CHAPTER II

A REVIEW OF LITERATURE

2.1 Introduction

The purpose of the present chapter is to provide a near comprehensive review of literature available on the subject of study; both in India and abroad, with a special focus on HOPCOMS research. The review as under principally deals with agriculture and horticulture, fruits and vegetable cropping, cooperatives and cooperative marketing, HOPCOMS and similar organizations at work, and all processes relating to post-harvest and marketing in fruits and vegetables, including marketing and new technologies.

The first part of the review deals with agriculture and horticulture, especially developments in the two, including some historical and latest events. Cropping patterns particularly in horticulture are an important aspect as well for appreciating the role of horticulture in cropping, production, and marketing.

The second part deals with fruits and vegetables as they are our focus in this research but in much the same way as we have treated agriculture and horticulture. All other related aspects of research on organized and cooperative retailing are discussed in the last part of this chapter.

2.2 Agriculture and Horticulture

Horticulture is a very important branch of plant science. It accounts for food from three major sources: vegetables, fruits, and nuts (Acquaah, 2009). Apart from food, it plays a significant role in other aspects of society also. It provides employment and also beautifies the environment. In this book, the divisions of professional horticulture are discussed along with the field’s importance to society.

William New (1869) reported that with the object of introducing improved method of culture of flowers, fruits and vegetables, more especially among the native gardeners, two exhibitions were held under the auspices of the Agricultural-Horticultural Society at the Lalbagh Gardens: one on September 19, 1868, and the other one on February 16, 1869, respectively. Prizes to the amount of Rs. 734 were distributed to successful competitors on the award of judges, and in addition, bronze
and silver medals were given in furtherance of the same object, monthly shows were instituted at the cantonment market place and prizes were given in the form of medals, money or marks for excellence in such fruits and vegetables and flowers as are at the fine in season as well as for fine stall fed bullocks sheep’s and poultry.

Boddam (1869) remarked that a careful culture of the apple seemed to have been more popular with the native gardeners than that of any other fruits. Apples grown at Bangalore were really very fine, and also the peaches improving yearly though not at the same rate. Good strawberries were plentiful in hot months on all occasions where gardeners went to the expense of purchasing European seeds and the production of vegetables were most satisfactory. It was encouraging to find that several of the principal native gardeners were alive to this fact and had got from the horticultural society large supplies of the best seed, procurable in London and the people were looking out for more of the beneficial results at the Vegetables Show held at the end of the year. The English cauliflower seed having been found not to answer well at Bangalore, a considerable quantity of cauliflower seed from the north western provinces and other northern stations were procured and distributed to the market gardeners and it was expected that in future this vegetable would be plentiful and cheap here. Superior kinds of brinjals, recently imported into Europe from Tibet and China, were introduced by the MHS. The most marketed and rapid improvement were however made in horticulture from the MHS, and the European residents of that time gave their attention exclusively to their flower gardens, the number of new flowers and ornamental plants that were successfully introduced into Bangalore since the formation of the Society.

**Krumbiegal (1920)** reported that the Horticulture Society was the most direct stimulus in spreading horticulture work and interest, but in order to establish such a society, very active and sustained technical help and guidance was required, which only the Department could give. This was seriously felt in Bangalore and people in several places desired to start such societies, if the Government could afford the necessary assistance. Horticulture societies consist largely of private or non-professional people and have a general horticultural interest as their aim; it was equally, if not more important to bring together professional growers for the betterment of their special branches, thus the planters had their association for combined settlement of their labour questions, supplies of seeds and stores, disposal
of their products and elucidation of planting problems. In the same way, it was necessary to form association.

Krumbiegal (1920) also reported that the Horticultural Society provided the most stimuli in spreading horticultural activities and interests but in order to establish such a Society, a very active and sustained technical help and guidance was required, which at that time only the Department could give. This was seriously felt in Bangalore and people in several places desired to start such societies if the Government could afford the necessary assistance. Horticultural societies consisted largely of private or non-professional people and had a general horticultural interest as their aim. It was equally, if not more, important to bring together the professional growers for the betterment of their special branches. Thus, the planters had their association for combined settlement of their labour questions, supplies of seeds, disposal of products, and elucidation of planting problems. In the same way, it was necessary to form associations.

Krumbiegal (1928) again reported that the membership of the Mysore Horticultural Society was 138 in June 1928. The Summer Horticultural Show was held in the last week of July as usual. Though the show was held two weeks earlier, the exhibits of flowers, fruits and vegetables were excellent. The section of the cut-flowers in the Show was very attractive. Among the perennial flowers exhibited were the dahlias and chrysanthemums and they were most striking and, in the annuals section, the noteworthy exhibits were asters, balsams, and phlox.

Horticulture is thus presented as an art, a science, and a business. Edwinna von Baeyer (1930) wrote that the horticulture historians believed that horticulture began in the Egyptian temple gardens where fruit trees, palms and grape vines were cultivated. Egyptian horticultural advances however did not happen in isolation, but were borrowed and refined from the horticultural innovations already found in the Near East and the Middle East. They were one of the most important technologies developed in agriculture and horticulture.

The Mysore Horticultural Society was an important means of spreading horticultural knowledge in the State of Mysore. At the request of several members, their gardens were inspected and suggestions and help were given in many cases. Plant diseases were treated by spraying with the assistance of staff of the Government
Gardens Department. The summer and winter horticultural shows were held at regular intervals of six months, namely, August 4, 1934 and February 2, 1935, respectively (Chetty, 1935).

In 1937-38, a report on the Government Gardens and two exhibitions showed that the membership of the Government Gardens increased to 214 as against 192 in the previous year. The domestic fruits preservation outfit and preserved fruits such as mangoes, pineapples, limes, tomatoes, and grapes were shown on pamphlets distributed to the public on the preservation of fruits. The Government horticultural farm exhibited excellent specimens of many kinds of vegetables, artistically arranged at both the shows (Dorasami, 1938). This stall was primarily a model intended to create an interest among the visitors in the cultivation of the new and improved varieties of vegetables. The report further indicated to the Mango Show held on May 28, 1938. This was held indeed for the purpose of introducing some of the late varieties of mangoes from the east coast of India to Mysore State. The local varieties from Bangalore, Mysore, Kolar, and Tumkur districts were also exhibited. The collections from the palace orchards and also Kodur included a number of good varieties. The show was greatly appreciated by the public, as evidenced by the large attendance and the keen interest taken by all interested in the fruit culture.

