BUSINESS ANALYSIS OF LOGISTICS FOR FRUITS AND VEGETABLES IN ORGANIZED RETAILING

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in

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Affectionately Dedicated

to my beloved Father

Mother

and my Guide

DEPARTMENT OF AGRICULTURAL MARKETING, CO-OPERATION AND BUSINESS MANAGEMENT
UNIVERSITY OF AGRICULTURAL SCIENCES
G.K.V.K., BANGALORE-560 065

CERTIFICATE

This is to certify that the Project Report entitled, "**Business Analysis of Logistics for Fruits and Vegetables in Organized Retailing**" submitted by **Mr. Suresh Kumar, C., ID No. MBA725** in partial fulfillment of the requirement for the degree of **Master of Business Administration (MBA) in AGRI BUSINESS MANAGEMENT** to the University of Agricultural Sciences, Bangalore is a record of research work done by him during the period of his study in this University under my guidance and supervision and the Project Report has not previously formed the basis of the award of any degree, diploma, association ship, fellowship, or other similar titles.

BANGALORE
June 2009

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ABSTRACT

The project work entitled "Business Analysis of Logistics for Fruits and Vegetables in Organised Retailing" was conducted in Bangalore city during 2009 with the sample size of 70 respondents, including 30 producer-members, 10 non members and 30 consumers drawn randomly from Bangalore urban and rural district of Karnataka. Tabular and statistical analyses were used for the study. HOPCOMS procure on an average 110 tons of fruits and vegetables from farmers (80 %) and open market (20 %). Majority of farmers are supplying only vegetables (90 %) to HOPCOMS. With respect to consumers, nearly 37 percent are purchasing daily. HOPCOMS is incurring (8 to 10 %) as logistic cost out of its total cost due to poor management. No scientific handling of fruits and vegetables at godown due to lack of facility and also due lack of exposure to modern methods of storage by employees. The vehicles owned by HOPCOMS are not used optimally while transporting the produce from procurement centres to godown and also to retail units in high logistic cost. Besides, HOPCOMS vehicles are very old, hence cost of operation is high due to frequent repairs and also due to less mileage. The study suggests that HOPCOMS need to use scientific grading practices, use of cold storage units and replacement of old vehicles to minimize the losses also to increase the efficiency of logistics. Further there is a need to procure vegetables only from farmer-members through procurement centres to encourage members to bring quality graded produce and appointment of professional managers for efficient performance of HOPCOMS.

Signature of the student

(B. M. Shashidhara)
Major Advisor

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Introduction

CHAPTER I
INTRODUCTION

India is the largest producer of fruits and vegetables in the world (12 % of fruits and 13 % of vegetables). India now ranks first in the world in the combined production of fruits and vegetables. Out of 370 million tons of fruit production, the share of India is about 30 million tons. Similarly out of 450 million tons of vegetables production, the share of India is about 59 million tons. India is the largest producer of Mango and Banana in the world (with a share of 54 % and 27 % respectively). In respect of other fruits India has occupied fifth position in Pineapple (with a share of 7 %), sixth in Orange (with a share of 3.4 %), tenth in Apple (with a share of 2.2 %) in the world production (Annexure I). Among the vegetables produced in the world, India occupies first position in Cauliflower and Brinjal (with a share of 37.7 % and 67 % respectively), second in Onion (11.1 %), third in Cabbage (7.3 %) and ranks sixth in Potato (6.1 %) production.

In India horticultural crops are mostly labour intensive and provide substantial employment not only in production but also in transportation, processing and marketing (Sharma 1991). The marketing of horticultural crops is quite complex and risky due to perishibility, seasonal production and bulkiness. Apart from increasing production and productivity of fruits and vegetables, it is very important to supply fruits and vegetables to consumers regularly at a reasonable price. There has been great concern in the recent years regarding the efficiency in marketing of fruits and vegetables in India. It is believed that poor linkages in the marketing channels and poor marketing infrastructure are leading to high and fluctuating consumer prices, and only a small proportion of the consumer rupee reaching the farmers (Kaul 1997, Ashturker and Deole 1985). There is also substantial wastage,

deterioration in quality, and frequent mis-match between demand and supply spatially and over time (Subbanarasiah 1991, Singh et.al. 1985). One of the most important challenges in organized retail in India is poor supply chain and logistics management. This can be understood by the fact that the logistics management cost component in India is as high as 7 to10 percent against the global average of 4 to 5 percent of the total retail price. Therefore, there is a need to reduce logistics cost by improving the supply chain and logistics management by organized retail chains and also by institutions like cooperatives who are involved in organized retailing of fruits and vegetables in the country.

1.1 Meaning of Logistics

The term "logistics" originated from the Greek word "*logos*" which means ratio, word, calculation, reason, speech, and oration. Logistics is the management of the flow of goods, information and other resources, between the points of origin to the point of consumption in order to meet the requirements of consumers. Logistics involve the integration of information, transportation, inventory, warehousing, material handling and packaging. Logistics Management is conventionally defined as the process that ensures the delivery of the right product at the right place at the right time in right quantities to its customers. Normally when logistics management is talked about, the entire supply chain is considered, from the procurement of raw material to the delivery of finished goods and services to customers. Logistics management is that part of the supply chain which plans, implements and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customer requirements.The important components of logistics system include customer service, demand forecasting, distribution, communications, inventory control, material handling, order processing, parts and service support, location analysis,

purchasing , packaging, return goods handling, salvage and scrap disposal, traffic and transportation, and warehousing and storage. In a small retail organisation logistic management may involve of these, but in a large corporation logistic management involve all the above systems.

In business, logistics have either internal focus (inbound logistics), or external focus (outbound logistics) covering the flow and storage of materials from point of origin to point of consumption. The main functions of a logistician include inventory management, purchasing, transportation, warehousing, consultation and the organizing and planning of these activities. Logisticians combine a professional knowledge of each of these functions so that there is a coordination of resources in an organization.

1.2 Emergence of supply chain and logistics in fruits and vegetables

India is among the largest producer of food grains, fruits and vegetables in the world. India is bestowed with varied agro-climate conditions, which is highly favorable for growing horticultural crops. At Present, horticultural crops occupy around 13 per cent of India's gross cropped area, producing 177.41 million tons during 2005-06. Fruit and vegetable production in the country is about 140 million tons which is about 24 percent of global output. The total production of fruits has been estimated at 52.85 million tons from an area of 5.34 million hectares and the production of vegetables has been estimated at 108.20 million tons from an area of 7.05 million hectares during 2005-06. However 40 to 45 percent of Fruits & Vegetables are wasted before it reaches the consumer. Wastages in the supply chain are estimated to be about 9.8 per cent of GDP in agriculture. The wastage of fruits and vegetables in the country is higher than the entire annual consumption of UK. One of the main reasons for this is presence of many channels and the lack of

adequate transportation and storage facilities. In India by improving supply chain management practices, there is a scope to reduce wastages in fruits and vegetables which in turn will benefit both the farmers as well as the consumer by means of increased returns and decrease in price respectively. Given the fragmented nature of the food supply chain, few companies have access to capital and the ability to invest in supply chain and quality control. They also set quality standards, establish warehouses, and minimize spoilage, set up cold chains to ensure reliability and maintain inventory control to reduce waste. The present trend is towards greater concentration on agricultural input and food distribution, through increasing role of information and logistics management. Agri-food systems have become highly organized and linked from producer through consumer with an increasingly dominant role being played by highly concentrated agro-industrial firms and retailers. The most notable change is the rapidly changing food distribution systems worldwide. The key indicators of the changes in agribusiness food system are:

- Establishment of modern retail outlets such as supermarkets, hyper markets, Departmental stores, fast food services etc.
- Increasing vertical partnerships and horizontal alliances.
- Greater market segmentation.
- Availability of range of goods at market.
- Aggressive brand promotion and marketing.
- Strong presence of Multinational Corporations (MNCs) in processing and retailing.
- International purchasers/agents.

Successful participation in global markets requires efficient organization of agri-food system in the country. In parallel to these interrelated trends, a new type of organization and management in agri-

food system - supply chain management (SCM) has emerged in developed countries. With the rapid economic growth, the increasing urbanization, and accelerated integration into the world market, the similar trends have been observed in many of developing countries like Latin America and South East Asia. The quest for a more efficient supply chain organization has been considered by many as a driving force for the future growth of agri-food industries in developing countries. In the future, it will no longer be company competing with company, but supply chain competing against supply chain.

1.3 Importance of Logistics

Logistics is the one important function in business today. No marketing, manufacturing or project execution can succeed without logistics support. For companies, 10 per cent to 35 per cent of gross sales are logistics cost, depending on business, geography and weight/value ratio. Logistics is comparatively a new term, but not the operation. Logistics has existed since the beginning of civilization. Raw material and finished products have been transported from place to place, country to country on a small scale. Things began change with the advances in transportation. The population began to move from rural to urban areas particularly to business centers. The geographical distance between the production point and consumption point increased and as a result logistics gained importance. Since the early 1990's, the business scene has changed. The liberalization, privatization and globalization, the free markets and the competition among companies has created an opportunity for the customer get the right material at the right time, at the right point and in the right condition at the lowest cost.

One of the most important challenges in organized retail in India is poor supply chain and logistics management. In India, with demand for end-to-end logistics solutions far outstripping supply, the logistics

market is gaining momentum and for organized retail is at present valued at $50 million and is growing at the rate of 16 percent and it is expected to reach $120-$130 million by 2010. Besides organized retail is also growing at the rate of 400 percent and is expected to reach around $30 billion by 2010. The supply chain management is logistics aspect of a value delivery chain. It comprises all of the parties that participate in the retail logistics process Manufacturers, Wholesalers, and Third Party Specialists like Shippers, Order Fulfillment House etc. and the Retailer. The logistics is the total process of planning, implementing and coordinating the physical movement of merchandise from manufacturer to retailer to customer in the most timely effective and cost efficient manner possible. Logistics regards order processing and fulfillment, transportation, warehousing, customer service and inventory management as interdependent functions in the value delivery chain. It oversees inventory management decisions as items travel through a retail supply chain. If a logistics system works well, the retail firm reduces stock outs, hold down inventories and improve customer service.

Logistics and Supply Chain enables an organized retailer to move or store products more effectively. Efficient logistics management not only prevents needless movement of goods, vehicles transferring products back and forth but also frees up storage space for more productive use. The efficiency and effectiveness of supply chain and logistics management can also be understood by the fact that modern retail stores maintain lower inventories than traditional retail. In India, generally in the kirana stores, inventories are kept for a period of three weeks while in a modern retail store, its nine days to less than two weeks. Hence it is beneficial for both the manufacturer as well as the retailer. The supply chain perspective can help the retailers to identify superior suppliers and distributors and help them improve productivity, which ultimately brings down the customers costs. At the same time,

Market logistics helps in planning the infrastructure to meet demand, and implementing and controlling the physical flows of material and goods from point of origin to points of use, to meet customer requirements at the lowest cost.

1.4 Horticultural Producers Cooperative Marketing Processing Society Limited (HOPCOMS)

HOPCOMS initially started as 'Grape Growers' Marketing and Processing Co-operative Society 1959, under the guidance of Dr. M.H. Mari Gowda, the then Director of the Department of Horticulture. The main objective of HOPCOMS was to encourage grapevine cultivation by providing necessary inputs, technical knowhow and marketing facilities to grape farmers. The jurisdiction of the HOPCOMS included Bangalore, Kolar, Mysore, Tumkur, Mandya and Mangalore districts. Since grape was a seasonal fruit, the society started handling all types of fruits and vegetables from 1965, and as a result the nomenclature of the society was changed as Horticultural Producers Co-operative Marketing and Processing Society Ltd. In 1997 district level HOPCOMS were formed as independent units. Consequently in 2006 the area of operation of HOPCOMS was reduced to three districts i.e. Bangalore urban, Bangalore rural and Kolar as its area of operation. Besides in remaining districts independent HOPCOMS were organized. At present HOPCOMS in addition to supplying fresh fruits and vegetables through its retail outlets it also undertakes the processing activity of grapes.

In Bangalore selling produce in the HOPCOMS is influencing the consumption of fresh produce. Hence the management of the supply chain of the fresh produce in the HOPCOMS should include two aspects: one is the management of the logistics of fresh produce, including the development and management of different varieties, implementation of criteria, supervision of quality, packing, transportation, storage,

processing and distribution; the other is the management of the relation and organization, including the selection of suitable logistic channels and partners, determination of contracts, allocation of added value, and maintenance of long-term partnership and smooth running of the supply chain.

1.5 Need for the study

Fruits and vegetables are highly perishable in nature and efficient management of logistic and supply chain management is a prerequisite for reducing wastages in fruits and vegetables. HOPCOMS is unique cooperative organization for marketing of fruits and vegetables in the state. Hence supply chain and logistics management through proper planning, in HOPCOMS can play a critical role in improving the efficiency of organization. This study is intended to examine issues relating to logistics and supply chain management in HOPCOMS and to serve as a blue print to improve the efficiency in day to day operations by reducing the cost of operation and increasing the income and also to supply fruits and vegetables to consumers at a reasonable price.

1.6 Objectives of the study

The study aims at evaluating the logistics aspects of the HOPCOMS. For this purpose, Horticulture Producers Co-operative Marketing and Processing Society Limited (HOPCOMS), Bangalore was selected for the study with the following objectives

1. To study the logistic structure for fruits and vegetables in retail chains.
2. To identify the factors influencing selection of logistics system for fruits and vegetables.
3. To examine the constraints in the present logistics structure.
4. To design suitable logistics system for fruits and vegetables.

1.7 Limitations of the Study

The data pertaining to procurement, logistics and distribution of fruits and vegetables of HOPCOMS was drawn from records available from different sources. However the secondary data available from HOPCOMS was not sufficient to realize the objectives of the study particularly in respect of logistic management. This is one of the serious limitations in conducting this study. With respect to primary data collected from farmers, consumers and officials of HOPCOMS were restricted to Bangalore urban and rural district. Hence the results drawn from the study are subject to the limited area covered under the study. The interview method of data requires respondents to recall details about crops grown, place of sale, cost incurred in transportation, mode of transportation, wastages during transportation and harvesting practices. The information provided is subjected to memory lapses of the respondents. Hence it would to be difficult to draw precise generalization regarding the implications of the study. The findings in this study, interpretations and conclusions drawn could be best seen with in these limitations.

Review of literature

CHAPTER II

REVIEW OF LITERATURE

A review of past research studies helps in identifying the conceptual and methodological issues relevant to the study. This will enable the researcher to collect relevant data, analyze and interpret the same so as to draw meaningful interpretations. This chapter attempts a brief review of the relevant studies related to the present study. Keeping in view the objectives of the study, reviews are presented under the following headings.

2.1 Cooperative marketing of fruits and vegetables

2.2 Supply chain Management and Logistics

2.3 Transportation model

2.1 Cooperative Marketing of Fruits and Vegetables

The Studies on marketing includes marketing channels, fruit and vegetables sold future opportunities, marketed surplus, consumer preferences, tools of promotion, etc.

Mc Million (1959) studied fruit and vegetable bargaining cooperatives in Washington and indicated that the rapid growth and development of fruit and vegetable bargaining cooperatives reflects an attempt by growers to maintain and improve their bargaining position. A bargaining cooperative's effectiveness lies in its ability to be able to negotiate for a large proportion of the total tonnage, base decisions on reliable economic and market information, obtain competent management, carryout an effective membership relations programme and develop an attitude of long run industry improvement rather than short run price movement.

Sharma and his coworkers (1964) investigated about the awareness of facilities available to members of industrial cooperatives and indicated the existence of high awareness regarding financial assistance as compared to low level of awareness about organizational, technical and marketing facilities. This was probably due to the fact that all were practically unanimous about giving top most priority to meet financial needs than other needs

Tewari and George (1971) conducted an opinion survey on marketing of Agricultural produce through cooperative marketing societies in Punjab and Haryana states and investigated the factors influencing farmers choice of special agencies to dispose of the study covered producers, sellers, traders and cooperative marketing societies in the jurisdiction of 11 regulated markets. It was found that (a) private agencies had an edge over cooperative marketing societies, (b) cultivation did not sell all their produce through cooperatives, even though they were members and (c) private traders success as compared to the cooperatives was due to the additional facilities they provide such as clean loans, free storage, transport, supply of consumer goods and farm inputs on credit, personal relations and hospitality.

