MT)

<table>
<thead>
<tr>
<th>Crop Group</th>
<th>Base Period Production 2011-12</th>
<th>Production By End of XII Plan 2016-17</th>
<th>Average Annual Growth Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruits and Nuts</td>
<td>78.16</td>
<td>105.01</td>
<td>6.0</td>
</tr>
<tr>
<td>Vegetables including Potato and Tuber Crops</td>
<td>147.45</td>
<td>206.80</td>
<td>7.0</td>
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<tr>
<td>Spices</td>
<td>4.34</td>
<td>5.28</td>
<td>4.0</td>
</tr>
<tr>
<td>Plantation Crops (Cashew, Areca nut, Cocoa and Coconut)</td>
<td>12.87</td>
<td>15.66</td>
<td>4.0</td>
</tr>
<tr>
<td>Flowers (cut and loose)</td>
<td>1.46</td>
<td>1.95</td>
<td>5.5</td>
</tr>
<tr>
<td>Nuts</td>
<td>0.21</td>
<td>0.32</td>
<td>8.0</td>
</tr>
<tr>
<td>Miscellaneous (Honey, Mushroom, Medicinal and Aromatic Crops)</td>
<td>0.6</td>
<td>1.02</td>
<td>6.5</td>
</tr>
<tr>
<td><strong>Total Horticulture</strong></td>
<td><strong>245.09</strong></td>
<td><strong>336.42</strong></td>
<td><strong>6.5</strong></td>
</tr>
</tbody>
</table>


- Coconut Conversion 1450 Nuts/Tonnes.
- Cut Flowers Converted as 15000 Nos= 1 Tonnes

If the targeted growth rate is achieved, the country may attain the desired availability level of 120 Gms per capita per day of fruits by the end of year 2015-16 and 280 Gms per capita per day of vegetables during the year 2016-17. On the front of each of the spices and plantation crops,
annual growth rate of 4 percent per annum in production has been taken into account and growth rate of 5 percent per annum in production has been taken into account for floriculture. A growth rate of about 7.57 percent has been taken into account for nut crops. In totality, the horticulture crops which have so far recorded annual growth rate of 4.7 percent per annum in production is targeted to achieve a growth rate of 6.5 percent per annum during 12th plan period, which does not include tea, coffee, rubber and medicinal and aromatic plants related crops.  

Economic Profile of Maharashtra State:

Maharashtra occupies the western and central part of the country and has a long coastline stretching nearly 720 kilometers along the Arabian Sea. The Sahyadri mountain ranges provide a physical backbone to the state on the West, while the Satpuda hills along the North and Bhamragad Chiroli-Gaikhuri ranges on the East serve as its natural borders. The State is surrounded by Gujarat to the Northwest, Madhya Pradesh to the North, Chattishgarh to the East, Andhra Pradesh to the South East, Karnataka to the South and Goa to the South West.

The State enjoys a tropical monsoon climate, the hot scorching summer from March onwards yields to the rainy monsoon in early June. The rich green cover persists with mild winter during monsoon season.
that follows through an unpleasant October transition. The seasonal rains from the Western Sea-Clouds are very heavy and the rainfall is over 400 cm on the Sahyadrian crests. The Konkan on the windward side is also endowed with heavy rainfall, declining northwards. East of the Sahyadri, the rainfall diminishes to a meager 70 cm. in the Western plateau districts, with Solapur-Ahmednagar lying in the heart of the dry zone. The rains increase slightly, later in the season, eastwards in the Marathwada and Vidharbha regions.

Maharashtra is the second largest state in India both in terms of population and geographical area (3.08 lakh sq. km.). The State has a population of 11.24 crores (Census 2011) which is 9.3 percent of the total population of India. The state is highly urbanized with 45.2 percent people residing in urban areas.