In 1958, the then Director of the Department of Horticulture reported that the membership of the MHS was 220. But during the year under review, 46 new members were enrolled in the Society, thus raising the strength to 226. Branches of the MHS were started in the districts, taluks, and hoblies. Prior to 1952, however, there was only the Horticultural Society at Lalbagh, operating for the whole of the State. But now the privileges and benefits of the Society were extended to other parts of the State as well by the branches at district headquarters, namely, Mysore, Hassan, Tumkur, Shimoga, Chikkaballapura, Mandya, Chitradurga, Kolar, Dharwad, Belgaum, Raichur, and Bijapur and also in Nelamangal and Dodbalpura taluks and in Bannur hobl. These branches strove to develop horticulture in their jurisdictions. Garden competitions and horticultural shows were organized every year by the branches and the activities infused horticultural interest among the people (Marigowda, 1958).
Sharma (1963) reported on the activities of the MHS and in the context of the Winter Horticultural Show held in aid of the National Defence Fund in February 1963. The show had many special features and attracted a large number of entries from private exhibitors, industrial military and other establishments. There were altogether 537 entries under the ornamental class. There was very good response from the fruits and vegetables growers and dealers and also the European and Indian vegetables of very high quality were exhibited in a most impressive fashion. As adjuncts of the show, many firms dealing with horticultural implements, insecticides, seeds, and also book keeping were involved in the show at the location of the Gardeners; Training School of KSDH and many other stalls gave added attraction and educational value to the show. Additional attractions, including film shows, were arranged every day in the evenings by the Mysore State Adult Education Council. The corner groups arranged by the industrial concerns and Corporations were most attractive and lent special charm to the show. Special exhibits, which usually do not come in the season like the dahlia, caladium, tuberous and rooted begonia were also on display. The vegetable mini-gardens exhibited were of very high order. Pot culture and box culture of vegetables in the private garden sections of Bangalore Nursing Home and the Commissioner of Income Tax demonstrated the possibility of backyard cultivation of vegetables in pots and boxes and the tomato variety “Ox Heart” grown in the garden of the Industries and Commerce of the Mysore Government deserved special mention for the size, quality and quantity of fruits.

To cut a long story short, the economic policy of liberalisation has resulted in substantial growth in horticulture through introduction of hybrid seed plant material, huge investment in fruit and vegetable processing sectors, infrastructural facilities and export of horticultural produce (Subramanyam, 1994). The introduction of hybrid seed in horticultural crops like tomato and cabbage has more than doubled the productivity of these crops from hardly 20 tonnes / ha to around 50 tonnes / ha and resulted in not only increasing the production but also the productivity of labour (Subramanyam and Sudha, 1992). The studies have already shown that the horticultural crops in general are labour intensive and introduction of them in cropping patterns will help in increasing the farm incomes (Subramanyam, 1981). As small and marginal farms account for 76 percent of the operational holdings and contribute to a third of cropped area, if we can induce these small and marginal
cultivators to grow horticultural crops and adopt the latest technologies by taking appropriate measures, there is a tremendous scope for increasing their income (see Subramanyam and Sudha, 1995).

Though the magnitude of subsidies is not alarming when compared to macro-parameters, there is need to prune the subsidies. For this, a detailed study on the quantum of subsidies in various sectors is required. The Institute for Social and Economic Change is currently working on this aspect. It can be said that proper targeting can reduce the subsidy on public distribution. The weaker section oriented programmes were started in the state much earlier than when the Government of India stepped into the programmes. With the entry of the Government of India in introducing the programmes, the state’s liability on these programmes appeared to have come down. Public distribution and Bhagya jyothi programme are the examples (Deshpande, 2004: 22).

2.3 Fruits and Vegetables Production and Marketing

India is the second largest producer of fruits and vegetables in the world, and the commercial processing of these commodities is less than 2 per cent of production. In spite of high rates of growth in the post-reform period, capacity utilization of the food processing industry remains below 50 per cent, yet. Increasing value addition activities and processing, as recounted by an Expert Committee, required huge investments. As long as there was endemic poverty and low purchasing power, it was unlikely that the country could build a heavyweight fruits and vegetables processing industry (Sidhu, 2005).

Of the total global production of 465.4 million tonnes (1994-95), China produced 125.5 million tonnes and India’s contribution was 66.5 million tonnes. The estimated area under vegetable crops in India (1994-95) was 6.2 million ha, excluding potato. This area was around 2.9 per cent of the total cropped area of the country, which was very low considering the massive population and its accelerated rate of growth. The production of 71 million tonnes during 1995-96 was far below the requirements of the rapidly growing population. By 2000 AD, India’s population was expected to be 1.0 billion, requiring more than 115 million tonnes of vegetables. So it was targeted to increase the area under vegetable crops to 8.0 million ha by 2000 AD. Vegetable crops in India were grown from the sea level to the snowline. The entire
country could be broadly divided into 6 vegetable grown zones (Hazra and Som, 1999).

Vegetable crop production in one of man’s basic skills. Wherever he has settled for long enough to produce a crop he has cultivated vegetables for human and animal food. It is now becoming increasingly appreciated that successful vegetable production is very dependent upon a supply of satisfactory seeds. At the present time the seed industry plays an important role in both production and distribution of vegetables seeds. The production areas of vegetables range from large-scale farm enterprises and market gardens growing for profit to private gardens or homesteads, where vegetables are an essential element of the family’s own efforts to supplement their diet or income. There are some relatively small-scale producers who aim at self-sufficiency in vegetables plus a surplus for sale or exchange in village communities. The market growers in many areas have evolved from this type of disposal of surplus crops to deliberate production of crops for sale (Raymond, 1985: 63).

2.4 Cooperatives and Cooperative Marketing

The cooperative movement in India owes its origin to agriculture and allied sectors. The farmers generally found the cooperative movement an attractive mechanism for pooling their meagre resources for solving common problems relating to credit, supplies of inputs and marketing of agricultural produce. The experience gained in the working of cooperatives led to the enactment of the Cooperative Credit Societies Act 1904 (Premchander and Sampark, 2002).