Bhale Rao and Viswanth (1972) studied cooperative marketing of fruits and vegetables and highlighted the weaknesses of the societies in marketing of fruits and vegetables which will have to be expeditiously removed if they have to create a significant impact on producers. An intensive membership drive will have to be launched to enroll majority of the fruits and vegetables growers as their members. They advocated state partnership by contribution to share capital as well as loans and subsidies for management, storage, transportation and processing equipments.

Boulet and Laporte (1974) studied the structure of viticultural enterprises and cooperative action and pointed out the weaknesses of the cooperative movement and the influence of the cooperatives on production structures. The two main consequences were the continuation of small scale farming and the development of part time farming

Ananth (1984) in his study on business performance analysis of Bangalore Grape growers marketing and processing Co-operative Society in Bangalore opined that the society had a sound financial structure and therefore, it could grow w further by augmenting its infrastructural facilities like transportation and storage facilities.

Dave Dyer (1988) reported that advertising and promotion boost consumption of dairy products, helping both the farmers and the consumers. He cautioned that promotion shall be cost effective. Mandatory participation by all milk producers in national promotion programme, with a promotion check to know the effect of promotion would result better. He suggested one should not increase the funds for promotion unless the evidence of increase in sale due to measures are obtained

Nagaraj *et al.* (1989) in their study on evaluation of the performance of Karnataka Agro Fruits Ltd. Bangalore noted that almost all the fruits except mango were procured through Horticultural produce Co-operative Marketing Society (HOPCOMS). The mango was purchased directly from the producer farmer

Mattigatti *et al.* (1992) analyzed the marketing of milk in Dharwad district and found three channels of milk marketing by milk producers. The most effective channels were through cooperatives where the

producer received the highest share in consumer rupee. The study also revealed that cooperative paid higher price.

Tilekar *et al.* (1992) who analyzed the marketing efficiency of vegetable cooperative marketing societies in Ahmednagar district of Maharashtra found that, the marketing efficiency index for the non-member who sold the vegetables through cooperative marketing societies in the same market. They concluded the cooperative marketing societies operate were efficiently than other agencies in marketing the vegetables

Ray Chaudhuri (1993) reported dairy plant was concerned with the management of transportation, processing or converting a set of inputs into a set of output. He defined the plant management in cooperative milk union as unique competencies and has control over manpower, productivity, and engineering, management of information system, accounts, market and quality control. He suggested eliminating the middlemen to satisfy both producer and consumer. He recommended to have field visits to have feel about consumers, conduct market survey, introduce new milk products, maintain crate and can accounts and aerated truck sheet for polypouch distribution.

Subramanyam *et.al* (1993) the economics of juice preparation in HOPCOMS worked out by Subramanyam (1993) indicates that, it costs about Rs. 1.26/bottle (200ml) of juice and at Rs. 2/bottle, as in being priced, the society earns a profit of 74 paise per bottle i.e., 37 per cent. This shows that it is profitable to take up simple processing of fruits on a large scale and sell through the retail outlets

Subramanyam *et al.* (1994) conducted a case study of horticultural produce cooperative marketing and processing society, Ltd (HOPCOMS) Bangalore during 1987-88 to 1992-93, to assess the sales performance of the society. It is observed that the progress of sales during the last six

years (1987-88 to 1992-93) of the items handled by the society viz., sales of fruits and vegetables and inputs. It may be observed that fruits and vegetables accounted for over 88 percent of the total sales and there was more than two folds increase in the sales of fruits and vegetables between 1987-88 to 1992-93 registering an annual growth rate of 22 percent. Similarly the sales of inputs which accounted for 8-10 percent of the total sales was sales registered an impressive compound growth rate of 25 percent.

Sharma *et al*. (1995) studied marketing of vegetables in Solan district of Himachal district cooperative growers to study the problems of cultivators during storage, transportation and marketing of these crops. They pointed out some of the major problems like costly wooden boxes, time consuming manual grading. Distant markets, high transportation charges, mal practices in the market and lack of market information. it was observed that 90 percent of growers were facing the problem of distant market, lack of standard grade was reported by about 37 percent of cultivators and costly packing material was reported as a problem by 75 percent of cultivators. It was thus suggested that the market information should be announced through mass media like radio/TV and also through pamphlets.

2.2 Supply Chain Management and Logistics

Wilson (1996) in his study on supply chain of perishable products in Northern Europe found out that, the supermarket chain was more important in the retail marketing of fresh products and he suggested that increased use of supply chain management techniques could increase the margins of the innovative and competitive firms that remain in the chain. Also he found that the inherent cost of distribution networks and channels of fresh produce could be reduced substantially by using supply chain management. The fruit and vegetable supply chain has

traditionally been fragmented. Some links have performed well but others have caused bottle necks.

Mohamed Zairi (1998) in his study on the best practices of supply chain management in retail sector noted that the retail sector is undergoing major changes resulting from factors such as increased competition and tighter profit margins. He found out that integrated management through the extended supply chain is the most effective means to achieve good value provision to the end consumer, which can be achieved through better product, better quality, better assortment and better in-stock service, less cost throughout the chain, accurate and timely information and committed business leaders.

Fearne (1999) in his study found that super market strategies, food safety legislation and supply chain intensity, rationalization of the supply base and innovation are the four key driven the transformation of the fresh produce industry of UK. Under super market strategy he found out that own label products accounted for closely half of all foods purchased in the UK super market. Changing the location of fresh produce within the retail store yielded 50 per cent increase in their fresh produce sales. The search for improved supply chain integrity and greater consistency in the quality of fresh produce coupled with the need to squeeze the cost out of the supply chain, through greater control has resulted in the rationalization of supply base, with retailer seeking the deal with few numbers of larger, technically efficient and innovative suppliers.

Ricks (1999) in his study revealed that the appropriate combination of vertical coordination arrangements like contracts, informal agreement and joint venture can improve supply chain performance by providing adequate supplies to the shippers from packers and growers, aiding standardization and packaging of fruit products and risk sharing between the shippers, packers and growers

Allen (2000) in his study on the supply chain management and logistics of past and future noted that in the future, supply chains and not firms will compete for dominance. He also concluded that retailers have a large role to play in any supply chain because of their closeness to the consumer and their access to buying data.

Fearne (2000) in his study on supply chain partners for private label products: Insight for the UK, found that power of retailer increases along with their interest on own label products. So they become increasingly dependent on fewer larger suppliers who can deliver safe products on a large scale at a competitive price. He suggested that farmers and growers should directly link with other sector of the marketing chain in order to supply the right and consistent quantity and quality of different products. The producer of raw material need to accept the fact that the financial benefit, which comes from partnership will invariably distributed in relation to value added.

Helen (2000) in his study on "Buyer-Supplier relationships in the UK fresh produce industry" found out that the relationship development in fresh produce retailing is dependent on product, service performance, levels of trust and commitment. The average life expectancy of relation measured was 8 years and one third of relationships were more than 10 years. Both the suppliers and retailers gain more profit if they attain a mature supply chain stage.

Ricks (2000) in his study revealed that the important area of need for fruit industry supply chain is consistent but not excessive supply of products to meet the market demand. This involved the supply of products balanced with demand in the same seasonal years and over a period of several years.

Mc.Cluskey and Desmond O'Pourke (2001) studied the relationships between produce supply firms and retailers in the food supply chain and noted that both suppliers and retailers agreed that logistical efficiency was a must in order to achieve the required results. Thus they had realigned their warehouses and distribution centers to reduce inventory and to speed up delivery.

Champion (2002) in his study on alternative marketing system for the apparel wool textile supply chain filling the communication vaccum found that in a vertical coordinated supply chain fragmentation is essential and inherent and that rather than causing confusion, it is central to the building relationship with the chain. The aspects of improved communication and the drivers of the customer value inherent in supply chain management could be used effectively in the wool supply chain.

Ricks (2002) in his study revealed that the important area of need for fruit industry supply chain is, consistent but not excessive supply of products to meet the market demand. This involved the supply of products balanced with demand in the same seasonal year and over a period of several years.

Wermed *et.al* (2002) in their study on "Key challenges facing the cherry supply chain in the U.K" found out that irregular cropping, specification of export countries, high investments costs are the key challenges faced by the growers. Irregular cropping pattern, too many sales desks, lack of response in terms of uniform marketing strategies, lack of cooperation with the retailers and growers are the key challenges faced by marketing agents. Unreliable supply, customer pay premium are the challenges faced by the retailers and finally differences in purchase and consumption behavior are the key challenges faced by the consumers in the UK cherry supply chain.

Prasad (2003) in his study on "Growing Scenario of Retail Marketing" found that retail organizations have grown in size dramatically, especially in fruits and vegetables. They are benefited by the economies of operation and efficient scale of operations

Subha (2004) examined the "ways of managing a supply chain" and reported that the requisites to manage a supply chain were creation of a logistics vision, tackling conventional problems and developing a supply chain. The author also indicated that open communication between supply chains partners would help in better management of supply chain.

B S Sahay and Arun K Gupta (2005) in their study "Managing supply chain in FMCG sector in India" found out that the FMCG sector which has higher volume and vast network ranks the highest in cost of material and logistics. On an average transportation costs accounted for 6.78 percent of total supply chain cost. Storage and warehousing accounted for 3.86 percent. They also found out that the Indian FMCG companies carry a total of 26.09 days of inventories as raw materials, 4.4 days as work in progress goods, 6.0 days of goods in transit and 13.25 days of finished goods.

J. Suresh Reddy (2005) in his study revealed that supply chain management showed a way to cost minimization and value optimization all along the chain, starting from the customer order to the delivery of goods to him. It involves coordinated management of material, information and manpower in the entire process within a organization. Managing was found to be the effective method to reduce operational costs and increase customer satisfaction.

Suresh Reddy (2005) in his study "Supply chain management" shows a way to cost minimization and value optimization all along the

chain. It involves coordinated management of material, information and man power in the entire process within an organization. Supply chain management helps organizations through cost reduction and service enhancement.

2.3 Logistics Model

Stollsteimer (1963) worked out the models for ware house locations. A model was presented with certain restrictions and it permits the determination of the number, size and location of the warehouse which minimizes the combined cost of assembling and processing of any given total quantity of raw material produced in varying quantities at scattered production points. The model in essence, is an extension of basic linear programming transportation model to solve for the number, size and location that minimizes combined plant and transfer costs. The model appears to be adoptable to a wide range of empiric analysis which involved determinations either with respect to the assembling and processing of raw materials or in the manufacture and distribution of finished goods.

Trychniewics and Tosternal (1973) put up a model for rationalizing the Canadian grain transportation and handling system on region basis. In this study collection, handling and distribution (CHAD) simulation model was used which was modified Stollsteimer location model. Here trains were used for grain transportation. The CHAD simulation model abstained from the effect of certain institutional constraints. Introduction of alternative point system made it extremely difficult to measure the impact of rationalization of farmer's collection costs.

Kumbhare and Sirohi (1981) designed an application of linear programming in transportation and storage of wheat. The linear programming model aimed at minimization of costs of transportation and

storage both in surplus and deficit areas subject to quantity balancing equations and existing railway transportation constraints. The study revealed that the storage space requirements were directly related to assumed level of initial stacks and storage space needed to be larger in surplus states to minimize the transportation and storage costs.

Methodology

CHAPTER III

METHODOLOGY

The study was carried out to know the logistic structure for fruits and vegetables in HOPCOMS. This chapter presents a brief discussion on the methodology used in the study under the following headings.

3.1 Selection and description of the study area

3.2 Description of study unit

3.3 Sampling procedure

3.4 Collection of data

3.5 Analytical techniques and tools employed

3.1 Selection of the study area

Bangalore, the capital city of Karnataka was selected purposively for the study, as it is one of the fastest growing metropolitan and is highly cosmopolitan in nature with people of different religion, caste, occupation, culture, speaking diverse languages and of different food preferences reside here. It is the IT and BT hub of India, with industrial estates and numerous financial and educational institutions with an immense potential for retail food outlets. Besides the present study aims at evaluating logistics aspects of HOPCOMS which is mainly operating in Bangalore city. Bangalore is located in the Deccan Plateau in southeastern Karnataka. It has an estimated population of 6.1 million, making it India's third largest city and fifth largest metropolitan area. Over the years, Bangalore has evolved into a manufacturing hub for public sector industries like aerospace, telecommunications, machine tools, heavy equipment, space and defense. The establishment and success of business software services firms in Bangalore after the liberalization of India's economy has contributed in great measure to the growth of India's information technology industry. Bangalore is referred

to as the Silicon Valley of India and accounts for 35 percent of India's software exports. Home to prestigious colleges and research institutions, the city has the second-highest literacy rate among the metropolitan cities in the country. Bangalore is also known as the Garden City of India because of its climate, greenery and the presence of many public parks, including the Lal Bagh and Cubban Park.

Bangalore is situated in the south-east part of Karnataka at an average elevation of 920 meters (3,018 feet). It is positioned at 12.97° N 77.56° E and covers an area of 2190 km^2. Bangalore District borders with Kolar District in the northeast, Tumkur District in the northwest, Mandya District in the southwest, Chamarajanagar District in the south and the neighboring state of Tamil Nadu in the southeast.

The highest temperature recorded is 39°C (102°F) and the lowest is 11°C (52°F). The wettest months are August, September and October; with a heaviest rainfall of 180 mm recorded in 24-hour period. It is the 3rd most populous city in India and the 27th largest city in the world by population. With a decadal growth rate of 38 percent, Bangalore is the fastest-growing Indian metropolis.

3.2 Description of study unit

HOPCOMS head office established at Bangalore covers Kolar, Bangalore rural and Bangalore urban districts under its jurisdiction. It has a membership base of 16,500 farmers as on 2007-08, who supply the vegetables to HOPCOMS, through five procurement centers. The produce is then marketed through 320 HOPCOMS retail units in different localities of urban Bangalore and 18 in rural Bangalore. The transportation of fruits and vegetables from procurement centre to godown and to distribution centre is done through 40 vehicles.

3.3 Sampling procedure

Bangalore was selected as the study area as this city was the hub of retail revolution and has different food retail chains operating from a long period of time. Also many new retail chains like Reliance fresh, Namadhari fresh, fresh @ including HOPCOMS have opened their outlets in the city and have made Bangalore as their focal point of their managerial operations.

3.4 Collection of data

3.4.1 Primary data

In order to find out the logistic structure and constraints for fruits and vegetables in HOPCOMS, the data was collected from 30 farmer-members and 10 non members who are supplying fruits and vegetables to HOPCOMS. The primary data collected from farmer-members of HOPCOMS the quantity of vegetables sold to HOPCOMS, reasons for selling at HOPCOMS, suggestion for improvement by using pre tested questionnaire. Further various aspects of procurement of fruits and vegetables, price and quality and distribution of fruits and vegetables were collected from the staff of HOPCOMS, procurement and supply chain manager, vehicle manager and Managing Director. Primary data regarding socio-economic characteristics like household size, age, income, education, expenditure, purchasing behavior, attributes influencing their purchase were collected by personally interviewing the respondents using a structured questionnaire which was pre-tested and redefined. The respondents were contacted individually and the objectives of the study were clearly explained to them to ensure their cooperation and accuracy in their responses.

Further about 30 consumers from Bangalore city who are purchasing fruits and vegetables from HOPCOMS outlets were

interviewed by using pretested questionnaire. The secondary data regarding logistics of fruits and vegetables were collected from HOPCOMS, Bangalore.

3.4.2 Secondary data

The secondary data about different activities of HOPCOMS was obtained from various sources like annual reports, financial statements, and other records provided by the society.

3.4.3 Period of study

The reference year of the study was 2008-09 and the collection of primary data was carried out during the period of March and April 2009. The total period of six years was considered from 2003-04 to 2008-09 to document the different activities of HOPCOMS.

3.5 Analytical techniques and tools employed

The methods of analysis employed in the present study are elaborated under the following headings.