The state has 35 districts which are divided into six revenue division’s viz. Konkan, Pune, Nashik, Aurangabad, Amravati and Nagpur for administrative purposes. The State has a long tradition of having statutory bodies for planning at the district level. For local self-governance in rural areas, there are 33 Zilla Parishads, 351 Panchayat Samitis and 27,906 Gram Panchayats. The urban areas are governed through 26 Municipal Corporations, 219 Municipal Councils, 7 Nagar Panchayats and 7 Cantonment Boards. Mumbai, the capital of
Maharashtra and the financial capital of India, houses the headquarters of most of the major corporate and financial institutions. India's main stock exchanges and capital market and commodity exchanges are located in Mumbai.

The gross state domestic product (GSDP) at current prices for 2011-12 is estimated at 11, 99,548 crores and contributes about 14.4 percent of the GDP. The GSDP has been growing at a rapid pace over the last few years. Presently industrial and services sector both together contribute about 87.1 percent of the State’s income. The agriculture and allied activities sector contributes 12.9 percent to the State’s income.

The State has 226.1 lakh hectares of land under cultivation and area under forest is 52.1 lakh hectares numbers of irrigation projects are being implemented to improve irrigation. A watershed mission has been launched to ensure that soil and water conservation measures are implemented speedily in the unirrigated area.

Animal husbandry is an important agriculture related activity. The State’s share in livestock and poultry population in India is about 7 percent and 10 percent respectively.

Maharashtra is the most industrialized state and has maintained leading position in the industrial sector in India. The state is pioneer in Small Scale industries. The state continues to attract industrial
investments from both, domestic as well as foreign institutions. It has become a leading automobile production hub and a major IT growth centre. It boasts of the largest number of special export promotion zones. The state has given importance to primary education, which has resulted in consistent improvement in literacy rate. The literacy rate of the state is 82.9 percent as against 74 percent at national level as per Census 2011. The state is providing free education to girls studying up to 12th standard. The state has excellent higher educational institutions in the fields of engineering, medical and management.

Progress on Human Development Index is often depicted as a benchmark of a state’s progress of key development indicators. As per India Human Development Report, 2011 Human Development Index of India is 0.467 and state ranks 5th in the country with Human Development Index of 0.572.

The state has well spread road network of 2.43 lakh km. (maintained by public works Department and Zilla Parishads). All weather roads and fair weather roads connect more than 99 percent villages. It has best surface transport facilities and connectivity with sea ports and airports has resulted into good transport system. It has highest installed capacity and generation of electricity in the country. All this has made this state the most favored destination for investment.
The state is well known for its administrative acumen and innovative ideas. The State is first to implement women policy and engendering the budget by establishing separate woman and child development department. It is pioneer in implementing its ‘Employment Guarantee Scheme’ which is replicated by the government of India.

Maharashtra is not just a geographical expression but an entity built on collective efforts of its people. Natural as well as cultural diversities have helped in the development of a unique Marathi culture. It has its own spiritual dimensions and known as Land of Saints. Saints of that time helped the cultural awakening of the region along with their spiritual contribution. Maharashtra has played a significant roll in the social and political life of India.

Maharashtra’s contribution to the freedom struggle against the British is notable and after that it was engaged in the task of nation building. Monuments such as Ajanta, Ellora and Elephanta caves, Gateway of India and architectural structures like Viharas and Chaityas have attracted people from all over the world. Besides the wonderful monuments, segment mix of population and its cultural aspects makes it intra-national. It has produced many important personalities covering almost every aspect of human development.
The State has sizable contribution in sports, arts, literature and social services. The world famous film industry, popularly called “Bollywood” is located in Mumbai, a capital city of the State.

Areas of Horticulture Crop Development in Maharashtra:

Usually horticulture is mainly referred to fruit crops. Horticulture includes following areas:


For development in above areas, following activities play an important role:


Following the area under fruit, vegetable, floriculture and spices is proposed as under:-
Table No.1.3

Areas of Horticulture Crop Development in Maharashtra

<table>
<thead>
<tr>
<th>Crop</th>
<th>Area (Lakh/Ha)</th>
<th>Production (Mt/Ha)</th>
<th>Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruits</td>
<td>2011 6.13</td>
<td>85.53</td>
<td>13.95</td>
</tr>
<tr>
<td>Vegetables</td>
<td>2011 4.04</td>
<td>50.96</td>
<td>12.00</td>
</tr>
<tr>
<td>Floriculture</td>
<td>2011 0.07</td>
<td>0.28</td>
<td>4.00</td>
</tr>
<tr>
<td>Spices</td>
<td>2011 1.66</td>
<td>13.65</td>
<td>8.22</td>
</tr>
</tbody>
</table>

Source: Horticultural Database 2012.