There are some successful stories of co-operative movement in the state. Dairy and HOPCOMS come under the successful stories. On the other hand, many societies are facing the usual managerial problems and incurring losses. Hence, there is need for a comprehensive training to co-operators in the areas of Cooperative Act, management, and marketing (Deshpande, 2004: 22).

Marketing of horticultural crops is quite complex and risky due to the perishable nature of the produce, seasonal production and bulkiness. The spectrum of prices from producer to consumer, which is an outcome of demand and supply of transactions between various intermediaries at different levels in the marketing system, is also unique for fruits and vegetables. Further, marketing arrangements at
different stages also play an important role in price levels at various stages, namely, from farm gate to the ultimate consumer of products. These features make the marketing system of fruits and vegetables to differ from other agricultural commodities, particularly in providing time, form and space utilities. While the market infrastructure is better developed for food grains, the fruits and vegetables markets are not that well-developed and the markets are congested and unhygienic. The markets in many of the major cities in some states are not covered by market legislation and continue to function under the civic body as well as private ownership (Gandhi et al, 2002).

Marketing cost has been identified as the major constraint in the wholesale channel and bringing down the costs particularly the commission charges as demonstrated in the co-operative channel, will help in reducing the price spread and increasing the producers’ margin. By separating out marketing loss at each stage of marketing, the actual margins of intermediaries have been estimated. It has been observed that the existing methods tend to overstate the farmers’ net price and margins of the intermediaries. In fact, the margin of the retailers’ after accounting for the physical losses during retailing has been found to be negative (loss), which was otherwise positive (profit) in the conventional estimation. Similarly, the producers’ net share and wholesalers’ margin have also been reduced substantially. It has been shown that marketing efficiency is inversely proportional to the volume of post-harvest losses.

2.5 HOPCOMS and Similar Organizations at Work

Charles R. Hall (2009) reported that marketing is one of the most important factors determining the success of any fruits and vegetables farming enterprises. The direct farmer–to–consumer marketing includes any methods by which the farmers sell their products directly to consumers. Farmers sell their products directly to consumers by several means, however: pick your own operations (mainly in the West), road-stands and market, markets located in or near an urban area, house-to-house delivery, sales from trucks and other parking area, and similar places with potential consumer traffic.

A study of Kolady, Krishnamoorthy and Narayan (2008) on the largest framework of the Re-governing Markets Project was to characterize the HOPCOMS
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as an institutional innovation. Through extensive field visits, involving interviews with actors in HOPCOMS and outside, combined with quantitative information from a survey of 186 farmers in Karnataka, where the discussion was on (a) the farmer-agent who brought their fruits and vegetables to the Mandi (a wholesale unit) of the HOPCOMS where the Mandi agent auctioned or sold the products in larger lots directly to retailer–consumer; and (b) the farmer–pre-harvest contractor–Mandi agent–consumer. The survey was spread in the six districts of the southern Karnataka and showed HOPCOMS’ success in acting as a counterbalance for small scale farmers in the modern retail environment.

The HOPCOMS works with fruits and vegetables whereas the promotion of other horticultural products is by the Department of Horticulture through it other activities. The HOPCOMS can have a logistic network of Members / Farms to Procurement centres to Central godowns to Retail outlets and to consumers, if only they could make slightest changes in the present network centred at Lalbagh and have 3 more proposed centres one each at Madiwala, Byappanahalli and Hebbal (Ambekar et al., 2011). The HOPCOMS pays a remunerative price 10-15 per cent higher than the open market prices to the farmers and that it pays in cash, so that it is immediately available to the farmers. HOPCOMS also provides farmers with inputs such as seeds, fertilizers at subsidized rates. The price of the fruits and vegetables sold to the consumers are reasonable, although it is set with 20-25 per cent margin, added to the wholesale price rather than retail price. The logistic network suggested by Ambekar et al. (2011) is such that the proposed distribution centre at Madiwala would save a route distance of 15 km for transport of products, the centre at Byappanahall would result in a saving of 29 km and the centre at Hebbal could save 35 km. So, it is advisable to have 4 distribution centres instead of just one, that is, Lalbagh.

There are several researches exclusively on HOPCOMS but on varied subjects and themes by young researchers at the Universities, particularly in Masters. A particular research that deals with consumer price index of selected fruits and vegetables at HOPCOMS is by Swaminath (2011). Speaking of prices of 15 fruits and vegetables at HOPCOMS outlets during 2005-06 to 2009-10, he gives the reasons for price fluctuations in various crops (fruits: mangoes, grapes, pomegranates, sapota, banana (yelakki, pachabale) and oranges; vegetables: beans, capsicums, tomatoes, onions, potatoes, carrots, radish and green chillies). In most crops, the prices have
risen with the years: for example, the price/kg of beans has gone up from Rs. 17.5 to Rs. 22.05, tomatoes from Rs. 8.8 to Rs. 12.3, onions from Rs.12.2 to Rs. 20.9, potatoes from Rs. 10.88 to Rs. 18.94, mangoes from Rs. 26.97 to Rs. 39.2, grapes from Rs. 15.6 to Rs. 25.1, pomegranates from Rs. 46.8 to Rs. 96.9, and banana yelakki from Rs. 17.9 to Rs. 26.9. Thus the price rise has been moderate (beans, capsicum, tomatoes, mango, sapota, banana pachabale), high (onions, potatoes, banana yelakki) and very high (pomegranates). In comparison with open market prices, the prices at HOPCOMS are 10-12 per cent different and on the higher sides, compensating however with the quality of products. Besides, the HOPCOMS help farmers with marketing their produce when they have additional production even as they help the farmers to sell in the open market as well, providing transportation for the products.

The HOPCOMS are able to win customers over their competitors such as the supermarkets (Swaminath, 2011; Mathew, 2011). In his study of consumer preference to HOPCOMS over supermarkets, Mathew (2011) has taken 200 consumers as his sample and points out that 33 per cent of the consumers are the regular buyers from the HOPCOMS while 30 per cent are from the supermarkets, but the consumers prefer HOPCOMS over supermarkets for quality and freshness of products (79 per cent), access of location (17 per cent) and fair price (4 per cent). HOPCOMS’ quality and freshness is excellent for 28 per cent, good for 57 per cent, and fairly good for 15 per cent. As for prices at the HOPCOMS, they are excellent for 7 per cent, good for 30 per cent, and fairly good for 50 per cent.