3.5.1 Tabular analysis

Simple conventional method of tabular analysis was used in order to study the existing logistic structure and procurement and distribution of fruits and vegetables to end users, etc. Tabular analysis was also used to determine the efficiency of retail outlets by analyzing the constraints, procurement costs, transportation costs, etc. This analysis was also used to know the different costs incurred by a HOPCOMS towards their logistic and supply chain of fruits and vegetables.

3.5.2 Garret ranking technique

In order to know the reasons for purchasing of fruits and vegetables by consumers at HOPCOMS retail outlets the respondents

were asked to rank the order of preference of different parameters indicated. Accordingly these ranks were converted to scores by referring to Garrets table.

In this study, Garrett's ranking technique was used to analyze the reasons for purchasing of fruits and vegetables at HOPCOMS. The order of the merit given by the respondents was changed into ranks by using the formula

Garrett's formula for converting ranks into percent was given by

$$\text{Percent position} = 100*(Rij-0.50)/N_j$$

Where R_{ij} = Rank given for i^{th} item by j^{th} individual

N_j = Number of items ranked by j^{th} individual

The percent position of each rank was converted to scores by referring to tables given by Garret and Woodworth (1969). Then for each factor, the scores of individual respondents were summed up and divided by the total number of respondents for whom scores were gathered. The mean scores for all the factors were ranked, following the decision criterion that higher the value the more important in order of preference by customers.

Results

CHAPTER IV

RESULTS

In consonance with the objectives of the study, the data collected from different sources were analyzed and interpreted. The findings of the study presented under the following headings:

4.1 General profile of HOPCOMS

4.2 General profile of farmers and consumers

4.3 Logistic structure for fruits and vegetables

4.4 Constraints in the present logistic structure

4.5 Factors influencing in selection of logistics

4.6 Designing suitable logistic system

4.1 General profile of Horticultural Producers Cooperative Marketing and Processing Society Limited (HOPCOMS)

The profile of HOPCOMS regarding its origin and development, structure, growth, farmer membership, its stakeholder, marketing channel are presented below.

4.1.1 Origin and development

The Bangalore 'Grape Growers' Marketing and Processing Co-operative Society was established in 1959, under the guidance of Dr. M.H. Mari Gowda, the then Director of the Department of Horticulture. The jurisdiction of the HOPCOMS included Bangalore, Kolar, Mysore, Tumkur, Mandya and Mangalore districts. Since grape was a seasonal fruit, the society started handling all types of fruits and vegetables from 1965, and as a result the nomenclature of the society was changed as Horticultural Producers Co-operative Marketing and Processing Society Ltd. In 1997 district level HOPCOMS were formed as independent units. Consequently in 2006 the area of operation of HOPCOMS was reduced to

three districts i.e. Bangalore urban, Bangalore rural and Kolar as its area of operation. In remaining districts independent HOPCOMS were organized.

4.1.2 Structure

The department of Horticulture has taken the responsibility of promoting and supervising HOPCOMS. For the overall Development of Horticulture, the department of horticulture adopted the idea of 4 limb of approach (table 4.1).

The success of HOPCOMS led to the establishment of 15 district level co-operatives societies and 25 commodity societies. For several years, eight district level societies were under the control of HOPCOMS, Bangalore (Bangalore Urban, Bangalore Rural and neighboring Kolar, Tumkur, Mandya, Mysore and South Canara) (figure 4.1). Subsequently during the year 1998 (16 district level) HOPCOMS were established. As a result HOPCOMS in these districts started working independently.

4.1.3 Growth

As presented in table 4.2, HOPCOMS has five procurement centres located in and around 50 km radius from Bangalore for procuring fruits and vegetables .The produce is distributed through 504 retail outlets, of which 320 are in different localities of Bangalore city, 18 in rural Bangalore, and the remaining in other districts of the state. The HOPCOMS was established with 507 farmer members with a total paid up share capital of Rs. 1,269 in 1959. The membership increased to 16,300 in 2007-08, with a total paid up share capital of Rs. 258.54 lakhs. The state government's contribution to HOPCOMS' share capital steadily increased from 35 per cent in 1970 to 96 per cent in 1996 (Rao, 1997). However the share capital contribution by state government has come marginally down to 88 percent (Rs 228 lakhs) during 2007.

Table 4.1 : Wings of Horticultural development

Wings	Activities
Mysore Horticulture Society	Conducting training programmes, field days, Organizing short term courses
HOPCOMS	Procurement and sale of fruits and vegetables
Department of Horticulture	Procurement and supply of seed ,planting materials and inputs, creation of infrastructure, training programmes etc
Nurserymen Co-operative Society	Supply of quality seedlings

Source: HOPCOMS report

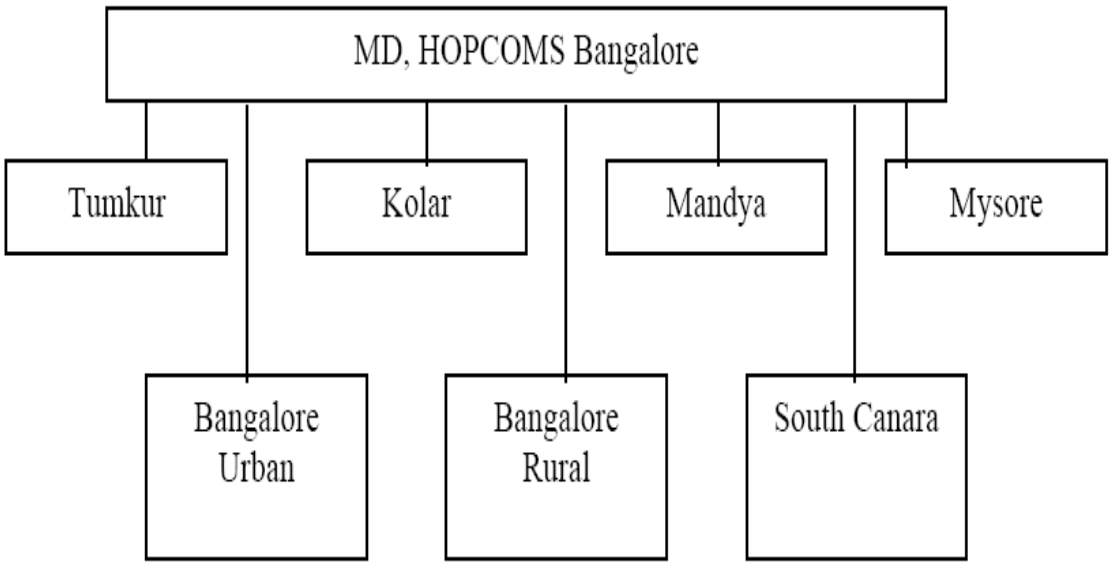


Figure 4.1 : Structure of HOPCOMS

Table 4.2 : Profile of HOPCOMS

(For the year 2008-09)

Annual Business Turnover	Rs. 42 crores
No. of Fruits and vegetables retail outlets in Karnataka	504
No. of Fruits and vegetables retail outlets in Bangalore	320
No. of Chemical & Fertilizers retail outlets	06
No. of Procurement centres	05
No. of Cold storages	05
No. of Juice processing unit	01
No. of Permanent employees	650
Temporary staff size	790

Source: HOPCOMS annual report, 2008

HOPCOMS has developed a network of procurement centers, godowns, retail outlets and input supply centers in eight districts of Karnataka. The retail price fixed by HOPCOMS is based on the procurement price, and is the same across all the outlets. HOPCOMS is the only intermediary between farmer and consumer (figure 4.2). As a result, it pays almost 80 per cent of the price paid by the consumers to the farmers. Apart from retailing, HOPCOMS is also undertaking processing activity by supplying fresh fruit juice to the consumers through their retail outlets.

4.1.4 Profile of membership

The shareholders of HOPCOMS are its members, who come under different categories (figure 4.3). The membership of the HOPCOMS consists of three categories viz., 'A' class members, 'B' class members, 'C' class members (table 4.3). The society is managed by the board of directors consisting of 15 members of whom 11 are elected, from the 'A' class members and 3 members are nominated by the department of cooperation and one member is nominated by the Government of Karnataka.

Any farmer who is residing in the area of operation of HOPCOMS can become 'A' class member on payment of Rs. 100/- towards one share in the HOPCOMS. The member's contribution to share capital stands at just over Rs.25.78 lakhs which is hardly 10 percent of the total shareholding.

The second category of members, 'B' Class members is mainly for institutions like NHBs, NGOs and NCDC others etc who also hold a stake in the society. The contribution of 'B' class members to share capital of HOPCOMS is Rs 4.67 lakhs, which is less than two percent of the shareholding.

Table 4.3 : Membership pattern of HOPCOMS

(Rs. in lakh)

Categories	Members	Numbers	Share capital	Percentage to total
A class	Farmer/Producer	16300	25.78	9.97
B class	NGO, Cooperative societies, NCDC and NHB	90	4.67	1.81
C class	State government	1	228.09	88.22
	Total	**16391**	**258.54**	**100**

Source: HOPCOMS annual report, 2007-08

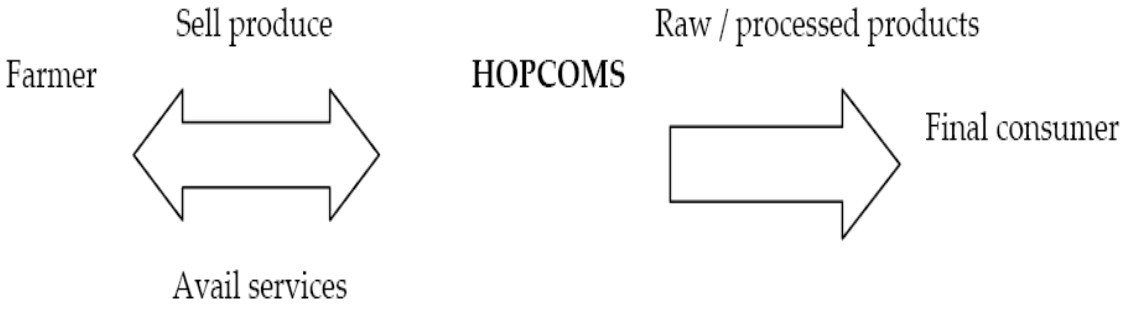


Figure 4.2 : HOPCOMS channel

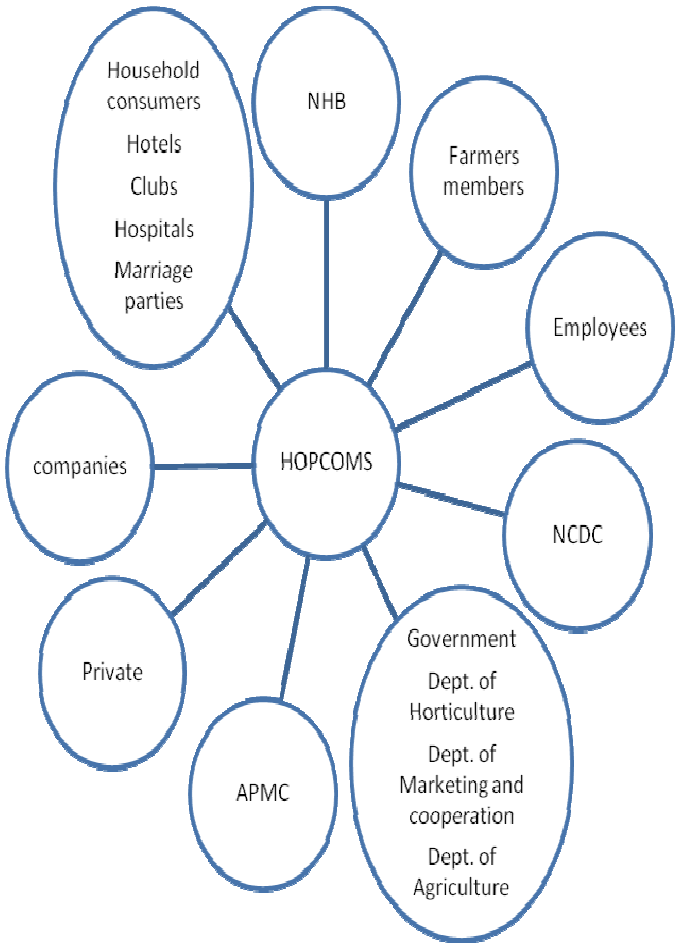


Figure 4.3 : Stakeholder of society

The state government is 'C' class members contributed highest value around Rs. 228 lakhs, in the society which is about 88 percent of the total shareholding. The remaining shareholders are classified as 'D' Class and have negligible shareholding in the Society.

4.1.5 Membership pattern

The membership pattern of farmers for past ten years is presented in table 4.4 and in chart 4.1. During the year 1996-97 the total member - ship of HOPCOMS was 9048, which increased to 16300 during the year 2007-08 with a growth rate of 44 percent. Similarly HOPCOMS share capital and owned funds increased substantially during the same period.

4.1.6 Types of fruits and vegetables procured from members by HOPCOMS

The fruits and vegetables procured by HOPCOMS from the farmers through procurement centres are presented in table 4.5. The fruits and vegetables are also procured from open market in addition to procurement centres due to non availability of fruits and vegetables during certain periods. Some of the seasonal fruits like Apple from Shimla, Oranges from Nagpur and Grapes from Nasik etc are directly procured from farmers of respective areas. The fruits and vegetables procured from farmers on daily basis and the same is transported to the central godowns through vehicles owned by HOPCOMS.

4.1.7 Crop calendar

The availability of fruits and vegetables and procurement of fruits and vegetables is presented in table 4.6 and table 4.7 gives a clear idea of peak and lean season for fruits and vegetables. The peak season indicates availability of surplus quantity of fruits and vegetables whereas the lean season indicates lack of sufficient quantity fruits and vegetables.