1. Development of Fruit Crops in Maharashtra:

The fruit crops in Maharashtra State is 6.13 lakh hectare areas is productive and the productivity comes to 13.95 MT/ha. Today Maharashtra stands first in terms of area, production and productivity in the country. Therefore the existing E.G.S. linked Horticulture Development Programmed needs to be continued. The major fruit crops cultivated in the state are mango, cashew, pomegranate, citrus, Sapota, banana, grapes and guava. The productivity in case of cashew, citrus, grapes, guava and banana is higher than the national average. However, the overall productivity of fruit crops in the state is 13.95 Mt/ hectare the productivity will have to be increased up to 15 Mt/ hectare by the end of 10th plan and 20 Mt/ha after 25 years.
The higher productivity can be achieved through measures like production and distribution of improved seeds and planting material, rejuvenation of senile orchards, judicious use of natural resources like land, water and light, integrated nutrient management, integrated pest management, disease surveillance, plant health clinics, mechanization of farm operations etc. Assistance for these activities will have to be extended to the public as well as private sector.

**Employment Guarantee Scheme Linked Horticulture Development Programme**

Considering the very congenial climatic conditions and soil types, an ambitious scheme namely Employment Guarantee Scheme linked Horticulture Development Programme has been launched in 1990-91 with following objectives.

- To utilize 29 Lakh hectare cultivable waste area.
- To convert the land from low value crops to high value crops.
- To generate employment opportunities in rural areas.
- To control soil erosion.
- Pollution control.
- To improve socio economic conditions of the farmers.

**Salient Features of the Employment Guarantee Scheme**

- 25 fruit crops covered under the scheme.
Each beneficiary can avail the facility up to 4 hectares. However, up to 10 hectares in Konkan region.

100 percent subsidy on wages and inputs to small and marginal farmers and those belongs to SC, ST, VJ, NT and Nav- Buddhist Categories. However, other beneficiaries can avail 100 percent assistance on wages and 75 percent assistance on inputs.

Subsidy amount ranges from Rs.17281 to Rs. 49189 per hectare as per the crop.

Subsidy is given in cash for wages and in kinds for planting material, fertilizer, plant protection chemicals for three years.

Subsidy amount is directly deposited by demand draft in beneficiaries’ bank account. Achievements under the Schemes

7 percent and 11 percent SC and ST farmers respectively have been benefited by this scheme until now.

35,525 Villages are covered under the scheme.

Since 1990-91 Rs.803.50 crores have been distributed as subsidy.

2. Development of Vegetables in Maharashtra State:

Maharashtra contributes 6 percent of production of vegetables in the country. The area under vegetable crops is about 4.04 lakh ha. The total production is 50.96 lakh MT. per year and the productivity is 12.00 M.T. per hectar. Maharashtra is the largest producer of onion in the
country covering an area about 1, 18,262 hectares with average annual production of about 14 lakh M.T. It accounts for 20 percent of total area and 25 percent of the total output of onion in India, Maharashtra is exporting about 2,50,000 to 3,00,000 M.T. Onions every year. State will give more emphasis on post harvest handling of the vegetable crops in future.