Yet another study of awareness of member producers and opinions of consumers on the functioning of the HOPCOMS by Shankar (2001) informs that 98 per cent of the farmer-producers are aware of the HOPCOMS’ price fixation after grading the produce and 79 per cent of them are also aware of the modalities for doing so. As much as 99 per cent of the producers are aware about the new procurement centres set up while 93 per cent of them are aware of the supply of fruits and vegetables to bulk buyers by the HOPCOMS. On the other hand, 98 per cent of the consumers are satisfied with the correct weights at the outlets, 86 per cent with the immediate service, 94 per cent the timing of outlets, 69 per cent the freshness of fruits and vegetables and 94 per cent the quality of services rendered at the outlets. However, 57 per cent of them feel that the hygiene of the outlets needs improvement.
just as 79 per cent of them speak of the need for improvement in the grading and sorting, and also 87 per cent in packaging clean produce in right quantity. Price fluctuation at the HOPCOMS outlets, according to 93 per cent of the consumers, is high. On the other, speaking of consumer attitudes towards organized retailers and HOPCOMS in Mysore city, Chandrashekar (2011a) has concluded that nearly 83 per cent of the consumers are for Hi-Tech HOPCOMS, 65 per cent of them favour the opening of large and modernized HOPCOMS outlet for quality (35 per cent) and service (30 per cent), and 97 per cent of them feel that HOPCOMS are very good (26 per cent) and good (71 per cent).

2.6 Supermarkets as Supply Chains

The past decades saw a rapid rise of multinational supermarket chains in the developing world. Empirical studies find that farmers’ supplying (Reardon et al., 2003) super markets are relatively more productive, but many farmers are excluded from the supermarket supply chain due to capacity constraints in production and marketing (Hernandez et al., 2007; Nevven et al., 2006). Advocates of economic globalization and trade liberalization view that it could help communities to improve rural incomes by reducing poverty, provided complementary policies are in place and economic benefits are shared sufficiently and widely among the economic agents (Harrison et al., 2007; Scheve et al., 2007). Benefits of any economic agent may however be compromised due to inadequate planning, infrastructure or governance, and adoption of new technology on their part (Johnson et al. 2003). These inadequacies can arise anywhere in the marketing chain which is from the point of production to consumption.

As the chain gets larger with shortfalls (inefficiency), larger the numbers of economic agents involved in it and lesser their incomes’ share in consumers’ price with high unpredictability. This is true in the case of farmers in the developing countries, including India, and also in underdeveloped countries where farmers are resource-poor and are highly vulnerable to production and marketing risks. Their production surpluses does not necessarily materialize into higher income (Dastagiri and Immanuelraj, 2012).

The problem of too many layers of middlemen, weak supply chain, and lack of proper information to farmers is discussed in Rawat (2011). The prospective solution
to these problems may be consolidation of supply chain and to achieve this there can be many ways. However, one of the possible solutions is linking the supermarkets and farmers directly. The possible rationalization are, due to price and supply fluctuations in a complex global market, that rural produce affect resource and infrastructure, planning and access to credit, at both farm and national levels on the one hand (Core, 2003), and rate of spread of supermarkets in developing countries and their potential important impact on farming and food business (Trail, 2006). The main drivers of supermarkatization are the westernization of Asian diets, the development of supermarkets, fast food chains and exports in Asian countries (Pingali, 2007).

Constant increase in per capita income and urbanization in India, for example, has augmented the demand for fruits and vegetables. This change in consumer tastes and demand has critical implications for the entire Indian food supply system (Pingali and Khwaja, 2004). Despite significant contribution to production (8 per cent of the world’s fruits and about 15 per cent of the world’s production of vegetables), India is characterized by small and marginal farming, the average size of landholding is 1.06 ha in 2003 (GOI, 2006). According to NSSO report, 88 per cent of the holdings in the country are below 2 ha, which constitute 44 per cent of the gross cropped area and contributes 51 per cent of the value of agricultural output. The fact that agriculture is not profitable and sustainable makes the situation worse, as most of the farmers are likely to leave agriculture in the near future as well. Yet, owing to their labour intensive nature, horticulture enterprises are recognized as important alternatives by the policy makers and experts for nutritional security, poverty alleviation and employment generation programs.

But there is a weak firm-farm linkage and inefficiency in the supply chains, and as such the level of value addition is quite low (Gulati, 2009). Farmers cultivating fruits and vegetables receive less than 20 per cent of the consumers’ price (Aneja et al., 2009). Studies by IFFRI (2008), and World Bank (2007) in India, the farmers’ share in consumer price is quite low and moving toward private marketing networks does benefit the farmers. These explain the significance of linking farmers and supermarkets. Also, for strengthening the bargaining capacity of farmers in India with the large retailers, it is necessary for the farmers to come in groups, be it in the form of cooperatives, farmers’ companies or farmers’ clubs. These would not only reduce the transaction cost of doing business but also correct the balance of market
power within the stakeholders in negotiating the terms of doing business, especially prices (Gulati, 2009).

In India, though concept of supermarket is not a new one, the spread began exceptionally in the last decade. During 2002-07, the average annual growth rate of the top 10 Indian food and grocery retailers was more than 70 percent a year. Considering the demand potential and investment opportunities, India is being considered the top third most attractive country in the world for foreign direct investment in retail (Gulati, 2009, Francesconi et al., 2010). The spread of supermarket is an ongoing, even accelerating, process that soon supermarkets would become the dominant food suppliers around the world (Trail, 2006). The implication of spread of supermarket has got potential to integrate agro-food supply, but particularly it has crucial role to play in the small and marginal farming.