Table 4.4 : Progress of membership in HOPCOMS

Years	Membership (In numbers)
1996-97	9048
1997-98	9351
1998-99	9948
1999-00	10287
2000-01	10458
2001-02	11424
2002-03	13158
2003-04	14760
2005-06	15000
2006-07	15600
2007-08	16300

Source: HOPCOMS report 2007-08

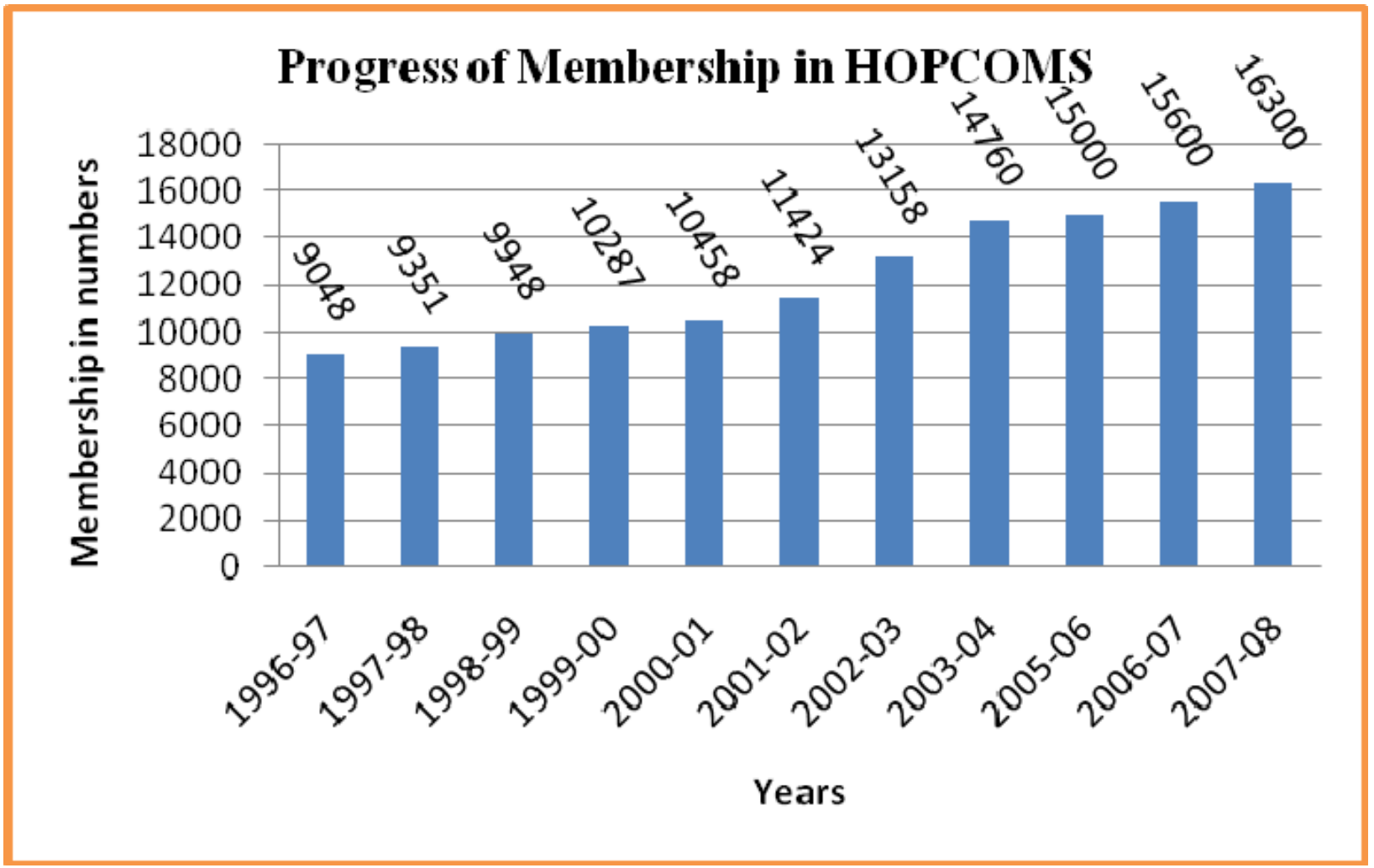


Chart 4.1 : Progress of membership in HOPCOMS

Table 4.5 : Types of Fruits and Vegetable procured from the farmer - members by HOPCOMS

Vegetables	**Fruits**
Tomato	Apple
Potato	Banana
Brinjal	Mango
Chilli	Orange
Cabbage	Pineapple
Cauliflower	Sapota
Carrot	Watermelon
Broccoli	Muskmelon
Beans	Orange
Bhendi	Musambi
Leafy Vegetables	Strawberry
Bitter gourd	Aonla
Bottle gourd	Kiwi
Ridge gourd	Ber
Chowchow	Peach
Pumpkin	Plumb
Capsicum	Pear
Drumstick	Grapes
Beet root	Guava
Cucumber	Amla
Coriander	Custard apple
Onion	
Field bean	
Cluster bean	
Methi	
Knolkhol	

Source: HOPCOMS procurement centres

Table 4.6 : Crop calendar for vegetables

Crops	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Tomato												
Potato												
Chilli												
Brinjal												
Leafy Vegetables												
Cabbage												
Cauliflower												
Carrot												
Beetroot												
Pumpkin												
Radish												
Capsicum												
Knolkhol												
Beans												
Bhendi												
Chow chow												
Bitter Gourd												
Bracolli												
Bottle gourd												
Ridge gourd												

Lean season Peak season

Source: HOPCOMS procurement centre

Table 4.7 : Crop calendar for fruits

Crops	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Papaya												
Apple												
Pomegranate												
Grapes												
Guava												
Sapota												
Musambi												
Orange												
Mango												
Banana												
Pine apple												
Watermelon												

Lean season

Peak season

Source: HOPCOMS procurement centre

For example in case of Tomato the peak season is from the May to July and the lean season will be remaining months of the year. Potato is grown in two season, rainy season (June to August) in parts of Hassan district and Rabi season (September to December) in all other production areas. The leafy vegetables and beans are grown throughout the year due to high demand in market and also due to suitability of climate, Cole crops like Cabbage, Cauliflower, Carrot, Beet root are grown during the month of September to December. The remaining crops like Pumpkin, Radish, Capsicum, Bhendi, Gourds are also grown in large quantity during the month of May to August. In case of fruits the availability is restricted to few months. Further only few are grown in the state. Hence many fruits are procured from other states. The fruits like Papaya are available during the month of January to April and October to December, Sapota during the month of March to May, November to December, Pineapple during the month of May to August, Grapes during the month of March to May, Guava during the month of August to October, Banana during the month of January to May and August to December, Watermelon and Muskmelon during the month of March to June. All these fruits are available locally within state where as fruits like Apple is from Shimla available during the months of September to December. The Orange and Musambi from Nagpur are available during the months of March to June, Mango during the month of May to June, Pomegranate during the month of June to October, Grapes during the month of March to May, Based on the season and availability of fruits and vegetables the procurement of fruits and vegetables are planned in order to meet demand of the customers.

HOPCOMS is also organizing Mango mela every year during the month of May to June by opening its outlets in public places like Bus stands, Hospitals and other Government offices. For conducting mela HOPCOMS start its procurement operations from places like

Srinivaspura in Kolar district. Similarly Grape mela is organized during the month of March to May and is being procured from Bijapur and parts of Devanahalli. HOPCOMS usually procures these fruits from farmers directly from these places and sells through its outlets at reasonable price to the customers.

4.1.8 Marketing Channel

The marketing channels available to farmers for selling fruits and vegetables are presented in figure 4.4. The figure clearly shows competitor channel-1 (private channel) indicates that there were many more intermediaries for the sale of fruits and vegetables but in society channel-2 and channel-3 intermediaries were less as compared to channel-1. Where major share was going to the producers in the sale of fruits and vegetables, but in channel-1 producers will get less benefit.

4.1.9 Retail outlets

HOPCOMS has opened 318 retail outlets in its area of operation, Bangalore, being the major consuming distribution has 278 retail outlets which provide fresh fruits and vegetables supplies to the consumers in the city. The retail outlets are being managed by the salesmen who are employees of HOPCOMS. As part of its marketing strategy, many HOPCOMS have located its outlets next to milk booths to enable consumers to pick up their daily necessities in one go. In addition to selling fruits and vegetables HOPCOMS is also supplying fruits and vegetables through mobile sale units by using owned vehicles where retail outlets are not located. The retail outlets in Bangalore are divided into 4 zones like North, South, East and West as shown in table 4.8.As per the table 4.8 the retail outlets in Bangalore are concentrated in South and West Bangalore (86 and 73 number respectively) followed by East Bangalore (45). However penetration of HOPCOMS retail outlets in North Bangalore is lowest with 22.

Figure 4.4 : Marketing Channels of fruits and Vegetables followed through competitors and HOPCOMS

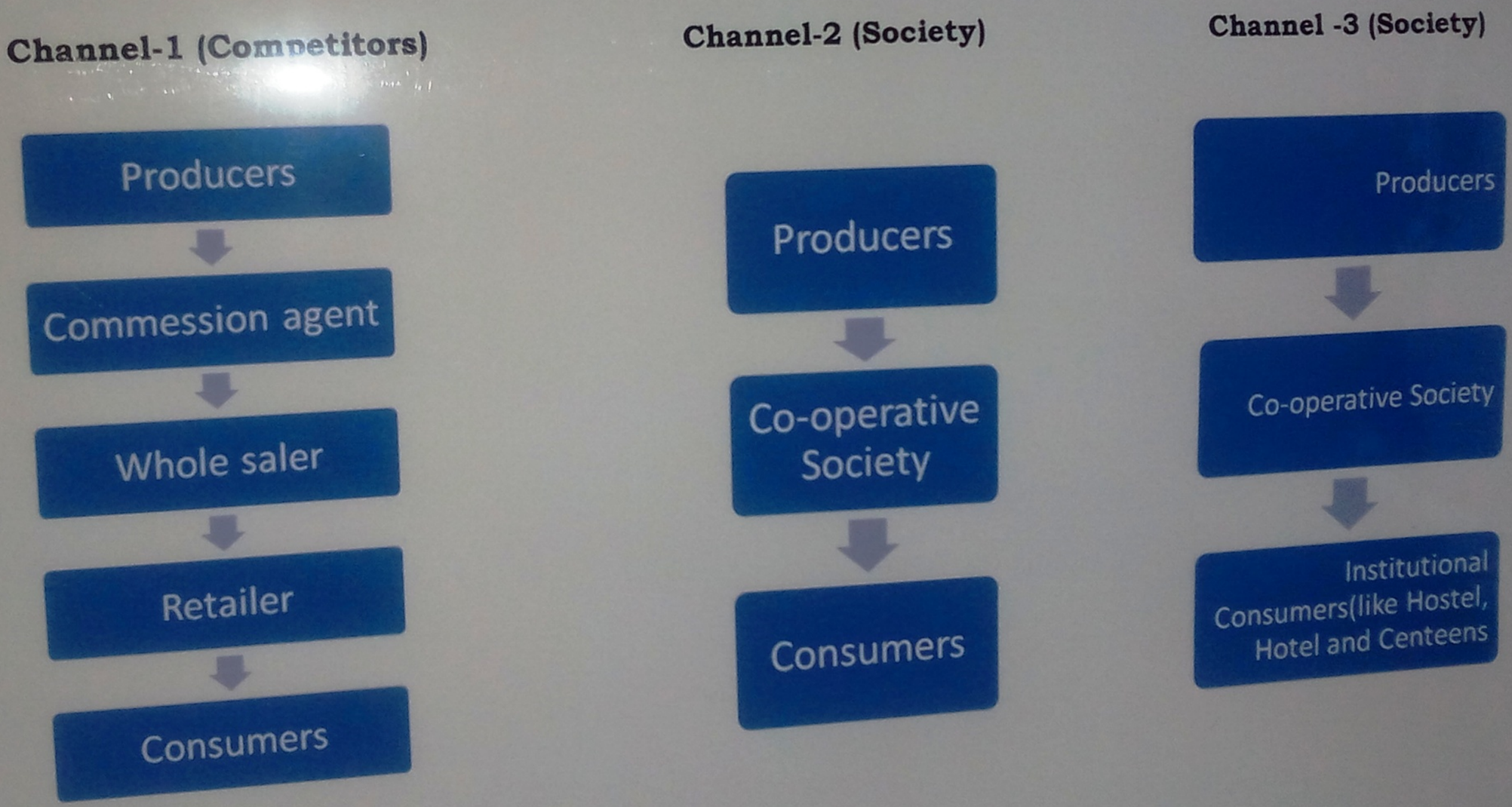


Table 4.8 : Classification of retail outlets in Bangalore city

Sl. No.	Particulars	Number	Percentage to total
1.	North	22	8.00
2.	South	86	38.05
3.	East	45	20.00
4.	West	73	32.30
	Total	**226**	**100**

Source: HOPCOMS (2008)

4.1.10 Performance of HOPCOMS

The HOPCOMS transactions for the last ten years are presented in table 4.9. As the table indicates from 1996 to 1999 the society was incurring huge losses. During 2000-01 to 2002-03 HOPCOMS was able to earn net profit and this trend is continued except during the year 2003-04.

4.2 General profile of producers and consumers

The profile of producers including age, education crops grown, place of sale and of relation with HOPCOMS and similarly the profile of consumers including age, education, occupation frequency of purchase and reasons for purchasing at HOPCOMS discussed under following sub-headings.

4.2.1 Socioeconomic profile of producer-members of HOPCOMS

The primary data was collected from producer-members of HOPCOMS, non-members who are supplying vegetables to HOPCOMS and also from customers who are purchasing fruits and vegetables from retail units of HOPCOMS. In all 30 producer-members 10 are non-members and 30 consumers were interviewed. The producer-member was chosen randomly from important production regions in and around Bangalore rural district and the 10 non-members were chosen purposively from the same regions. As for as consumer are concerned 10 retail units representing different parts of Bangalore city were randomly chosen.

The socioeconomic profile of producer-members is presented in table 4.10. It is clear from the table 4.10 that the producer-members from the age group of 30-35 years constituted 16.5 per cent of the total respondents.

Table 4.9 : Performance of HOPCOMS

(Rs in lakh)

Year	Total transaction	Net Profit/Loss
1995-96	3596.74	25.86
1996-97	4036.52	-4.98
1997-98	3727.98	-19.62
1998-99	3871.87	-13.2
1999-00	3754.2	-84.98
2000-01	4204	20
2001-02	4516	43.7
2002-03	4523	26.15
2003-04	4366	-21.36
2004-05	3769	66.4
2005-06	3906	57.9
2006-07	4551	80
2007-08	4850	104
2008-09	4142	148

Source: HOPCOMS report (2008)

Table 4.10 : Socioeconomic profile of farmer-members selling at HOPCOMS

Sl. No.	Characters	Category	Member		Non member	
			Number	Percent	Number	Percent
1	Age(years)	20-25	0	0	3	30
		25-30	0	0	0	0
		30-35	5	16.5	4	40
		35-45	17	57.0	0	0
		45-55	5	16.5	3	30
		>55	3	10	0	0
	Total		**30**	**100**	**10**	**100**
2	Education	Primary	14	47	3	30
		SSLC	16	53	7	70
		PUC	0	0	0	0
		Graduation	0	0	0	0
	Total		**30**	**100**	**10**	**100**

Similarly 57 % are from the age group of 35-45 years and the remaining 16.5 percent from the age group of 45-55 years. With respect to non-members the age group of 20-25 years constituted (30 %), 30-35 years (40 %), 45-55 years (30%) respectively. Among the farmer-members majority of them have completed SSLC accounting to 70 percent and remaining 30 had completed their primary school. Similarly among the non members majority had completed their primary school which accounted to 66 per cent.

4.2.2 Place of sale of fruits and vegetables by Farmer-members

Among the members nearly 47 percent of members are selling fruits and vegetables at HOPCOMS. Members who are selling both at HOPCOMS, wholesaler, Commission agent, Weekly market and Farm gate constituted 36 percent. Hardly 6 percent of members are selling at Weekly market as well as HOPCOMS. Further nearly 21 percent respectively of members are also selling at HOPCOMS as well as farm gate (table 4.11). Hence it is clear from the table that the members are not only selling at HOPCOMS but also through other channels.

4.2.3 Crops cultivated by producer members and non-members

Both producer members and non-members grow varieties of vegetables (table 4.12). For producer-members it is advantageous to grow all types of vegetables since there is a assured market by HOPCOMS. It is interesting to note that none of the producer-members of HOPCOMS are growing fruits.

4.2.4 Duration of the relationship of the Farmer-members with HOPCOMS

The table 4.13 indicates that majority of respondents (77 %) are members of HOPCOMS for more than 10 years, followed by (13 %) with ten years and the remaining 10 percent with six years.

Table 4.11 : Place of sale of fruits and vegetables by Producer-members

Sl. No.	Particulars	No of respondents	Percent
1	HOPCOMS	16	47.1
2	HOPCOMS+ Wholesaler	9	36.5
3	HOPCOMS+ Weekly market	2	5.9
4	HOPCOMS+ Farm gate sale	7	20.6

Table 4.12 : Crops cultivated by producer members and non-members

Farmer-members	Non Farmer-members
Ash gourd, Baby corn, Beet root, Bottle gourd, Brinjal (egg plant), Capsicum, Cucumber, and Musk melon, Pumpkin, Ridge gourd, Bottle gourd, Cabbage, Carrot, Cauliflower, Double beans, Green Chillies, Little gourd, Potato	Leafy vegetables, Bottle gourd, Cabbage, Carrot, Cauliflower, Double beans, Green Chillies, Little gourd, Potato

Table 4.13 : Duration of the relationship of the farmer-members with HOPCOMS

Duration of relationship	No. of farmers	Percentage to total
Six years	3	10
Ten years	4	13
More than 10 years	23	77
Total	**30**	**100**

4.2.5 Socioeconomic status of consumer shopping at HOPCOMS retail outlets

As shown in table 4.14 among the consumers 47 percent were males and 52 percent were females. The respondents were classified based on age groups. Among them 2 percent are in the age group of between 20-25 years. Similarly there were 7 respondents from the age group of 25-30 years, 5 respondents from the age group of 30-35 years, 10 respondents from the age group of 35-45 years, 6 respondents from the age group of 45-55 years and 2 respondents from the age group of more than 55 years respectively constituting for 6.25 per cent, 21.8 per cent, 15.6 per cent, 31.2 per cent, 18.75 per cent and 6.25 percent respectively. With respect to the occupation of the consumers nearly 16 percent were government employees. There were 10 respondents respectively who were engaging business constituting 31.25 per cent each. The IT professionals constituted for 22 per cent. The remaining 15.62 per cent of the consumers are from other categories. With respect to educational level of consumer, 7 respondents had completed SSLC and 10 had completed PUC constituting for a combined total of 15 per cent. Nearly 28.12 per cent are graduates and 19 percent respondents are post graduates.