The State Government has also laid emphasis on providing assistance for construction of improved onion storage structures to help the onion growers in the state. Since 1999-2000, under the schemes 1165 Onion storage structures are constructed with a storage capacity of 32,790 M.T. During 2011-2012 it is planned to construct another 980 Onion storage structures. The important recommendations are-

- Vegetable farming needs to be developed on commercial scale.
- An integrated approach is necessary for production and availability of fresh vegetables for a longer period.
- Climatic variability, high-tech production systems; use of green houses etc. needs to be fully utilized for enhancing year round availability of vegetables.
- Suitable varieties for export and processing need to be evolved.
- Technology and infrastructure for Post Harvest Management is necessary.
• Marketing network through producers or consumers co-operatives need to be developed to avoid the impact of middlemen.

• Indigenous and popular vegetable genotypes like kartoli need to be identified and commercially exploited.

• Production of clean vegetables through use of IPM, Organic cultivation etc. and minimizing use of pesticides needs to be promoted.

• Though tuber crops such as potato, sweet potato, calocasia, and amorphophalus are commercially exploited in the state, the unexploited tuber crops like tapioca, yam etc. have great potential and hence need to be promoted.

3. Development of Floricultures in Maharashtra State:

Maharashtra stands 6th in respect of area under floriculture in the country with approximately 7000 hectare under cultivation. The major flower crops grown are roses, chrysanthemum, aster, tuberoses, jasmine, gaillardia, marigold etc. These flowers are mainly grown in Pune, Nasik, Ahmednagar and Sangli Districts. Recently many private companies and progressive farmers in the State have started export oriented cultivation of flower crops. The crops grown are roses, carnations, gerbera, gladiolus, lillium, etc. These companies have contributed much more in floriculture development through green houses and tissue culture technology. There
are 14 big corporate green houses and 902 small green houses are erected on farmer’s field. Under the Government of India's scheme "Commercial Floriculture", Horticulture Department of Maharashtra State has established a Model floriculture center at Rajgurunagar, District Pune. One hi-tech floriculture unit with an investment of Rs. 3.00 crores is established in College of Agriculture, Pune to demonstrate hi-tech technology to the farmers.

The state Government has taken lead to establish auction market on the lines of Dutch auction centre (AlSameer) at Goregaon, Mumbai. Besides this, the Maharashtra State Agricultural Produce Marketing Board has established one hi-tech floriculture centre at Talegaon, Pune. An organization "Western Maharashtra Floriculturists Association" is working in the state.

4. Development of Spices in Maharashtra State:

Maharashtra is one of the important spices growing states. The area under spices crops is about 1.66 lakh hectare and production is 13.65 lakh MT. The major crops are chillies, ginger, turmeric, black pepper, cardamom, etc. These are cultivation of seed spices like coriander, fenugreek, etc. to some extent. The Konkan belt of the state i.e. coastal belt is most congenial for spices cultivation. Western Maharashtra region is famous for turmeric cultivation. There is auction market for turmeric at
Sangli. Some of the farmers / NGOs have started growing spices crops organically. The estimated area under organic cultivation is to the tune of 4500 ha. Considering the market potential, development of minor seed spices like Jeera, Cumin, Coriander etc. need to be focused.

5. **Medicinal and Aromatic Plants**: Though medicinal and aromatic plants have great potential for cultivation, presently majority of the material is sourced from the forest area. Therefore, it is not economical for individual farmer to cultivate them without buy-back arrangement.

6. **Mushroom**: Mushrooms are rich source of nutrients. This industry also provides employment to landless labors. Even though the production has been increased substantially, still there is wide gap in utilization, Mushroom, being highly perishable, its marketing needs to be done with care. Therefore an integrated approach is necessary for development of mushroom cultivation. The employment guarantee scheme linked with horticulture needs to be continued. Every year, the target of 50,000 is proposed.

7. **Research Activities in Maharashtra State**:

   The state has privilege of having 4 State Agricultural Universities along with 5 Colleges of Horticulture and 2 colleges of Forestry. So also there are 3 National Research Centers existing in the State for Grapes, Citrus and Onion and Garlic. The present research focused which is on
varietal improvement, production and utilization needs to be strengthened, related to WTO scenario. The agricultural universities have evolved promising varieties like Vengurla series of cashew, Ratna, Sindhu in mango etc. The strong crop based farmer’s organizations such as Mahagrapes, Grape Growers Association; Mahabanana etc. themselves are conducting need based research. Even the farmers are innovative who have evolved promising selections of grape. The technologies like micro propagation, micro irrigation, fertigation, organic farming, IPM, INM, playhouses cultivation is becoming popular.