2.7 Marketing of Fruits

In India, food is the largest segment of retail industry. There are around 3.7 million food retail outlets with an estimated turnover of Rs. 7,400 billion. Food retailing in India is, by and large, unorganized, highly fragmented and predominantly small, family owned businesses. About 78 per cent of these functions with only family labour. Nearly 96 per cent of the food outlets are small with less than 500 ft$^2$ area. Unorganized food retail segment consists of kirana shops, selling dry food products, and fruit/vegetable shops and hawkers selling wet food products. As the unorganized retail outlets are under-capitalized, these are not able to cater to the consumer demand for value-added services, thus providing the edge to the organized retail sector. Organized food retailing, which till recently accounted for only around 2 per cent of the total food retail sales, is expected to reach around 20 per cent by the year 2008. Food retail sector is reported to employ about 21 million people.

The marketing of banana variety Neypoovan through various channels in the study region showed that about 60-70 per cent of banana was marketed through Channel (wholesale channel) and Channel 4 (co-operative channel). In the wholesale channel, banana was brought to the exclusive regulated banana market at Binny Mills, Bangalore from the districts of Bangalore Rural, Bangalore Urban, Kolar, and Mysore in Karnataka, Satyamangalam, Tirupathur and Tiruchirappalli in Tamil Nadu and also
parts of Andhra Pradesh. Banana was sold through auction to wholesalers and other buyers within and outside the state of Karnataka.

In the co-operative channel, HOPCOMS procured banana (variety Neypoovan) from farmers through its collecting centres located at the producing areas, namely, Channapatna, Ramanagara and Kanakapura and disposes the same to the consumers through its 256 retail outlets located in major cities in Karnataka like Bangalore, Mysore and Mangalore. Channel1 (wholesale retailers, consumers) was also in practice for banana marketing, but the extent of trade was low. The pre-harvest contractors (PHC) also played an important role and they entered into a contract with the farmers for a mutually agreed price. PHCs harvested and transported banana to the nearby markets.

The study revealed that in the two major channels of marketing of banana variety Neypoovan, namely, wholesale and co-operative, the latter is a more efficient system in terms of both operations and price. The operational efficiency was reflected by the reduced post-harvest losses (18 per cent compared to 29 per cent) due to strict procurement procedure, better transportation and handling and lower marketing costs. Improvement in pricing efficiency was also reflected in terms of lower price-spread, higher efficiency index, increased producers’ share and lower consumers’ price. Both farmer’s as well as consumers are benefitted, but the extent of benefit is more to the consumers.

2.8 Marketing of Vegetables

In a study in Himachal Pradesh, Sharma et al. (1995) identified the problems of storage, transportation and marketing of off-season vegetables in Gabalpur district. The study found that during the storage at the farmers’ places, the losses to all the major off-season vegetables (tomato, capsicum, beans and peas) were the highest. The losses were higher in the market mainly because of unauthorized deduction. Higher production with minimization of market losses was likely to enhance the market surplus. The establishment of factories using fresh vegetables as raw materials, formation of cooperatives in the vegetable growing areas and strengthening of market intelligence network were the major suggestions for the overall development of the area in general and vegetable growers in particular.
2.9 Marketing of Fruit Juices and Wine

According to Amit Mittal (2007), the bottled beverages of the fresh fruits, mangoes and blue grapes of the Horticulture Producers’ Cooperative Marketing and Processing Society (HOPCOMS) are a much preferred choice in Bangalore. The Society manufactures the fresh fruit beverages at its processing unit in the city. The monthly production is around 4,000 bottles during off-season and 10,000 bottles during peak seasons. A 200 ml bottle is priced at Rs. 5. Currently, the beverage is sold at its retail outlets in Bangalore, apart from strategic points in the city such as the railways stations, bus stands, Janata Bazaar and other government retail outlets. The Society had plans to install mixies at certain locations where its 318 retail outlets dealing with fruits and vegetables already existed. Right now, it sells fresh fruit juices in the evenings, using seasonal fruits and these are priced reasonably per glass.

According to an internet report (Ray, June 13, 2013), the people of Bangalore will be able to pick up some fine wine from select HOPCOMS outlets in their neighbourhoods. Karnataka Wine Board’s proposal to set up wine boutiques received the green signal from the HOPCOMS. The Board had proposed 15 wine boutiques in that many select stores, but HOPCOMS had limited the number to just 5. Wine will be sold at market price and licenses will be issued by the Board. They will provide the refrigeration facilities as well. The decision to provide a marketing platform to wine producers and farmers who grew grapes was pending for long. Karnataka is known to be a major producer of grapes with over 2,000 acres of vineyards in Bagalkot, Bijapur, Koppal, Raichur, Bidar, Bangalore Rural, Chikkaballapur, Kolar, Mysore and Chamarajnagar districts. The Board registered an annual production of 3.5 million litres of wine through 17 distilleries. Wine is a healthy drink if consumed in small portions. It contains 8-14 per cent of natural alcohol. The other reason why the Board is promoting its sale through HOPCOMS is because many women find it odd to walk into liquor shops to buy wine. The Board had already made a survey to check which pockets of Bangalore were with a high demand for wines to zero-in on the HOPCOMS’ outlets. The wines to be sold are manufactured by private companies, licensed under the Excise Department. However, the HOPCOMS is yet to decide how much of wine will be sold in each of the outlets. The project may be extended to other areas if it is a hit in Bangalore.
2.10 Marketing and New Technologies

Consumers could buy vegetables and fruits along with milk packets early in the morning, HOPCOMS are open from 7.0 am in the morning so that people could buy fresh vegetables and fruits (Express News, 30 April, 2011). HOPCOMS are currently open however only late in the mornings. In an attempt to serve the people, who cannot shop at that time, and to save those from buying not–so–fresh vegetables and fruits late in the evening, they have come out with such an idea. They also start an SMS system that furnishes the customer with the price and other details even before they come to the outlets, on a day-to-day basis (Yadav, 2011). Along with changing times, the HOPCOMS have many other plans too, which would benefit the people. The customer could get a digital bill, and this system would also enable the HOPCOMS to directly update the sale information for the Head Office at Bangalore.