4.2.6 Socioeconomic profile of consumer shopping at HOPCOMS retail outlets

Information regarding HOPCOMS customers is presented in table 4.15. In all 30 consumers were purposively selected for the study. The average family size of the consumers was 3.1 of which the average family size of LIG was 3.1. The average family size of MIG was 3.2 and 3 for HIG.

Table 4.14 : Socioeconomic status of consumer shopping at HOPCOMS retail outlets

Sl. No.	Characters	Category	Respondents	
			Number	Percentage
1	Age	20-25	2	6.25
		25-30	7	21.875
		30-35	5	15.625
		35-45	10	31.25
		45-55	6	18.75
		>55	2	6.25
2	Sex	Male	15	46.875
		Female	17	53.125
3	Occupation	Govt employee	5	15.625
		Business	10	31.25
		IT professional	7	21.875
		Academician	5	15.625
		Other	5	15.625
4	Education	SSLC	7	21.875
		PUC	10	31.25
		Graduation	9	28.125
		Post Graduation	6	18.75

Table 4.15 : Socioeconomic profile of consumer shopping at HOPCOMS retail outlets

Sl. No.	Socio-economic variables	LIG	MIG	HIG	Average
1	Average Family size (Numbers)	3.1	3.2	3	3.1
2	Average number of people employed	1.43	1.87	2.12	1.8
3	Average expenditure on Fruits and vegetables (Rs/ month)	856	1156	1432	1148

LIG-Low Income Group, MIG-Middle Income Group, HIG-High Income Group

The average number of people employed was 1.8. The average number of people employed was 1.43, 1.87 and 2.12 respectively among the income groups of LIG, MIG and HIG. In general consumers are spending Rs 1148 per month. The average amount spent by LIG, MIG and HIG income groups is Rs.856, Rs.1156 and Rs.1432.5 respectively.

4.2.7 Frequency of purchase

With respect to frequency of purchase of Fruits and Vegetables, nearly 37 percent of consumers are purchasing fruits and vegetables daily, 33 per cent purchasing fruits and vegetables once in two days, 27 percent purchasing fruits and vegetables once in three days and 3 percent purchasing once in a week (table 4.16).

4.2.8 Reasons for purchasing at HOPCOMS

The consumers were specifically asked to give reasons for the purchase of fruits and vegetables in HOPCOMS retail outlets and the same has been presented in table 4.17. It is clear that consumers purchasing fruits and vegetables at HOPCOMS are mainly due to availability of fresh fruits and vegetables, reasonable price, followed easy to access to HOPCOMS retail outlet and also due to lack of choice.

4.3 Logistic structure of HOPCOMS

The important components of logistics for fruits and vegetables are procurement, pricing, transportation, grading and sorting, storage and distribution to retail outlets and the same has been presented below.

Table 4.16 : Frequency of purchase by consumers

Sl. No.	Category	Fruits and Vegetables	Percentage to total
1	Daily	12	37
2	Once in two days	10	33
3	Once in three days	8	27
4	Once in a week	2	3
	Total	**30**	**100**

Table 4.17 : Reasons for purchasing at HOPCOMS by consumers

Sl. No.	Constraints	Garret score	Rank
1	Fresh in quality	91	I
2	Reasonable price	83	II
3	Easy to access	78	III
4	Lack of choice	75	IV

4.3.1 Procurement centres

In order to reduce losses during the transportation and to save time of the farmers, HOPCOMS has established five procurement centres near to vegetables production belts (figure 4.5). The fruits and vegetables grown in the area is either collected from the members' field or the growers bring their produce at designated centres. The produce procured from farmer members is being transported to central godowns from where it is supplied to the retail outlets and to the institutions. At present HOPCOMS, Bangalore has five procurement centres at **Hoskotae & Malur, Doddabalapur, Devanahalli, Kankapur and Channapatna.** All the procurement centres collect nearly 3 tons of fruits and vegetables per day and transported it to HOPCOMS, Bangalore for supplying it to all retail outlets. HOPCOMS is procuring nearly 110 tons of vegetables from producer-member. This clearly indicates that hardly 15 to 20 percent is being procured near to production belts and the balance is procured directly at HOPCOMS head office from the producer-member members as well as from non-members. Sometimes if there is a shortage of fruits and vegetables, HOPCOMS also procured from open markets to fill the demand from consumers.

4.3.2 Process of the Procurement and Sale of Produce

One of the first conditions in HOPCOMS for a farmer to sell his produce is to become member. Secondly HOPCOMS issues indents giving the quantity of a particular vegetable to be purchased from members. On receiving the indent order for the required quantity, the member has to bring the produce to the procurement centre or directly to HOPCOMS. The produce is checked with regards it quality.

Further the produce is graded and a receipt for the same is given to the farmer member. The farmer presents the receipt to commercial bank operating within HOPCOMS, thus enabling farmers to take cash

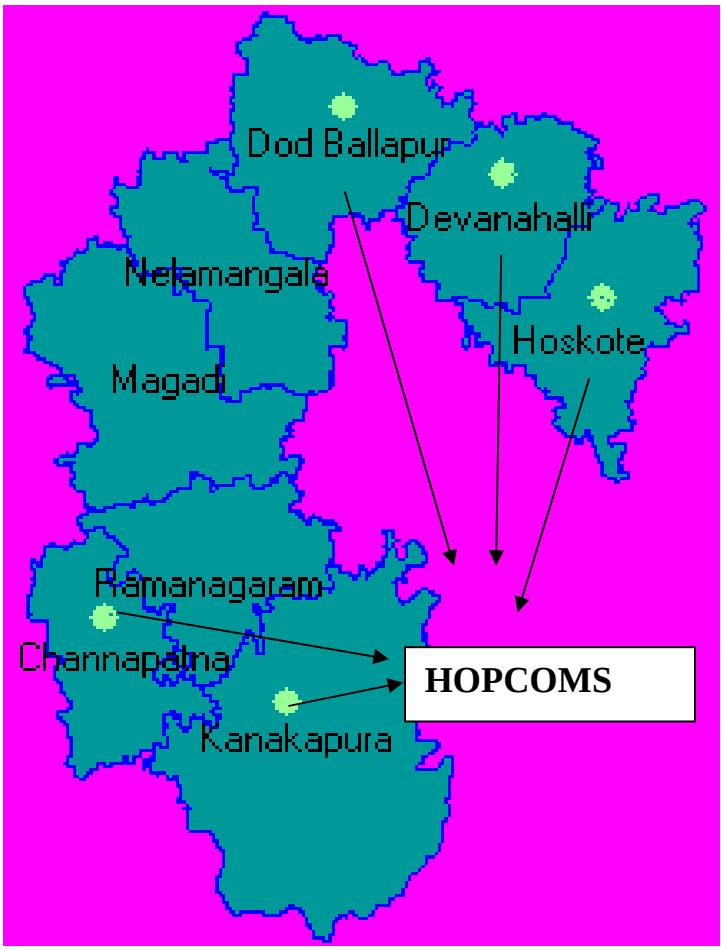


Figure 4.5 : HOPCOMS procurement centres

immediately (fig 4.6). At present the HOPCOMS is handling about 110 MT of fruits and vegetables out of which 75 percent is sold through retail outlets and 25 percent through the institutions like Hostels, Government hospitals, Clubs and major factories. It also undertakes bulk supplies to the marriages and other social functions vegetables.

The present system ensures that farmers who bring their produce to the procurement centres can sell it to HOPCOMS for a reasonable price and get cash on the same day. This system of selling and realization of cash on the same day is better than farmers selling it to wholesale traders.

4.3.3 Quantity and Value of fruits and vegetables procured by HOPCOMS

The table 4.18 and chart 4.2 clearly shows that decreasing trend in procurement of fruits and vegetables by HOPCOMS. During the months of April to June the quantity of fruits and vegetables procured is high especially Grapes and Mangoes due to demand from consumers at melas organized by HOPCOMS. Procurement of fruits and vegetables has decreased (table 4.18). Similarly prices were high during the month of April to June due to less production of vegetables during summer. However during kharif season prices tend to fall due to high production of vegetables.

4.3.4 Share of quantity procured from famers and Market

The table 4.19 and chart 4.3 clearly shows that HOPCOMS procure large quantity of fruit and vegetables from farmer-members which accounts to nearly 80 percent and the remaining 10 to 20 percent is procured from markets depending on the availability of produce from the farmers. However the quantity procured from farmers is decreasing over the months. On the other hand the quantity procured from the market is increasing during the months of April to December (Table 4.19).

Figure 4.6 : Process of the Procurement and Sale of Produce

Table 4.18 : **Quantity and Value of fruits and vegetables procured by HOPCOMS**

Qty (in tons) Value (Rs in lakhs)

Month	Quantity	Value
Apr	1963.63	289.81
May	1958.32	301.13
Jun	1979.11	310.38
Jul	1853.92	271.35
Aug	1854.76	294.49
Sep	1887.55	314.59
Oct	1813.93	313.81
Nov	1654.65	299.00
Dec	1769.22	301.28

Source: HOPCOMS-2008

Table 4.19 : Famers and Market share in total quantity procured by HOPCOMS

(In tons)

Month	Farmer	Market
April	1504.24	259.39
May	1822.49	145.83
June	1730	248.97
July	1650.86	203.06
August	1473	381.76
September	1469	213.34
October	1470.32	243.61
November	1305	345.19
December	1429	339.37

Source: HOPCOMS- 2008

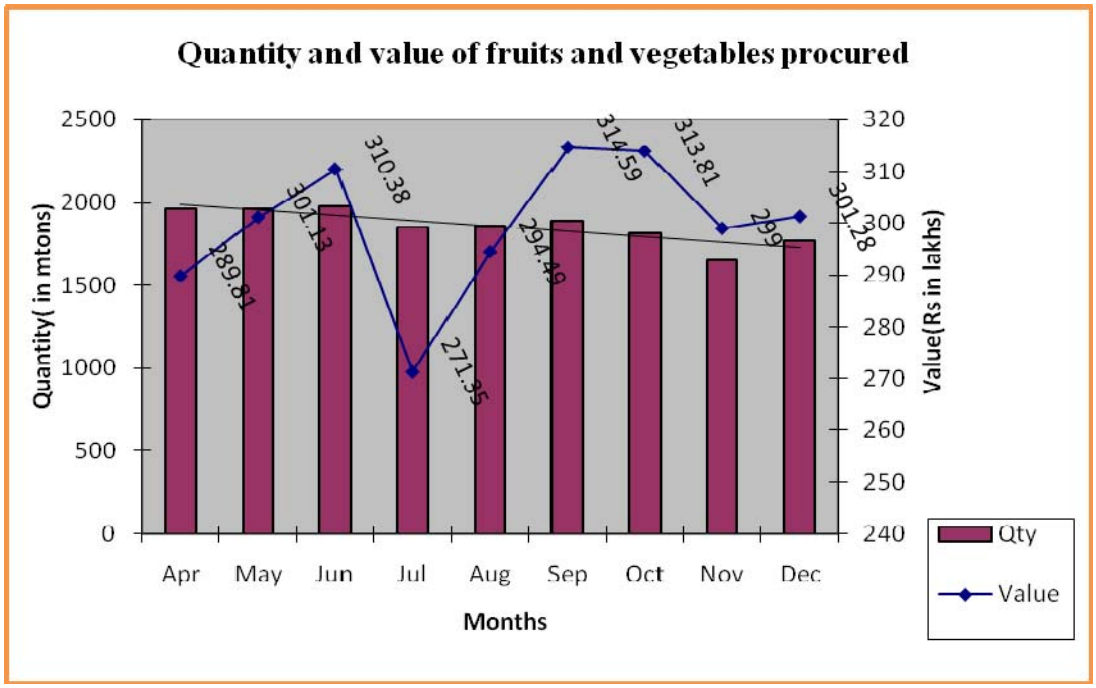


Chart 4.2 : Total procurement of fruits and vegetables

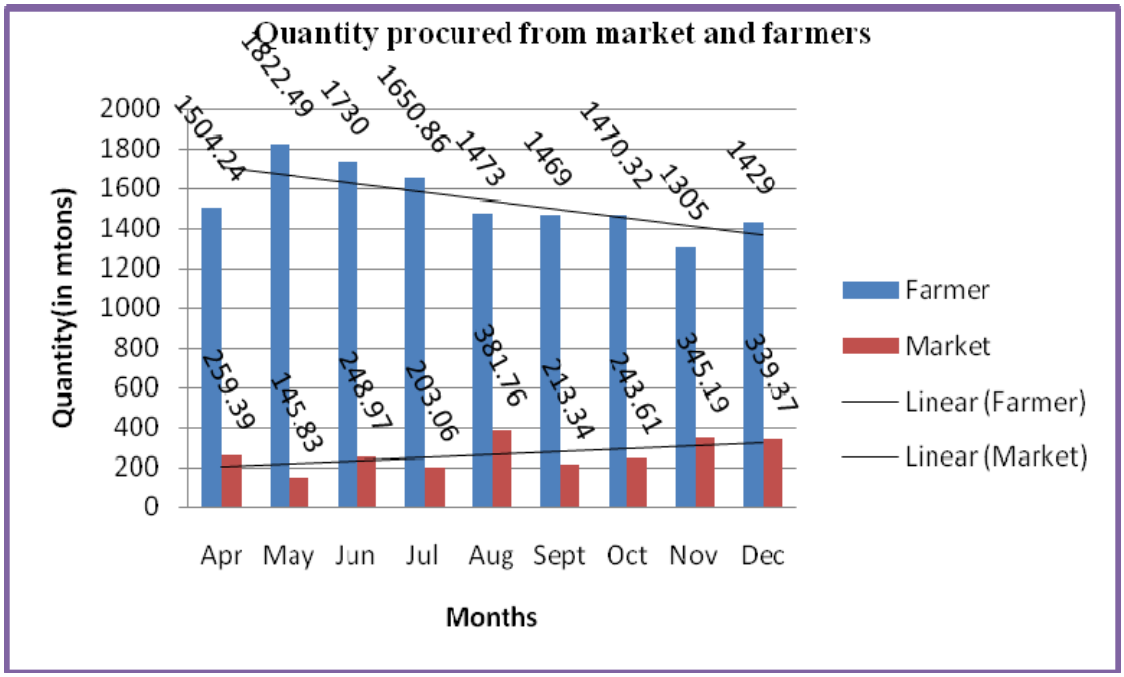


Chart 4.3 : Share of quantity procured from famers and market (2008)

4.3.5 Operational aspect of Go downs

There are 11 godowns for storing fruits and vegetables in HOPCOMS (table 4.20). In every godown store keeper will record the arrivals from procurement centre and dispatch it to retail outlets. Fruits and vegetables procured from procurement centre will be transported to the godowns as per the indent received by the procurement officer. On the next day morning at 5 AM all the sales men from the respective retail outlets cash in cash counter of previous day transaction and based on his indent choose the selected fruits and vegetables from go downs. Out of the total volume of purchased by sales person HOPCOMS has made provision for wastage by giving 2 percent rebate to sales persons of all retail outlets. Hence the sales person has to manage wastages not exceeding this limit. No grading or sorting done at go down, up to 2 percent commission given to store keeper within which the store keeper should maintain all wastages in go down.