8. Research Needs in Marketing of Horticulture Crops:

1. Standardization of grading and packing requirements for indigenous and foreign markets with reference to size, colour and quality parameters.

2. Package of practices and processing for medicinal and aromatic plants.

3. Techniques for production of grafted vegetable saplings (water melon on bottle gourd, Brinjal, tomatoes) using robot specially G 892.

4. Development of different crop models for medicinal and aromatic crops.

5. Survey and Identification of indigenous flora for export market.

7. Recommendations for micro-irrigation/fertigation in horticultural with reference to crop wise season wise requirements.

8. Efforts to develop and promote nutraciticals.


11. Mechanization in horticulture.

9. Agricultural Education and Training Facilities in the State:

Agricultural education facilities in Maharashtra are ample. The 4 state agricultural universities have all disciplines of agriculture and agriculture education facilities from diploma to post graduation is available in the state. The Yashawantrao Chavan Open University, Nasik has developed course curriculum in local language i.e. Marathi, with a part time education pattern that too with more practical normally conducted on weekends. Besides this there are private colleges wherein even the facility of biotechnology is available.

The Maharashtra State Agricultural Education and Research Council conducted massive training courses of six months duration on
minimum qualification basis to increase the human resource in the field of horticulture.

The state has optimum training facilities. There are 7 training institutes in the state having autonomous status. Vasantrao Naik Agricultural Management Training Institute, Nagpur is an apex body. Out of the seven training institutes, the department has now two training institutes exclusive for horticulture and one institute for agri-business at Daund, Dist. Pune. Besides this the state has institutes such as Water and Land Management Institute, Aurangabad with the depleting ground water table, judicious use of water and its conservation has become very important activity. Also NCL Pune and BARC Mumbai institutes are helping agriculture to lead towards hi-tech.

The state is pioneer in establishing Agri-polyclinics to demonstrate field trials and educate farmers on various aspects. Such facility is also available on Government nurseries and seed farms at taluka (block) level. Besides this the state has 3 tribal training centers in tribal belts of the state. The fruit processing centre at Aurangabad demonstrates house hold and cottage level processing techniques especially to the women. The above education facilities should be effectively used for imparting training, dissemination of information etc. to meet the future challenges.
10. Major Schemes of Demonstrations in Maharashtra State:

Demonstration is the best method of extension. Under various schemes demonstrations are conducted. Model floriculture centre at Rajgurunagar, Dist. Pune, hi-tech floriculture centre at college of agriculture, Pune, Centre of excellence for tissue culture at Marathwada Agricultural University, Parbhani are some of the major demonstrations in the state. The huge plantation of various fruit crops allover the Maharashtra done under Employment Guarantee Scheme linked Horticulture Development Programme, itself is a demonstration.

The hi-tech floriculture project at College of Agriculture, Pune worth Rs. 3.00 crores is being implemented to demonstrate hi-tech agriculture to the farmers. One model floriculture unit is established at Rajgurunagar, Dist. Pune wherein one low cost green house is established with the assistance from food and agriculture organization.

The Maharashtra State Agricultural Produce Marketing Board has established Floriculture Park at Talegaon to demonstrate hi-tech horticulture to the farmers. Considerable work has been done in the field of vegetables, floriculture, spices etc. The Konkan Krishi Vidyapeeth has Evolved multistoried crop model for intercropping of spices in coconut orchards popularly known as "Lakhi baug". The Maharashtra State
Agricultural Produce Marketing Board is promoting horticulture export zones which will demonstrate and promote crop production for export.

11. **Field Extension**: The department has undergone structural reform under "one window system". Now there is over 15500 field level staff available for extension. They arrange demonstrations, field days, Krishi melavas etc. The agriculture department and agricultural universities have system of conducting workshops/Zonal agricultural Research Conferences. Even the growers association such as Mahagrapes, Grape Growers Association etc. conducts seminars, training programmers for the farmers. Under various schemes farmers are given proper training.