The HOPCOMS outlets are doing away with the analog weighing scales, in a phased manner, and are introducing scales coupled with internet-connected billing devices. The move to equip the outlets with online-billing equipment is to ensure quick and hassle-free operations, according to the current Director of the Horticulture Department. The salespersons manning the outlets would need to put vegetables or fruits as the case may be on the scale and enter the respective codes and the dual display, which both the salespersons and the customers could see, indicates the weight of the produce up to 3 decimals and the price fixed by the Department. They have so far introduced 120 scales in 100 of the 250 outlets across the city of Bangalore. The response has been good as the new scales do not give any scope for customers to doubt either the price or the weight. The new scale, according to a report of the salesperson manning an outlet, is more reliable. The sales section is happy because they do not have to do number-crunching with pen and paper, besides there is no argument with customers who have always doubted the efficacy of the old machine. The scale works on UPS for an hour if the power goes off. The customers appear very happy because they are convinced with the quality, pricing and the weight at HOPCOMS outlets more so that at the push cart sales locations (TNN, November 5, 2010; also see Chandrashekar, 2011a).
2.11 Storage, Packaging, Transportation and Distribution

In a pre-feasibility study for (Storage and Distribution) Logistics Architecture in Karnataka, the Infrastructure Development Department, Government of Karnataka (IDECK, 2010), the state was ranked third in coconut production and occupied the fifth place with respect to production of fruits and vegetables. Due to the large scale production of crops at different locations and the distribution to end customers/markets widely dispersed, the sector had the largest requirement for proper storage facilities. Also, the crops produced were sensitive to climate and have a shorter shelf life. The local small farmers in the interior regions of the states had limited capabilities to transport the produce over longer distances. These farmers had no adequate storage facilities and hence needed to carry the produce to the nearest market at the shortest time in order to realize their gains.

There were, according to IDECK (2010), seven key agencies in the state providing storage facilities for agricultural crops besides private godowns. These agencies were: Central Warehouse Corporation (CWC); Karnataka State Warehouse Corporation (KSWC); Food Corporation of India (FCI); Karnataka State Cooperative Marketing Federation Ltd. (KSCMF); Karnataka State Food and Civil Supplies (KSF&CS); Karnataka Oil Seed Federation (KOSF); and Agricultural Produce and Marketing Committee (APMC). The key issues with respect to agriculture/horticulture storage in the state are summarized below.

- The storage facilities were spread out in almost all districts and taluks of the state. Most of these facilities were either running to full capacity or the utilization levels were more than 75 per cent.

- The capacities at such units could be augmented as a first step towards improving the storage facilities in the state. But the condition of the storage facilities was poor and needed better maintenance and higher hygiene standards. Arrangements needed to be made for disinfestations services, rodent control, insect control, cockroach control and specialized services.

Lack of an integrated cold storage chain was however leading to a lot of wastage of the produce or most often the produce was sold in the nearest market at a cheaper price. For the farmers to realize higher gains, a network of cold storage chains
were required to be developed, so that the produce could be transported to far off places or exported which would command a higher price and better returns to the farmers. And so, the absence of integrated agricultural-logistics hubs in the state were resulting in higher transportation costs and wastage of produce. The development of these hubs at suitable locations in the state would go a long way in improving the logistics of the agricultural sector.

Crops that were produced at different regions in the state required to be temporarily stored and brought to specific locations in the state for distribution / export. This industry was heavily dependent on storage and distribution facilities.

The key functions of storage facilities, according to IDECK (2010) are:

- **Creation of time utility**: There are products which are produced continuously throughout the year while consumption is seasonal. Storage enables goods to be made available to buyers whenever they are in demand.

- **Creation of place utility**: Another function of storage is to make goods available to a buyer at his place of business when he needs them. It creates place utility by warehouses location, for example, are tailor can obtain goods within a few hours or minutes by contacting the wholesaler's storage.

- **Finance function**: Storage helps to obtain or raise loans by providing collateral security of the goods stored.

- **Creation of form utility**: Certain commodities improve in quality or desirability while in storage, for example, curing of tobacco, liquor etc. Thus, storage creates form utility in certain goods.

- **Stabilizing prices**: Another functions of storage is to stabilize price by making the good available in the market whenever there is demand.

- **Regular production**: Storage performs the function of smoothing out irregularities in production, and to make available a free supply in the market at all times.
• **Ability to face natural calamities**: Storage enables the society to face natural calamities such as floods, famine, and drought. In such emergencies, commodities can be made available from the storage facilities.

• **Reduction of Risk**: Storage reduces the risk of the owner of the goods as the owner of goods can store merchandise with reputed warehouses which absorb a part of the risk.

• **Saving in Transportation Costs**: Storage allows accumulation of stock to be transported in bulk quantities thereby reducing the transportation costs.

• **Economies of large-scale**: Storage enables a concern to achieve the economies of large-scale production, large scale buying and selling, etc. as the goods may be kept in stores.

The time to pick fruit is dependent on the variety and the purpose for which it is meant. The picking stage is also governed by the distance to the market. In most fruits, the colour changes at the maturity stage. The best time for picking is early morning in dry weather. In case of small orchards near the market, the fruit may be carried in baskets with little attempt at sorting or packing. When larger quantities are handled, sorting and grading are desirable. Grade are mainly based on size, colour and freedom from blemishes. In general, the fruit is required to be mature, sound, well picked and reasonably uniform. Under the Agmark scheme, grading standards have been prescribed for several fruits produced in this country and same grading machines or plants have also been devised recently to enable quick grading. The most common package is the basket. It may be large or small, deep or shallow, flat, conical or cylindrical; they have half inch holes for ventilation, rope handles, and hinged lids, and are fastened with wire for sealing. Two types of boxes are generally used. One is fairly heavy and returnable when empty for repeated use. The other is a lighter box which is used only once. The transport of fruits to distant markets is mainly by rail. It presents numerous problems. High freight rates and the damage in transit are the main difficulties. These can be minimized to a certain extent by adoption of standard packages by the growers and the traders (**Singh, Krishnamurthi, and Katyal, 1963**).
2.12 HOPCOMS, Driage and Wastage

Though HOPCOMS did not classify fruits and vegetables into grades, it maintained quality by accepting only good quality produce from the growers. It rejected injured, damaged and diseased fruits. In banana, for example, HOPCOMS rejected the rotten fruits and fruits with bruises and rough handling (Singh and Singla, 2010). Cracked and blackened fruits due to over-ripening were also rejected (Murthy et al., 2007). Earlier, HOPCOMS deducted 20-30 per cent of the produce of the growers towards driage and wastage while making payments. By 2000, the practice of physical quantity deduction was completely stopped. In case of cabbage, payment was made only after the entire quantity was sold so as to account for the loss in quantity due to driage (Subrahmanyam and Gajanana, 2000). Driage and wastage was around 4-5 per cent of the total procurement of the produce. However, it reduced to 1.85 per cent in 2000-01 (Premchander, 2002). However, another recent study, revealed that proportion of produce rejected at HOPCOMS was 4.39 per cent, the maximum being as high as 66 per cent and minimum being nil (Kolady et al., 2007). About 77 per cent of the HOPCOMS farmers reported that they sold the rejected produce elsewhere at lower prices, 11.4 per cent each either threw away the rejected produce or HOPCOMS discarded it (Kolady et al., 2007).