4.3.6 Grading of fruits and Vegetables followed by HOPCOMS

The eye sight grading method is followed in HOPCOMS for grading of various fruits and vegetables. The grades of major types of fruits and vegetables in HOPCOMS, Bangalore is presented in table 4.21. HOPCOMS is at present is not using standard specifications for grading of fruits and vegetables. For example in case of 'Apple' the highest quality was graded as 'A' grade (big size, medium size and small size having red colour) and 'B' grade (having big size, medium size and small size slightly) .In case of Mango 3 grades have been followed. They are A grade, B grade, C grade mango. A grade having big size (weighing 280-338 gms) with yellowish colour and B grade mango having medium size (weighing 222-280 gms) with dull yellowish colour. Grade 'C' mango having big and medium size (weighing 163-222 gms) with shaded colour.

Table 4.20 : Godown operation

Sl. No.	Godown	Numbers
1	Tomato	1
2	Coconut	1
3	Banana	1
4	Onion, Potato, Ginger, Garlic	1
5	Dry fruits	1
6	Ash gourd, Sweet pumpkin	1
7	Other vegetables	3
8	Watermelon	1
9	Cabbage	1

Source: HOPCOMS reports

Table 4.21 : Grading of fruits and vegetables

Items	Name of Commodities	Quality grades	Special Characteristics
Fruits	Apple	A	Size-Big, medium, small, colour-red
		B	Size-Big, medium, small, colour-dull red
	Mango	A	Size-Big, colour-Yellowish, Variety-Alpanso, Ratnagiri, Kalmi, Size(min-max), 280-338 gms weight
		B	Size-Big, colour-Yellowish, Variety-Alpanso, Ratnagiri, Kalmi, Size(min-max), 220-280 gms weight
		C	Size-Big & medium, slightly damaged both side, shaded colour
	Banana	A	Size-Big, greenish, no wrinkles, colour-shining white
		B	Size-Big & medium, colour-green, immature & improper development of fruits were rejected, Variety-Cavendish, Yellaki, Rosebale, blood ball
	Papaya	A	Size-small, big, medium colour-yellow patches, improper colour rejected
		B	Size-small, big, medium colour-greenish yellow patches improper development of fruits
Vegetables	Ridge guard	A	Size-normal , straight length, colour-greenish dark green, rejecting damaged fruit, tip will not cut on top portion
		B	Size-abnormal, slightly aged light wrinkle shape local variety
	Brinjal	A	Medium size, colour-shining white strips, tip on top must be green
		B	Size-abnormal, colour-same but whitish , tip-greenish, rejecting damaged fruit, variety-red, white, green long
	Cluster bean	A	Size-medium, colour-greenish yellow, tip on top & dots must be rejected
		B	Size-small, colour-greenish yellow colour, rejecting beans with leaves variety-Belgaum local, hybrid
	Chilli	A	Variety-dwarf size colour green and dark
		B	Variety-same size also same colour-light green colour, tip black after harvesting on day
	Cucumber	A	Size-medium, colour-green yellow strips

Source: HOPCOMS, 2008

In Banana 2 main grades are followed. They are A grade and B grade Bananas. The A grade banana having big size greenish white colour with no wrinkles. The grade B Banana having small and medium size, green in colour.

In Papaya 2 main grades have been traded. They are A grade and B grade Papaya. The A grade Papaya has big size, fruits having yellow colour. The B grade Papaya having medium size to small size, greenish yellow patches on the fruits.

In HOPCOMS eye sight grading was followed for vegetables. For Ridge guard there are 2 grades. They are 'A' grade having straight length, normal size and greenish to dark green colour. The 'B' grade Ridge guard will be slightly matured, light wrinkle shape.

For Brinjal with 2 grades have been followed, 'A' grade Brinjal having medium size, shining white strips colour with green colour. 'B' grade Brinjal will be abnormal in size with shining white strips colour, but whitish strips, tip greenish.

For Cluster beans there are 2 grades namely 'A' grade with Cluster bean having medium size, greenish yellow colour, tip on top. The 'B' grade Cluster bean will have small size, greenish yellow colour.

In case of Chilli, 2 grades are followed. 'A' grade Chilli having dwarf size (Chameli variety) and long size (in Jwala variety) with dark green colour. The 'B' grade variety will have light green colour with same size. The Cucumber has 2 grades, 'A' grade having medium size, greenish yellow strip colour and 'B' grade having big size, green yellow strips colour.

4.3.7 Distribution of fruits and vegetables

HOPCOMS procures on an average 110 tons of fruits and vegetables daily both from farmers and open market depending on demand from customers and supply from farmers. Nearly 80 percent of its requirement is procured from the farmers and the remaining quantity is procured from open market. Out of the total procurement 70 percent of fruits and vegetables sold through retail outlets and the remaining quantity is distributed to institutions like College hostels & companies canteens and others on contract basis (table 4.22 and chart 4.4).

4.3.8 Pricing policy of HOPCOMS

The HOPCOMS buys the produce from the farmers based on the market rates and prices announced by department of agricultural marketing. The department collects maximum, minimum and model prices for the various commodities sold in the previous day of major APMC markets like Yaswanthpura market, KR market and the same is published in the news paper in the next day. Based on these rates, HOPCOMS fixes the procurement price for the fruits and vegetables. commodity and sell it to the consumers. In general it is observed that the prices fixed by the HOPCOMS are similar to prevailing market rates with 2 to 3 percent variation.

4.3.9 Wastages

From the table 4.23 and chart 4.5 it is clear that wastages were high during the month of April to June due to high temperature, and less wastage during July to December. The table clearly indicates that on an average 15 to 20 percent of fruits and vegetables procured are wasted during distribution process.

Table 4.22 : **Distribution of fruits and vegetables**

(In tons)

Month	Retail outlet	Institutions
April	1371.979	587.991
May	1366.806	585.774
June	1355.921	581.109
July	1271.977	545.133
August	1297.947	556.263
September	1309	561
October	1249.472	535.488
November	1004.108	430.332
December	1236.9	530.1

Source: HOPCOMS-2008

Table 4.23 : Quantity of fruits and vegetables wastages

Month	Quantity (in tons)
April	27.21
May	28.58
June	22.41
July	21.33
August	18.05
September	18.65
October	18.45
November	15.03
December	17.35

Source-HOPCOMS-2008

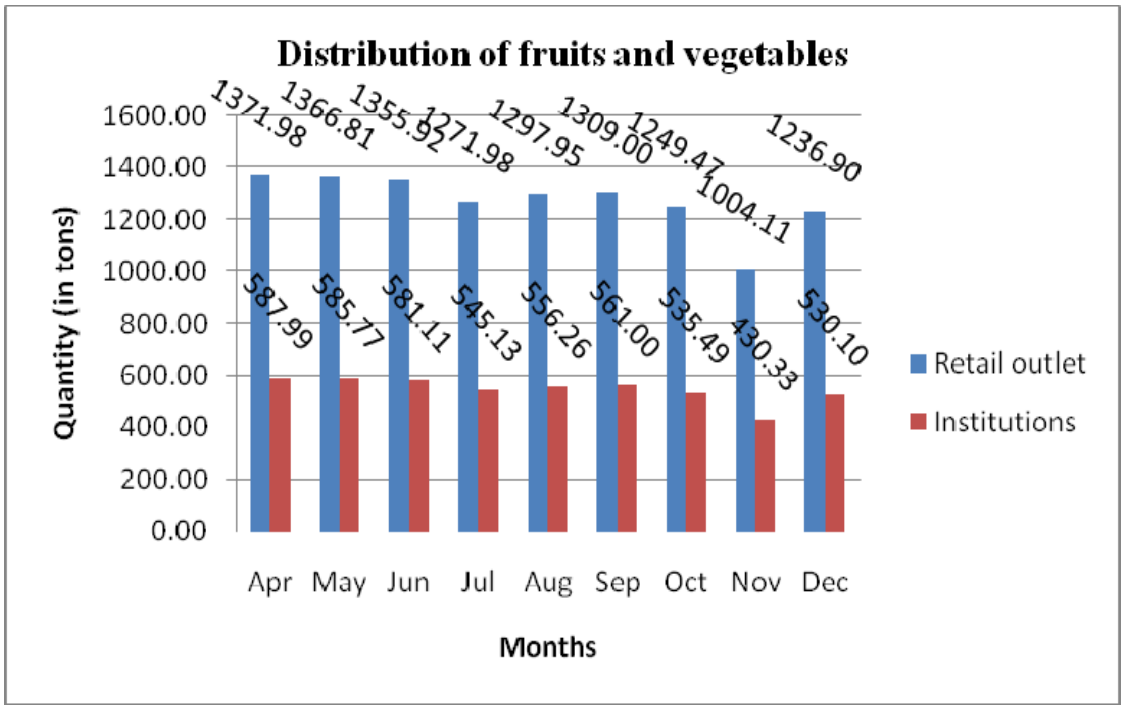


Chart 4.4 : Distribution of fruits and vegetables

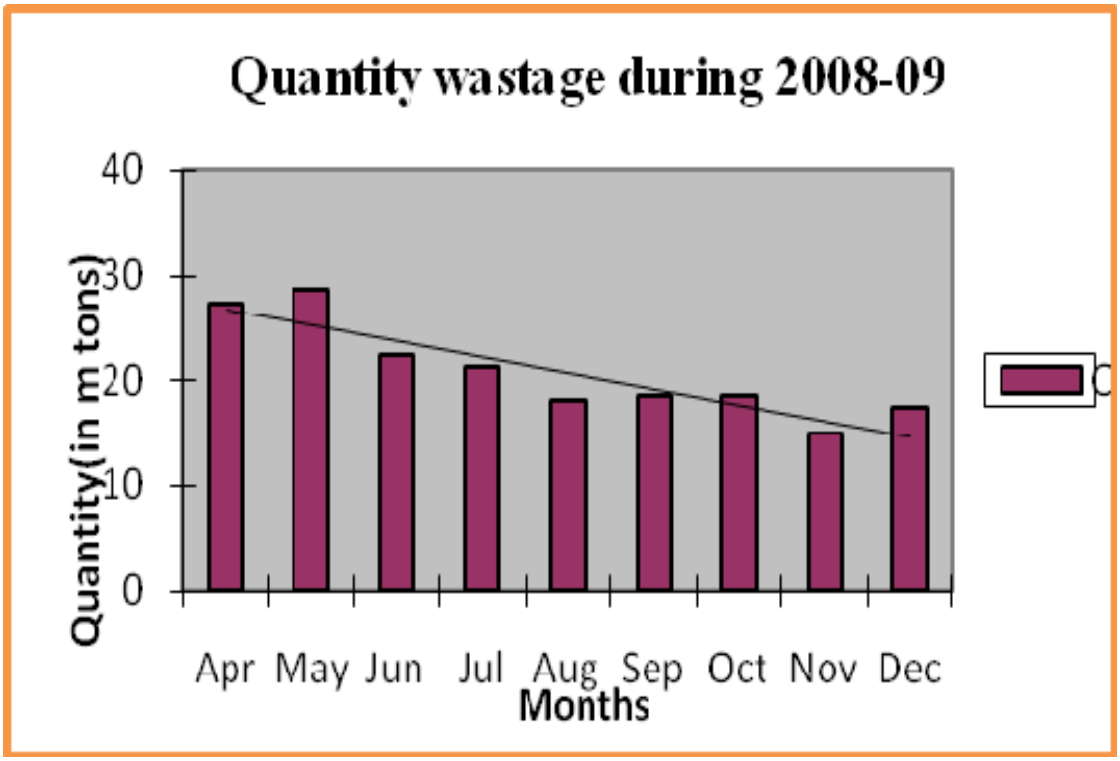


Chart 4.5 : Quantity wastage

4.3.10 Storage life of fruits and vegetables

The fruits and vegetable can keep long period in cool chamber compare to room temperature accordingly the losses also were high in room temperature compare to cool chamber (table 4.24).

4.3.11 Transportation arrangements

HOPCOMS has two wings for transportation of fruits and vegetables from procurement centers to godown and to retail outlets. The first wing is operated by HOPCOMS itself with its own vehicles. The second wing is operated through hired private vehicles. The details of transportation arrangements are presented in table 4.25. It is clear from the Table that HOPCOMS is using 18 own vehicles for the first wing and 50 hired vehicles for the second wing. In HOPCOMS, the first wing is used to carry the fruits and vegetables from procurement centres. These procurement centres are located in and around Bangalore within radius of 50 kms. Vehicles are allotted everyday to these routes as per the requirements, within the time frame. At morning 7.30 AM vehicle will departure from godown by loading the fruits and vegetables to the allotted outlets to dispatch fruits and vegetables to the respective outlets. Further the vehicles reach the procurement centre at 12 PM and collect the fruits and vegetables from the procurement centres the same vehicle will leave procurement centre at 4 PM and reach the godown at 7 PM. In general every day the same routine operations are followed. Under the second wing only hired vehicles are used. Every morning the vehicle should reach godown at 6 AM and all the sales persons will buy the required fruits and vegetables in godown and load into the vehicle. The vehicle will dispatch the fruits and vegetables to the respective outlets and bring back the empty trays to the godown.

Table 4.24 : Storage life of fruits and vegetables

Crops	Month	Cool chamber		Room Temp	
		Days	Weight loss (%)	Days	Weight loss (%)
Mango	Jun-Jul	9	5.04	6	14.90
Banana	Oct-Nov	20	2.50	14	4.80
Lime	Jan-Feb	25	6.00	11	25.00
Potato	Mar-May	90	7.67	46	19.08
Spinach	Feb-Mar	8	7.03	3	16.00
Amaranth	May-Jun	3	10.98	,1	49.80
Methi	Feb-Mar	10	10.80	3	18.00
Okra	May-Jul	6	5.00	1	14.00
Carrot	Feb-Mar	12	9.00	5	29.00
Tomato	Apr-May	15	4.42	7	18.62

Source: HOPCOMS report 2007-08

Table 4.25 : Transport arrangements

Routes of operation (First wing)				
Route	**Go down (7.30AM)**	**Retail outlets (10.30 AM)**	**Procurement centre (12 PM)**	**Godown (7PM)**
Route I				
Hoskotae	From godown	White field	Hoskotae Malur	Back to go down
		Gardarcharpalya		
		3 points in Hoskotae		
Route II				
Doddabalapur	From godown	Anand nagar	Doddabalapur	Back to go down
		Yelahanka shop 1,2		
		Devanahalli		
		Vijayapura		
Route III				
Channapatna	From go down	Rajarajeshwari nagar	Channapatna	Back to go down
		BEML layout		
		Channapatna		
Route IV				
Kankapur	From go down	Jay nagar 4 & 5th block	Kankapur	Back to go down
		J P nagar 1 & 2nd block		
		Kankapur		
		Valley school		
Route V				
Sarjapur	From go down	Kormangala I,II,III	Sarjapur	Back to go down
		HSR layout		
		Agara		

Source: HOPCOMS

4.3.12 Private Vehicle Expenditure

It is clear from the table 4.26 that the total numbest in of trips by private vehicles was highest during the month of April and May. Hence the expenses towards hiring of vehicles were also high during these months. Similarly the trips were comparatively less during September to December. As a result the expense towards hiring of private vehicles has come down.

4.3.13 Expenditure for hired vehicles (third party logistics)

In respect of hired vehicle HOPCOMS had fixed the transportation rate ranging from Rs 195(less than15 kms) up to Rs 385(more than 50 kms) (table 4.27). The hired vehicles work on daily basis with in their respective routes as fixed by HOPCOMS.

4.4 Constraints in logistic management of fruits & vegetables

At present HOPCOMS is facing several constraints in the logistics management. These constraints faced by HOPCOMS have been listed under various headings.

4.4.1 Procurement

- Procurement centres are located far away from production areas and as a result transportation cost is high.
- Procurement centres are not well equipped to grade the fruits and vegetables and as a result the fruits and vegetables are transported to godown. Hence there is an inordinate delay in sale of fruits and vegetables at retail outlets to consumers leading to wastage.
- At present procurement centres are collecting fruits and vegetables in gunny bags from the producers resulting in damages to the produce.