12. **Linkages with Research and Development Institutes in Maharashtra State**:

    Maharashtra State has well established linkages with research and development institutes. Various schemes are designed after thorough discussions with the university scientists, eminent personalities from industries, private sector etc. The ambitious scheme Employment Guarantee Scheme linked Horticulture Development Programme was designed after discussion with state agricultural universities. The work plan schemes are designed in the same manner. The universities are given funds for establishing infrastructural facilities and research work, especially need based research work. The state has 3 National Research
Centers. There advice is taken from time to time to tackle many issues. Many a times natural calamities occur in the state such as outbreak of Sigatoka disease on banana, off season rains spoiling crop etc. when these institutes come to great help in strategic planning/disaster management.

The state is having National Chemical Laboratory of international standard. There expertise was taken on consultancy basis for establishing tissue culture laboratory at Marathwada Agricultural University, Parbhani. The National Informatics Centre, Pune has guided the department in overall computerization of the department in developing various software' and website. There is urgent need to establish strong linkage with the national and international institutes considering the growing importance of horticulture.

The Non Government Organizations such as Hind Swaraj Trust, Ralegansiddhi, Dist. Ahmednagar, Vidya Vikas Pratishthan, and Baramati are actively involved in the development of agriculture sector in the state. "Adarsh Gaon" is a unique concept being implemented in the state. Jain irrigation is one of the major industry in the country, with it’s headquarter located at Jalgaon. A national symposium on micro irrigation was arranged by the company. Similarly a mega event called "Kisan" is organized at Pune in every alternate year by Deccan Exhibitors. Strong network of cooperative organizations is an asset of the state.
13. State Schemes:

1. Plant protection scheme on Horticulture crops
2. The fruit and vegetable cultivation in kitchen gardening for tribal families in Melghat area.

Centrally Sponsored Schemes:

1. Integrated Development of Fruits
2. Integrated Development of Vegetables
3. Integrated Development of Spices
4. Integrated Development of Floriculture
5. Integrated Development of Medicinal and Aromatic Plants
6. Integrated Development of Mushroom

Centrally Sponsored scheme for Establishment of Agri-business support system:

1. Assistance for preparation of feasibility report
2. Assistance for establishment of common facility center for value addition to fruit and vegetable crops. (Agro Processing Units)
3. Assistance for Establishment of Marketing Information Centers
4. Assistance for Opening of the Retail Outlet (Market support for fruit and vegetable)
5. Incentives on experimental consignments for exports
6. Assistance for Participation in International Exhibition by Entrepreneurs.

14. Board/Agency Schemes:

- Coconut Development Board sponsored schemes for integrated coconut farming in coconut growing area for improving productivity improvement.
- National Horticulture Board sponsored schemes.
- Spices board sponsored schemes.
- Coffee Board sponsored schemes.
- Schemes of Department of Food and Processing.
- APEDA schemes.

15. Thrust Areas for Development:

- Promoting organic cultivation of horticultural crops.
- Contract farming in medicinal and aromatic crops, vegetables, spices, fruits etc.
- Promotion of IPM, INM technology in horticultural crops.
- Strengthening PHT facilities (on farm, cold chain).
- Promoting horticulture mechanization.
- Precision agriculture & Micro irrigation.
- Value addition units (processing, extraction)
• Promoting export (AEZ, residue testing labs, and awareness about Codex etc.)
• Use of IT technology (software, GIS, satellite data and predictions about diseases, pests, cropped area and yields)
• Strengthening export cell (international market data, campaigning for promotion of Indian produce at International market)

16. Production Related: Area expansion and quality improvement, Improvement and modernization of nurseries for quality planting material, Speedy development and multiplication of market led varieties. Promoting varieties suitable for processing, value addition and exports. Developing package of practices for export production, Synergization of quality standards for domestic as well as international markets, Standardization of IPM and INM modules, Package of practices for organic farming, Package of practices for high density plantation, Pruning and training techniques off season production, Micro irrigation and fertigation, Mechanization, Production of hi-value crops in green house