There is yet another problem of fruits and vegetables which has not been looked at carefully in agri-business researches, because the area of ‘shelf life’ belongs perhaps to agricultural microbiology (Adarsh, 2005). Because fruits and vegetables are perishables, their shelf life is very limited. Among the vegetables the longest shelf life is perhaps for onion, but that would need dry and airy spot to store. Potatoes can last for a few days to a week or so and they might begin to sprout and become shrunk. Among the fruits, nothing can be stored for long for their shelf life is very short. But sapota or sapodilla, a hardy tropical evergreen fruit crop, grown in a range of climatic conditions, bears the fruit which can be hardly stored for more than 3-4 days, under ordinary conditions. But most fruits contain high amount of moisture and nutrients, and as such they have very short shelf life. They are therefore susceptible for various decay due to physiological and microbial activities. According to Adarsh (2005), because they are perishable in a short time, that is, rapid degradative metabolism, they are a major problem in long distance transport and marketing. Bio-preservation, which is a means to extend storage life and enhanced safety of foods, may be the only
way the vegetables and fruits may be preserved, because bio-preservation uses plant products which have antimicrobial properties. But this could be a costly affair, nevertheless.

2.13 Markets and Price Behaviour

The seasonal fluctuations in the potato market and the existence of cycles were worked out in their periodicity, using time-series data relating to arrivals and prices collected from four major potato markets in the Punjab, India (Jain and Kaul, 1980). In the case of two markets (Ludhiana and Pathankot), the data related to the years 1961/62 to 1975/76 while in the case of Jallandar and Hoshiarpur markets, the data related to the years 1963/64 to 1975/76. A multiplicative model of the time-series was used to analyze the trend, seasonal and cyclical variations in prices and arrivals of potatoes. The analysis showed the instability of price in the markets. There was an upward trend in prices but with large fluctuations in any given year. Analysis of cyclical variations confirmed the fluctuations in prices as it gave a three-year cycle period in potato prices.

Mundinamani et al. (1999) employed orthogonal polynomial regression to analyze the trends in arrivals and prices of groundnut in selected markets, in Karnataka. The trend in the pattern of arrivals of groundnut in the markets was mixed and that of prices was almost identical. As far the price trend pattern was concerned, a continuous upward movement was seen in all the markets without any exception. This was mainly caused by increase in population leading to an increase in demand for edible oils, general inflationary pleasure and failure of production of groundnut to keep pace with the expanding demand for their products. In case of seasonality in arrivals and prices, higher indices of market arrivals of groundnut were noticed immediately after harvest in almost all the markets. Thus, high indices were found during October to January in respect of rain-fed crop and April to September in respect of rabi / summer crop. In respect of prices and indices of groundnut, lower values were observed during peak arrival months and higher values during lean arrival months of March and August in Bijapur, Talikoti and Gadag markets. However, in Raichur, Ranebennur and Gangavati markets, such pattern was not noticed.

Mali et al. (1999) analyzed the trends in arrivals and prices of vegetables (tomato and lady’s finger) in Pune regulated market during 1978-79 to 1996-97. The
coefficient of variations in arrivals (56 per cent to 80 per cent) and prices (40 per cent to 80 per cent) of tomato were higher than the variations in arrivals (27 per cent to 60 per cent) and prices (49 per cent to 75 per cent) of lady’s finger. The compound growth rate of arrivals (2.11 per cent) and prices (1.02 per cent) and both the vegetables were significant during the same period and prices of both vegetables showed increasing trend indicating the good integration of Pune regulated/vegetable market.

Another study was undertaken with the twin objectives of examining the variability pattern of market arrivals and prices of selected vegetable crops (cabbage, cauliflower, tomato and peas) in metropolitan markets of Delhi, Mumbai, Bangalore and Kolkata and analysing the relationship between market arrivals and prices (Kumar, Sharma and Singh, 2005). The study was based on market arrivals and wholesale prices of different vegetable crops collected from the Azadpur market of Delhi and Agricultural and Processed Food Products Export Development Authority (APEDA), New Delhi, for the period 1990-2001. The study has shown that the extent of variability in the arrivals of cabbage was lower in Bangalore and higher in Mumbai. The prices were relatively stable in Mumbai but were more volatile in Bangalore. There was broadly a similar pattern in the price variability across different months in Kolkata and Delhi markets. For cauliflower, the variability in the market arrivals was more pronounced in Kolkata than the remaining three markets. The price variability was, however, more marked in Delhi. The extent of variability in the market arrivals of tomato across different months was very high in all the four markets. Likewise, while the maximum variability in the prices of peas was noted for Delhi, these were relatively less marked in Bangalore. The results of the study confirmed the negative relationship between market arrivals and prices in terms of correlation coefficients over the years and across months in all the four metropolitan markets, though there were several instances of positive relationship.

2.14 Marketing Margins

The explicit evaluation of the post-harvest losses at different stages of marketing and their impact on farmers’ net price, marketing costs, margins and efficiency have been presented in Murthy et al. (2007) in a case study on banana in Karnataka. It has been found that the existing methods tend to overstate the farmers’
net price and marketing margins of intermediaries. In fact, the margin of the retailers’ after taking into account the physical loss during retailing has been found to be negative (loss), which otherwise, was positive (profit) in the conventional estimation. Similarly, the producers’ net share and wholesalers’ margins also decrease substantially. It has been shown that marketing efficiency is inversely proportional to the marketing losses. The co-operative marketing has been found to be a more efficient system in terms of both operations and price. Marketing cost has been identified as the major constraint in the wholesale marketing channel and bringing down the costs, particularly the commission charges as demonstrated in the co-operative channel, will help in reducing the price-spread and increasing the producers’ margin. The need for specialized transport vehicles for perishable commodities has been highlighted.