Table 4.26 : Month wise expenditure on Private Vehicle (2008)

Month	Amount (Rs)	Trips (No)
April	2,99,900	1403
May	3,14,245	1463
June	2,84,625	1332
July	2,96,190	1333
August	2,88,685	1260
September	2,52,285	1184
October	2,72,210	1208
November	2,76,520	1235
December	2,78,860	1258

Source: HOPCOMS-2008

Table4.27 : Hired vehicle charges

SI. No.	Kilometer	Amount (in Rs)
1.	Min 8 to 15	195
2.	16 to 30	250
3.	31 to 50	340
4.	Above 50	385

Source: HOPCOMS-2008

- The procurement centres are not using plastic crates and further there is no system for packaging the fruits and vegetables. Hence there is no scientific way of handling the produce and as a result the retail outlets are not able to attract well to do urban consumers.
- The procurement centres are not using plastic crates and further there is no system for packaging the fruits and vegetables. Hence there is no scientific way of handling the produce and as a result the retail outlets are not able to attract well to do urban consumers.
- At the procurement level weighment of produce is done through weighing scale. As a result majority of the farmer- members are not happy about the weighment.
- Sometimes procurement centres are unable to procure sufficient quantity of fruits and vegetables. As a result the vehicle which brings the produce from procurement centres to godown is not used optimally resulting in high transportation cost and also loss in sale of fruits and vegetables.
- At present there are no proper grading specifications with respect to fruits and vegetables. This has resulted in procurement of all types of fruits and vegetables without bothering about the quality parameters. Sometimes this creates mistrust among the farmer-members since they feel that there is no incentive for bringing good quality produce. Further HOPCOMS is incurring losses due to high wastage as they are unable to sell inferior quality of produce.
- The communication between officials at procurement centres and store level is rather absent. As a result matching of demand and supply of fruits and vegetables is not there thereby losing the chance in selling their produce or unable to dispose the produce procured from the farmers.

- At present HOPCOMS is procuring fruits and vegetables on indent basis. However in majority of the cases farmers bring their produce without any indent. As a result the HOPCOMS may purchase limited quantity of the produce if there is a need or it may even refuse to purchase the produce from the members. This has created mistrust among the farmer members. Added to it there is no proper guidance to farmers for harvesting of fruits and vegetables at appropriate time.
- At present the staffs who are working with HOPCOMS in procurement operations do not have any exposure to operational aspects of supply chain and logistics management. Hence the staff procures fruits and vegetables on a hunch. This has created problems in transportation, storage and distribution.
- At present fruits and vegetables procured by procurement centres are transported in open air conditions without any provision for cooling chambers. Hence the products procured at procurement centres deteriorate very fast in the absence of cooling chambers. Besides the products also not very attractive to sale since they do not look fresh. As a result the retail units are not able to dispose to final consumers resulting in losses to the organization.
- Majority of farmer-members lack awareness about the harvesting practices and also handling (Plate 4.1). Many farmers sell fruits and vegetables during afternoon leading to quick ripening.
- HOPCOMS at present follows indent system while procuring fruits and vegetables from the farmer-member this indent system has got its own drawbacks. Since HOPCOMS procure hardly 10 percent of harvested produce this has resulted in large number farmer-members selling fruits and vegetables to the traders either at the farm gate level or at the wholesale market level.

Plate 4.1 : Compression injuries on tomatoes and beans

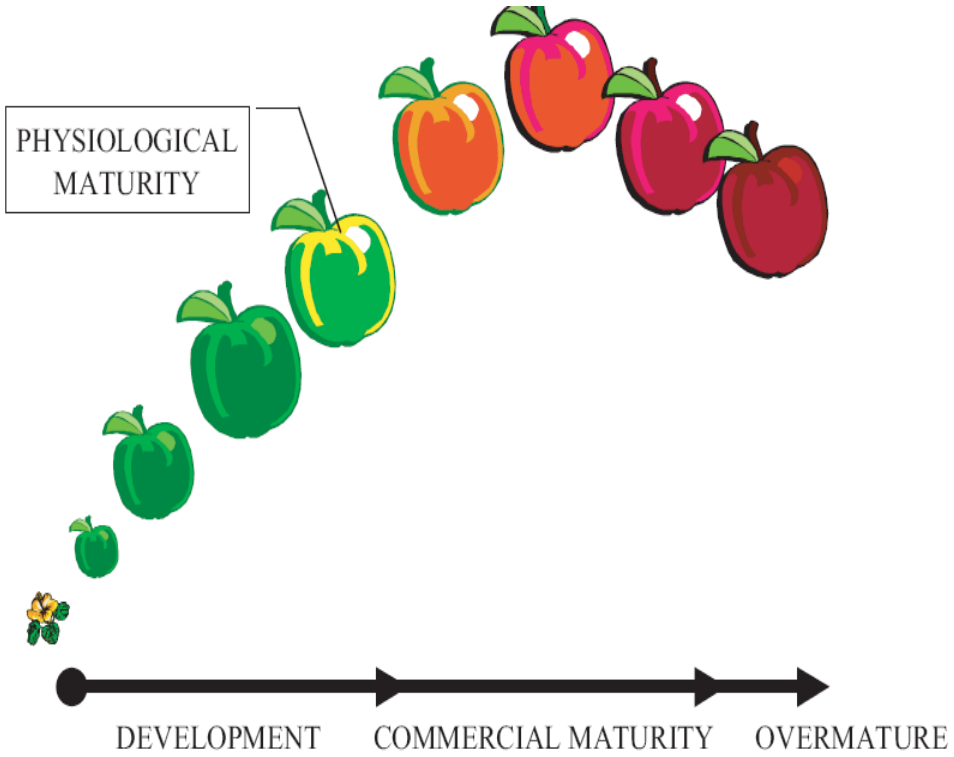
- At present there is no proper guidance to famers about the procedure for harvesting fruits and vegetables. The maturity index varies with the crop. For instance farmers are harvesting either less matured or over matured tomato which will not fetch good value in market due to poor quality. Hence tomato should be harvested at physiological maturity (Plate 4.2) which is better suited to the market at this colour of the fruit just turn green to red colour, where as tomato at commercial and over mature stage not suited to the retail market instead it is suited for processing purposes.

4.4.2 Godown

- No scientific handling of fruits and vegetables at godowns due to lack of facility and also lack of exposure to modern methods of storage by the employees.
- Even in central godown provision for cold storage facility for storage of fruits and vegetables has not been made.
- The fruits and vegetables are not graded properly and sold to the customers without any proper grading and packing. At present majority of urban consumers are preferred to buy graded and standardized products. Since retail units are not focusing on proper grading, packing the potential for regarding customers has been lost.

4.4.3 Distribution

- The vehicles owned by HOPCOMS are not used optimally while transporting the produce from procurement centres to godown and also to retail units(Plate 4.3) This has resulted in high logistics cost. Added to it crates are not being used to carry fruits and vegetables. Instead most of the vegetables are carried in gunny bags resulting in losses to the organization.



Source: FAO

Plate 4.2 : Quality of Tomato in relation to its ripening

Plate 4.3 : Under utilization of space in the vehicle

- The Transportation vehicles are very old. Hence cost of operation is high due to frequent repairs and also due to less mileage.
- Drivers are working on fixed working hours from 9 AM to 4 PM. However the activities undertaken by HOPCOMS involve working in odd hours. As a result the organization not able to use employees effectively resulting in poor management of staff and further adding to cost of operation.
- Drivers are not willing to work during holidays

4.4.4 Retail outlets

- Shortage of staff in the retail outlet leading to difficulties in monitoring. This is common problem expressed by sales person of retail outlets at HOPCOMS.
- Front views of Retail outlet Buildings are not attractive unlike other organized retailers as shown (Plate 4.4). No painting or repair for these structures since many years, thereby it gives very shabby look to Consumers.
- No shelters in front of the shop (Plate 4.5) thereby difficult to cope up with summer and rainy season. Most of the shops are located in main roads, hence there is shortage of space resulting display of fruits and vegetables outside the store.
- The utilization of space and display of fruits and vegetables inside the HOPCOMS retail outlet is unscientific (Plate 4.6).
- Many stores are adjacent to main roads, majority of high end customer owning four wheelers without any parking facility are unable to visit these stores.
- The motivational level of staff is very low in HOPCOMS. At present HOPCOMS is not giving any incentives to the staff for increasing sales and reducing wastages.

Plate 4.4 : Front view of HOPCOMS retail outlet

Plate 4.5 : Exposure of fruits and vegetables to sunlight

Plate 4.6 : Improper display of fruits and vegetables

- The policy of HOPCOMS in respect of disposing wastages is also not clear.
- No flexibility in price for the material unsold, due to any changes in price its loss to the store salesmen.
- Sales persons do not give receipt for purchasing of fruits and vegetables to customers tend to lose faith in the system.
- Sometimes consumers are not getting fresh fruits and vegetables due to selling of previous day left out material thereby elite customers are shifting from HOPCOMS to organized retail units.
- Some of the retail stores are established by using iron roof sheet (Plate 4.7). These sheets become hot quickly due to direct exposure to sunlight during summer. Fast deterioration of quality of fruits and vegetables during summer months (Plate 4.8) due to heat absorbed by the iron roof sheet and also there is proper no ventilation.
- Due to improper fitting of doors of outlet (Plate 4.9), during night times rodents will enter retail outlets destroy fruits and vegetables resulting in more losses to HOPCOMS.

4.4.5 Issues related to Management of HOPCOMS

- Political interference in the day to day administration of HOPCOMS
- Operational efficiency is very low
- No incentives for drivers on holidays and festival days
- No proper supervision among workers by managers thereby efficiency of workers has come down drastically
- Members involvement and participation in the HOPCOMS is also very low
- Lack of professionalism in the management of HOPCOMS

Plate 4.7 : Retail outlet store with iron roof sheet

Plate 4.8 : Driage and decay of fruits and vegetables

Plate 4.9 : Improper fitting of store

- Lack of funds and as a result dependence on government for money is very high.

4.5 Factors influencing selection of logistic system for fruits and vegetables

Management of Logistics and Supply Chain enables the retailer to transport or store products more effectively. Efficient logistics management not only prevents unnecessary movement of goods and also frees up storage space for productive use**.** The importance of this can be understood by the fact that the logistics management cost in India is as high as 7 percent to 10 percent against the global average of 4 percent to 5 percent of the total retail price. Therefore, there is a need to reduce logistic cost in the HOPCOMS at least by 3 percent to 5 percent by improving the supply chain and logistics management. The important components of logistic management are divided into two and they are back end operation and front end operations and the same are presented below.

4.5.1 Back end operation

1. HOPCOMS need to provide extension services regarding crop planning, selection of variety, market information farmer-members. This will lead to farmers producing fruits and vegetables as per the market requirement.
2. HOPCOMS should employ persons having good exposure about procurement operations for procuring fruits and vegetables at procurement centre. This will lead to providing technical knowledge to the farmers and also procuring the fruits and vegetables.

4.5.2 Front end operation

4.5.2.1 Procurement

1. Procurement centres need to be well equipped with modern facilities like computerization, electronic weighing and electronic billing in order to create transparency in the system. Further display of quantity required and the prices of fruits and vegetables in the procurement centres will also help the farmer members to bring the quantity required for the procurement centres.
2. Information flow is very important in the logistics management. The procurement manager should have good information about demand from retail units to procure required fruits and vegetables and also to procure fruits and vegetables from farmer-members on indent basis to keep losses at minimum. Besides the number of vehicles required to transport fruits and vegetables from procurement centre to godown, can be reduced by proper planning of procurement of fruits and vegetables and also for distribution.
3. The employees who are working at the procurement centres should have cordial relationship with farmer-members for continous sourcing of fruits and vegetables, since many retail chains are operating at farm end for buying of fruits and vegetables from farmers.
4. Ripening chambers can be established at godown level to adjust the available supply of fruits and vegetables thereby cutting down the logistics cost.

4.5.2.2 Grading, sorting and cooling chambers

1. Grading and sorting can be under taken at procurement centre. This will help in proper screening of quality fruits and vegetables, since urban customers are highly quality conscious and demand good quality fruits and vegetables.

In this respect replication of Safal mechanical graders to grade all fruits and vegetables may be thought of. Mechanical graders are one time investment and economical compared to manual grading.

2. The availability of Fruits and vegetables is seasonal. For instance, the main arrival season for apple is July to October, for Mango it is April to August and for grapes it is February to July. HOPCOMS may procure sufficient quantity of fruits during season and store it in cold storages units to increase shelf life and can sell the same to consumer during lean season.

4.5.2.3 Transportation

1. Transportation of fruits and vegetables is an important step in the logistics management. Since fruits and vegetables are highly perishables it should be transported in safe manner by using modern packaging materials like plastic crates in order to reduce the physical damages to fruits and vegetables while handling at multiple stages.
2. HOPCOMS can plan for Replacement of old vehicles by purchasing new vehicles in order to increase the efficiency of transportation of fruits and vegetables. This will lead to lower the operation cost.

4.6 Designing suitable logistic system for fruits and vegetables

4.6.1 Proposed model of supply chain/ Logistics management "Farm to city"

The proposed model to HOPCOMS is **"farm to city"** as the name implies the **"farm to city"** approach is based on investing in the complete chain – starting from the input level to the front end retail. The main components of this model are:

I) Rural business hub, ii) Procurement centre and iii) Retail end.

1. Rural business hub

The rural business hub is essentially a "rural store" set up by the HOPCOMS on its own or as a joint venture with private input agencies in the semi-urban and rural areas. These "rural store" : i) provide inputs and farm support services including seeds, fertilizers, plant protection chemicals, extension support and other services such as lab testing, water testing etc. ii) Serve as procurement centers for fresh fruit and vegetables.

ii) Procurement centre

At present HOPCOMS is not procuring required quantity of fruits and vegetables from famers-members. In the proposed model, HOPCOMS has to procure fruits and vegetables only from farmer-members. HOPCOMS need to devise mechanism to procure fruits and vegetables from farmers after harvesting their produce and the material should reach to procurement centre/ collection centre. The procurement centre after collection of required produce need to transport to the godowns within 3 hrs by using plastic crates to minimize the transportation losses. The partial grading and sorting should be carried out to remove damaged and diseased conditions and the same need to keep at zero energy cool chamber. The fruits and vegetables kept in zero energy cool chamber need to be distributed to retail outlet in the morning hour.

iii) Retail end

The fruits and vegetables need to be distributed to the retail outlets as well as institutions within 2 hours by using crates .By using crates the losses in fruits and vegetables can be minimized (table 4.28). The concept of using crates for handling of fruits and vegetables from farm end till sales to the final consumer need to be taken by HOPCOMS at the earliest.