17. Processing Related: Use and application of maturity indices, Improvement in harvesting techniques, on farm and off farm storage management, Extension efforts for improvement of harvesting, handling, grading and packing techniques, Measures to reduce post harvest losses, Promoting farm/village level primary processing in different crops.
18. **Marketing Related**: Market intelligence, Development of interstate/intrastate markets, there is needed to introduce new technology from wherever it is available in the field of Cold storage, Processing, PHM, etc. Such attempts were successfully made by organizations like Mahagrapes, who consulted "Humifresh" for controlled atmosphere storage.

**Significance of the Study**:

Marketing of Horticultural crops has several distinctive features due to the special nature of the crop itself. Because of their high perishability, seasonality and bulkiness, these horticultural crops require special care and attention in providing time, from and place a utility which in turn adds to the marketing costs. Due to prevalence of imperfect market structure and also existence of few traders in the marketing system of horticultural crops in general and fruit and vegetables crops is influenced by the ultimate prices realized for these crops by the growers effective marketing of fruits and vegetable crops has been traded equally important to their production, Perishability, seasonality in production, scattered and small scale production, high marketable surplus in relation to total production, localized consumption and relatively less inclination of the consumers towards the consumptions of processed products, involve a large numbers of intermediaries for performing different
marketing activities like assembling, packing, storing and transporting etc.

These horticultural crops differ from other food crops like cereals, with respect to certain natural characteristics like moisture content, texture and unit size which makes them highly perishable resulting in huge post-harvest losses. The post-harvest losses obviously have an impact both on macro and micro levels of the economy. Hence, there is a need to study these aspects in detail.

**Rationale of the Study**: In view of the immense importance of marketing of fruit and vegetable crops the present marketing of horticultural crops in Maharashtra state has undertaken for detail study. Against this background, the present empirical study analyses the functioning of present marketing mechanism of fruit and vegetable crops in Maharashtra state. Attempt has not only been made to understand fully and fairly marketing inefficiencies but, wherever possible explanations and suggestions have also been recommended.
Objectives of the Study:

The specific objectives of the study are as follows:

1. To analyze and review empirically the growth of horticultural crop in general and fruit and vegetable crops in particular in Maharashtra state.

2. To study comprehensive description of current status of marketing of horticulture crops in Maharashtra state.

3. To examine and analyze the existing marketing practices and problems of fruit and vegetable growers in Maharashtra state.

4. To examine the price spread marketing margins of fruit and vegetable crops and

5. To offer a few suggestions for the efficient and effective marketing of fruit and vegetable crops in Maharashtra state.

Hypothesis:

1. The existing marketing facilities such as, assembling, pooling, grading, processing, storage and transport etc. are inadequate to the special marketing needs of the fruit and vegetable crops.

2. Marketing managements has so far, been neglected area in the case of fruit and vegetable crops.

3. An efficient market structure has a stimulating as well as regulatory influence on production methods.
Research Methodology :

The above mentioned objectives have critically appraised by using both primary and secondary data. The main source of data, however, is field investigations carried out by the researcher. Two different schedules are prepared and pretested for administering on the farmers and traders separately. The schedule for farmers is intended to seek information on their background, yield, finance, marketing practices and problems. The second schedule for traders is meant to seek information on their background, finance and opinion on the marketing of fruits and vegetables.

The secondary data constitutes published and unpublished reports of central and state governments. Further a review of the existing literature available in the libraries of various universities, is also formed the basis for secondary data. Specifically the secondary data collected from below given sources has been utilized. National Horticulture Board, India. Economic Survey Government of Maharashtra, Directorate of Marketing and Inspection, Department of Rural Development, Ministry of Agriculture, Government of India, Nagpur. Directorate of Marketing and Inspection, Government of Maharashtra. Financing and Planning Department, Government of Maharashtra. The data also collected through various research Journals, Magazine, Periodicals, Standard books and
Websites. The researcher used various statistical tools like Indices, Average, Percentage, Ratios and other Statistical tools in this research.