The losses at different stages of handling banana, namely, field, transit, ripening, wholesale, and retail were estimated for the wholesale and cooperative marketing channels, as banana was marketed mostly through these two channels. The post-harvest losses were as high as 28.8 per cent in the wholesale channel, comprising 5.5 per cent at the field and assembly level, 6.7 per cent at the wholesale level and 16.7 per cent at the retail level (Murthy et al., 2007).

### 2.15 Marketing Channels

According to Murthy et al. (2007), the following are the marketing channels in operation specific to fruits and vegetable marketing in the state of Karnataka:

- Channel 1: Farmers Pre-harvest Wholesalers-Retailers-Consumers and contractors;
- Channel 2: Farmers’ Wholesalers-Retailers-Consumers;
- Channel 3: Farmers’ Wholesalers Consumers; and
- Channel 4: Farmers’ Co-operative Society Consumers (wholesaling and retailing).

In a study purporting to investigate how alternative supply chain management practices adopted by leading supermarkets engaged in fresh fruit and vegetable marketing in Sri Lanka impact on the performance of the supply chain, Abeysekera and Abeysekera (2006) investigated the on-going changes in the supply chain using information from leading supermarkets and related players. The information shed light on how the new supply chain management policies and procedures affected the
cost structures, long-term profitability and organizational viability of the system. The emergence of supermarkets over the last decade or so had profoundly influenced Sri Lanka’s fresh fruit and vegetable marketing system, and the trend was expected to continue into the foreseeable future. The efforts of profit-motivated supermarket giants to sustain a very competitive market had altered traditional production and marketing channels. Evidence suggested that the supermarkets were competing to adopt a range of management strategies to offer quality products, a wider choice, reduced wastage, greater value for money and shorter, but more effective supply chains. The impact of supermarkets on global and local supply chains, and its implications for actors in the supply chains had received much attention.

This research study utilized standard performance measures to compare performance of competing supply chains including: (i) satisfaction of stakeholders (supermarkets); (ii) price performance (profitability); (iii) labour employment; and (iv) efficiency (price stability, timely delivery of orders, quality management). Information was collected through a series of interviews with the appropriate personnel in the supermarkets concerned and their supply chain partners.

The explosive growth of supermarkets in Sri Lanka had profoundly influenced the fresh fruit and vegetable marketing system, and the trend is expected to continue into the future. Continuing efforts by the supermarket chains to maintain their position in a very competitive market had altered the traditional production and marketing channels in Sri Lanka. The study indicated that the influence of the supermarkets had brought about major improvements in the quality of fruit and vegetables. The study suggested that the supermarkets were adopting a range of management strategies such as the establishment of out-growers, reduction in waste, and improved transportation and storage, to offer superior quality produce to consumers, to give them a wider choice, uninterrupted supply and greater value for money. Efficient management of supply chains and closer co ordination from the farm-gate to the consumer had a strong influence on the future welfare of the consumer and everyone else involved in the fresh produce industry in Sri Lanka.

There are several studies which examined the patterns of price behaviour (for example, Selvaraj and Krishnamoorthy, 1991), the existence of market channels, nature of price spread and the relationship between market arrivals and the price of
potato based on data collected from a sample of 10 commission agents, 10 wholesalers and 10 retailers in the Nilgiris district of Tamil Nadu. The role of cooperatives in marketing was investigated using the Nilgiris Cooperative Marketing Society (NCMS) at Mettupalayam Market Centre. Two important channels for potato marketing were found, namely Channel 1 (producer-NCMS-wholesaler-retailer-consumer) and Channel 2 (producer-mandies-wholesaler-retailer-consumer). It was observed that channel 1 was more efficient. The price behaviour analysis showed wide annual and seasonal fluctuations in prices, in this channel as well.

2.16 Cooperatives and Marketing Infrastructures

The Federal Government of India provided assistance for the creation of infrastructure and facilities for marketing, which also includes the construction of warehouses. A network of co-operatives at national, state and producer levels operates to help farmers and traders by providing access to inputs and services, and assistance with the sale of produce. The National Cooperative Development Corporation (NCDC) is an apex institution, which formulates policies for marketing, storage and production, and for the export and import of agricultural produce through cooperative societies. The NCDC had provided Rs. 799.7 million for setting up 248 cold storages with an installed capacity of 739,000 tonnes by the beginning of 1996. The National Agricultural Cooperative Marketing Federation of India Ltd (NAFED) is an apex cooperative organization dealing in the distribution, procurement, and export and import of selected agricultural commodities (Rao, 2006: 18). NAFED is a central nodal agency tasked with providing price support for pulses and oilseeds. It also provides market intervention in support of horticultural products such as potatoes, onions, grapes, kino/malta, black pepper, red chilli and others. The turnover of NAFED for 1996/97 was Rs. 9,360 million. The marketing of agriculture produce through cooperatives had seen remarkable growth from a value of Rs.19,500 million in 1980-81 to Rs. 95,040 million in 1994-95 (that is, > 4-fold). Other organizations in the cooperative sector are the National Cooperative Tobacco Growers Federation Ltd, the National Consumers Cooperative Federation (NCCF) and the Tribal Cooperative Marketing Development Federation of India Ltd (TRIFED). TRIFED caters specifically to the marketing requirements of people in the tribal areas.
2.17 HOPCOMS and Socio-Economic Change

A study of member-producers of HOPCOMS in the city of Mysore has shown that HOPCOMS has had brought about a socio-economic change in their midst because 80 per cent of the farmers have benefitted from HOPCOMS when compared with other organized retail organizations, and 71 per cent of the farmers have also strongly agreed to HOPCOMS paying fairer prices to farmers and without the intermediary of middlemen for their products (Chandrashekar, 2011b). Direct farmer-HOPCOMS marketing reduces marketing costs and capture profits attributed to intermediaries (middlemen) in the supply chain and capitalizing on the desire of consumers to buy and their willingness to perhaps pay a premium for riper, fresher and higher quality fruits and vegetables (see Hall, 2009). This in itself is a sure means of bringing about a socio-economic change in the midst of farmers.