**Sample Design:**

The study was conducted in Maharashtra State in India. The Maharashtra State is divided into four Regions namely Marathwada, Vidharbha, Western Maharashtra and Konkan.

### Table No. 1.4

**Sample Design of Selected Districts in Maharashtra State**

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Regions</th>
<th>Districts</th>
<th>No. of Farmers</th>
<th>No. of Traders</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Marathwada</td>
<td>Aurangabad</td>
<td>20</td>
<td>03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jalna</td>
<td>20</td>
<td>03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Parbhani</td>
<td>20</td>
<td>03</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td><strong>60</strong></td>
<td><strong>09</strong></td>
</tr>
<tr>
<td>2.</td>
<td>Vidharbha</td>
<td>Nagpur</td>
<td>20</td>
<td>03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amravati</td>
<td>20</td>
<td>03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Akola</td>
<td>20</td>
<td>03</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td><strong>60</strong></td>
<td><strong>09</strong></td>
</tr>
<tr>
<td>3.</td>
<td>Western Maharashtra</td>
<td>Pune</td>
<td>20</td>
<td>03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nashik</td>
<td>20</td>
<td>03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ahmednagar</td>
<td>20</td>
<td>03</td>
</tr>
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<td></td>
<td></td>
<td><strong>Total</strong></td>
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<td>4.</td>
<td>Konkan</td>
<td>Thane</td>
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<td></td>
<td><strong>Total</strong></td>
<td></td>
<td><strong>240</strong></td>
<td><strong>36</strong></td>
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</table>
From each region three districts are selected for the present study. Which account for 80 percent of the total area, under fruit and vegetable crops cultivation in the state. From each district twenty farmers are selected. There is one main trading center in the district under study, three traders has selected from each district. The selection of farmers is based on the stratification done on the basis of the size of the cultivated land holdings. The selection of the traders is based on the willingness of the traders to co-operate with the researcher. Thus the total sample came to 240 farmers and 36 traders for purpose of in-depth survey.

Limitations of the Study:

1. The period of study is restricted to ten years from 2001-02 to 2011-12.
2. The study is restricted to the marketing aspects of fruit and vegetable crops only.
3. The present research is limited to the farmer and trader from each three districts of the regions.
4. The conclusions of this research depend on the responses of the selected farmer and trader.
Design of the Study:

Present study is divided into seventh chapters, which can be justifying the title of research topic as below.

First Chapter is introductory in nature. Development of horticulture crop in Maharashtra, it gives an overview of the growth and role of horticultural crops in human nutrition, the objectives of study, research methodology and the design of study. This chapter forms the foundation on which the supper structure of the analysis of the present research investigation as contained in the successive chapters has been built up.

Second Chapter deals with recent and related literature. An attempt has made to review of literature, which focused on horticultural crops. A brief review of past studies will enable us to understand the various aspects of horticultural crops.

Third Chapter deals with the theoretical covers the conceptual framework of marketing. This chapter discusses the definition of marketing from the mid 20th to 21st century to date. It reveals drastic change in the concept and practices of marketing worldwide, new liberalized public horticultural marketing institutions in India during WTO regime.

Forth Chapter consists in two parts, first part discusses on a critical appraisal of horticultural crops in the Maharashtra and second part deals
with physical and financial programme for horticultural crops in the Maharashtra state.

Fifth Chapter examines the market cost and net return analysis of horticultural crops.

Sixth Chapter reviews the existing marketing practices and problems of horticultural crop growers in Maharashtra states.

Seventh Chapter is the subject matter of summary, major conclusions of the study and important suggestions given by the researcher to the present research work.
References:


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5. K.L. Chadha., op. cit., pp 125-126


8. Ibid. p27

9. NHRDF Report, op. cit., pp 16-18

10. Economic Survey of Maharashtra 2012-2013, PP7-12