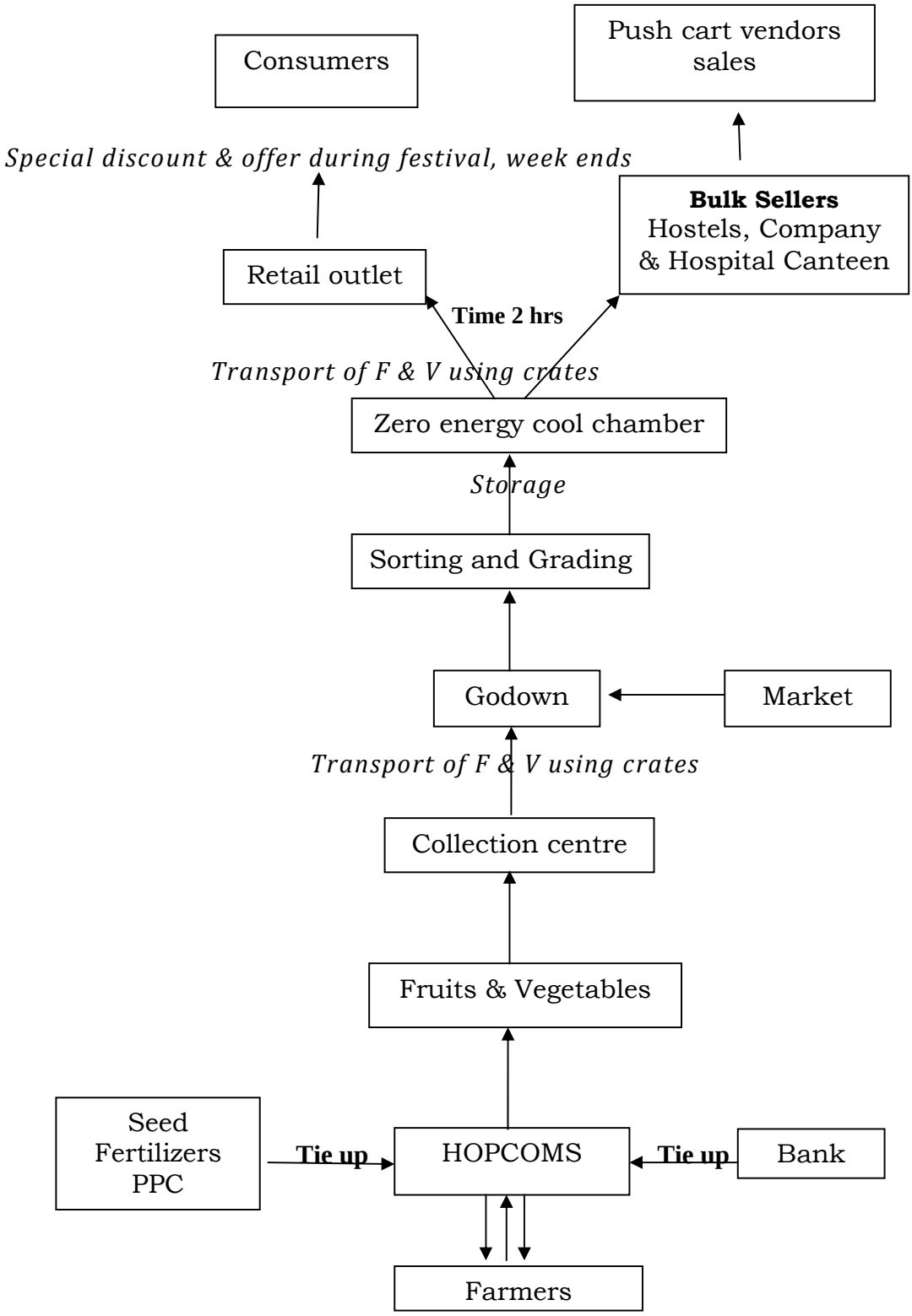


Figure 4.7 : Proposed model of supply chain/ Logistics management for HOPCOMS

Table 4.28 : Estimated reduction of losses of fruits and vegetables by using crates

Fruits and vegetables	Estimated loss (In per cent)
Tomato	5
Chilly	4
Fruits	2
Carrots, ladyfinger, drumstick etc	3
Cauliflower	4
Potatoes	2
Other leafy vegetables and flowers	8

By using crates, post harvest losses could be reduced drastically. The study conducted by Research Center (Tamil Nadu University) has revealed that, by using crates a farmer can reduce handling losses by 2 to 5 percent. In retail outlets the membership cards can be introduced to keep the customers on a long term sustainable basis. Special discounts can be given to the members for purchasing of fruits and vegetables there by increasing the sales.

Discussion

CHAPTER V
DISCUSSION

The results of the study presented in the previous chapter are discussed below under following headings.

5.1 General profile of HOPCOMS

5.2 General profile of producers and consumers

5.3 Logistic structure for fruits and vegetables

5.4 Constraints in the present logistic structure

5.5 Factors influencing in selection of logistics

5.6 Designing suitable logistic system

5.1 General profile of HOPCOMS

The general profile of HOPCOMS includes origin and development, membership pattern, structure and growth of HOPCOMS, types of fruits and vegetables procured from members, crop calendar, marketing channels, retail outlets, and performance of HOPCOMS.

5.1.1 Origin and development

The Bangalore 'Grape Growers' Marketing and Processing Co-operative Society was established in 1959, under the guidance of Dr. M.H. Mari Gowda, the then Director of the Department of Horticulture. The main objective of the society was to encourage grapevine cultivation by providing necessary inputs, technical knowhow and marketing facilities to grape farmers. The jurisdiction of the HOPCOMS included Bangalore, Kolar, Mysore, Tumkur, Mandya and Mangalore districts. Since grape was a seasonal fruit, the society started handling all types of fruits and vegetables from 1965, and as a result the nomenclature of the society was changed as Horticultural Producers Co-operative Marketing and Processing Society Ltd. In 1997 district level HOPCOMS were formed

as independent units. Consequently in 2006 the area of operation of HOPCOMS was reduced to three districts i.e. Bangalore urban, Bangalore rural and Kolar as its area of operation. In remaining districts independent HOPCOMS were organized.

5.1.2 Structure

The initiative to establish HOPCOMS was taken by the Department of Horticulture. The Department of Horticulture has a number of schemes to improve production and marketing of horticultural crops in the State like providing quality seedlings to the growers at subsidized rate, giving assistance to the growers to build storages and green house etc. HOPCOMS is concerned with procurement and sale of fruits and vegetables. For the overall Development of Horticulture, the department of horticulture adopted the idea of 4 limb of approach (table 4.1).

The success of HOPCOMS led to the establishment of 15 district level co-operatives societies and 25 commodity societies. For several years, eight district level societies were under the control of HOPCOMS, Bangalore (Bangalore Urban, Bangalore Rural and neighboring Kolar, Tumkur, Mandya, Mysore and South Canara) (figure 4.1). Subsequently during the year 1998 16 district level HOPCOMS were established. As a result HOPCOMS in these districts started working independently.

5.1.3 Growth

The Horticulture Producers Co-operative Marketing and Processing Society Limited (HOPCOMS), with its headquarters in Bangalore, is a unique cooperative organization for marketing of horticultural produce. It has five procurement centres located in and around 50 km radius from Bangalore for procuring fruits and vegetables (table 4.2). The fruits and vegetables are distributed through 504 retail outlets, of which 320 are in

different localities of Bangalore city, 18 in rural Bangalore, and the remaining in other districts of Karnataka.

The HOPCOMS initially started membership with 507 farmers with a total paid up share capital of Rs. 1,269 in 1959. Over the period of time the membership increased to 16,300 in 2007-08, with a total paid up share capital of Rs. 258.54 lakhs due to the increasing awareness among farmers about the activities of HOPCOMS and its importance to the farming community in marketing of fruits and vegetables. Further HOPCOMS has developed a network of procurement centers, godowns, retail outlets and input supply centers in eight districts of Karnataka. HOPCOMS is the only intermediary between farmer and consumer (figure 4.2). Apart from retailing, HOPCOMS is also undertaking processing activity by supplying fresh fruit juice to the consumers through their retail outlets.

5.1.4 Profile of Membership

The membership of HOPCOMS falls into different categories (figure 4.3). The membership of the HOPCOMS consists of three categories viz., 'A' class members, 'B' class members, 'C' class members (table 4.3). The society is managed by the board of directors consisting of 15 members of whom 11 are elected, from the 'A' class members and 3 members are nominated by the department of cooperation and one member is nominated by the government of Karnataka. Any farmer can become 'A' class member on payment of Rs. 100/- towards one share in the HOPCOMS. The members of the co-operative, are eligible sell their produce to HOPCOMS. Further they are also entitled to receive dividend if the society earns profit. The member's contribution to share capital stands at just over Rs.25.78 lakhs which is hardly 10 percent of the total shareholding of HOPCOMS.

The second category of members, 'B' Class members, is mainly for institutions like NHBs, NGOs and NCDC etc who also have hold a stake in the society. The contribution of 'B' class members to share capital of HOPCOMS is Rs 4.67 lakhs, which is less than 2 percent of the shareholding.

The state government is 'C' class members which has highest shareholding (Rs. 228 lakhs) of HOPCOMS, and this forms about 88 percent of the total shareholding. The remaining shareholders are classified as 'D' Class and have a negligible share in the HOPCOMS.

5.1.5 Membership pattern

The initial membership of the society was 507, which increased to 16300 during the year 2007-08 with a growth rate of 44 percent (Table 4.4). Similarly HOPCOMS share capital and owned funds also increased substantially during the same period. The phenomenal increase in membership of HOPCOMS was mainly due to availability of market for fruits and vegetables produced by farmers through HOPCOMS. Further the facilities provided by HOPCOMS also encouraged large number of HOPCOMS to grow fruits and vegetables and in the process joined as members of HOPCOMS to market their produce.

5.1.6 Types of Fruits and Vegetables procured from members by HOPCOMS

HOPCOMS has established its procurement centres in major production areas of fruits and vegetables at Hoskotae & Malur, Doddabalapur, Devanahalli, Kankapur and Channapatna. HOPCOMS has established procurement centre around Bangalore with a radius of 50 km for easy transportation of fruits and vegetables from procurement centres to godown. The vegetables procured from farmer-member are mainly Tomato, Potato, Brinjal, Leafy vegetables, Gourds, Cabbage m

Cauliflower Carrot, Radish, Beetroot, Capsicum, Turnip, Broccoli, Bhendi, Beans, Cucumber, Coriander, Onion Field bean, Cluster bean and Knolkhol similarly the fruits like Apple , Banana, Pomegranate, Papaya, Orange, Musambi, Guava, Peach , Plumb, Pear and Amla (Table 4.5.) HOPCOMS also procures from institutional agencies and traders outside the state like Apple from Shimla, Oranges from Nagpur, Grapes from Nasik and Litchi from Bihar. Further few vegetables not available within the state are also procured from outside the state.

5.1.7 Crop calendar

The availability of fruits and vegetables and procurement of fruits and vegetables presented in Table 4.6 and Table 4.7 gives clear idea of peak and lean season for fruits and vegetables. The peak season indicates availability of surplus quantity of fruits and vegetables where as lean season indicates non availability of fruits and vegetables in sufficient quantities. The vegetables like Tomato are grown throughout the year but the peak season is during the month of May to July. The Potato crop is grown in two season namely rainy season (June to August) and Rabi season (September to December). The leafy vegetables and beans are grown throughout the year due to high demand in market and also due to suitability of climate. The Cole crops like Cabbage, Cauliflower, Carrot, and Beetroot are grown during the month of September to December. The other vegetables like Pumpkin, Radish, Capsicum, Bhendi, Gourds are grown in large quantity during the month of May to August.

In general the seasons for fruits confined to few months for example Papaya is available in the month of January to April and October to December, Sapota during the month of March to May, November to December, Pineapple during the month of May to August, Grapes during the month of March to May, Guava during the month of

August to October, Banana during the month of January to May and August to December, Watermelon and Muskmelon during the month of march to June. All these fruits are available locally within state where as other fruits like Apple from Shimla which is available during the month of September to December, Orange and Musambi from Nagpur available during the month of March to June, where as other fruits like Mango during the month of May to June, Pomegranate during the month of June to October, Grapes during the month of March to May, Based on the season and availability of fruits and vegetables the procurement of these fruits and vegetables is planned in order to meet demand of the customer.

HOPCOMS is also organizing Mango mela every year during the month of May to June by opening its outlets in public places. For this mela HOPCOMS procures large quantity of Mango from places like Srinivaspura in Kolar district and sells it to customers at discount rate. Similarly Grape mela is also held during the month of March to May, and the grapes are procured from Bijapur and parts of Devanahalli. HOPCOMS sells these fruits through its outlets at reasonable price to the customers.

5.1.8 Marketing Channel

At present HOPCOMS follows channel-2 and channel-3 for marketing of fruits and vegetables (fig 4.4). Nearly 75 to 80 percent of fruits and vegetables procured from farmer-members are sold through HOPCOMS retail outlets and the remaining 25 to 20 percent of fruits and vegetables are sold to various institutions (like company's, hostels, and hospitals canteens). Further no intermediaries are involved in this channel thereby major share of consumer rupee goes to farmer-members. In contrast to this the competitors follows channel-1 for marketing of fruits and vegetables which involves intermediaries who

take major share of consumer rupee and as a result the producer member gets a very small share.

5.1.9 Retail outlets

HOPCOMS has opened 278 retail outlets in Bangalore city to supply fresh fruits and vegetables to the consumers. For the opening of retail outlets, the sites have been provided by the respective corporations / municipalities / development authorities on lease basis at nominal charges. The retail outlets are being managed by the salesmen who are employees of HOPCOMS. As part of its marketing strategy, HOPCOMS has established majority of retail outlets next to milk booths, railway stations, bus stands and other prominent locations. The retail outlets operate between 10.30AM and 8PM with a break of 2 hours in the afternoon and are managed by two people, one of whom is a permanent employee of HOPCOMS and the other working as assistant on a temporary basis. In many retail stores only one permanent employee is managing the store. If the retail store sales are more than Rs 8000 per day usually HOPCOMS provides one additional employee. HOPCOMS has made provision for wastages, at the retail level to 3.5 percent within which the sales person has to manage wastages.

HOPCOMS is using 19 owned & 40 hired vehicles to supply fresh fruits and vegetables to retail outlets. The retail outlets in Bangalore are classified into 4 divisions like North, South, East and West (Table 4.8). As the data indicates most of the retail outlets in Bangalore are concentrated in South and West Bangalore (86 & 73 respectively) followed by East Bangalore (45). However the number of HOPCOMS retail outlets in North Bangalore is low with just 22.

5.1.10 Performance of HOPCOMS

The HOPCOMS business for the past ten years (table 4.9) indicates that during 1996-99 the society was incurring huge losses and over the period of time but gradually started earning profit. This is mainly due to bifurcation of HOPCOMS to respective districts and also due to poor management.

5.2 General profile of producers and consumers

The general profile of producer-members includes age, education, crops grown, place of sale and duration of relation with HOPCOMS. Similarly profile of consumers include age, education, occupation also frequency of purchase and reasons for purchasing at HOPCOMS were discussed below.

5.2.1 Socioeconomic profile of producer-members selling at HOPCOMS

The details on the socioeconomic profile of the sample farmers provided in table 4.10. Among fruits and vegetables suppliers to HOPCOMS majority are farmer-members and only few are non members. Out of the total respondents surveyed majority of respondents are in the age group of 45-50 years. All these farmers are selling their major share of fruits and vegetables in HOPCOMS based on indent given. Majority of HOPCOMS members are small and medium farmers having less than 3 acres of land holdings. Further majority of respondents are literates.

5.2.2 Place of sale of fruits and vegetables by Producer-members

Among the producer-members majority are selling fruits and vegetables at HOPCOMS (table 4.11), mainly due to realization of higher returns, correct weighment and immediate cash after selling. As a result farmer-members are selling fruits and vegetables to HOPCOMS.

5.2.3 Crops cultivated by members and non members

Based on the availability of resources farmers grow all most all vegetables which is having demand in market. Since majority of farmers are small and medium HOPCOMS giving inputs at subsidized rate to take up fruits and vegetable cultivation and also supply vegetables to HOPCOMS (table 4.12).

5.2.4 Duration of the relationship of the Farmer-members with HOPCOMS

HOPCOMS is the unique cooperative organization for procuring and selling of fruits and vegetables. It is a famer's organization wherein producer-members can sell directly to consumers through HOPCOMS retail outlets. Among the respondents many of them having long term relationship with the HOPCOMS (more than 15 years) (table 4.13). This shows that awareness among farmers about HOPCOMS good opinion about the organization.

5.2.5 Socioeconomic profile of consumer shopping at HOPCOMS retail outlets

As presented in table 4.14 many of the respondents are having nuclear families with an average family size of 3 members. Majority of respondents are literates. Further many of respondents are from middle income group. As a result they are highly health consciousness and spending more money on purchase of quality fruits and vegetables. Majority of respondents are having good opinion of HOPCOMS due to availability of fresh fruits and vegetables in its retail outlets.

5.2.6 Socioeconomic status of consumer shopping at HOPCOMS retail outlets

As shown in table 4.15 among the consumers female constitutes nearly 52 per cent who are purchasing at HOPCOMS retail outlets. Also majority of the female respondents had the same opinion about the availability of fresh fruits and vegetables at HOPCOMS retail outlets. Nearly 31 percent of consumers are the age group of 30-35 years. With respect to the occupation of the respondents majority of them engaged in business followed by working in IT companies and expected HOPCOMS to supply quality fruits and vegetables. Majority of consumers expressed that the availability fresh and quality fruits and vegetables at HOPCOMS.

5.2.7 Frequency of purchase by HOPCOMS

With respect to purchasing of Fruits and Vegetables (table 4.16), majority of respondents are purchasing fruits and vegetables daily because of habit of consuming fresh fruits and vegetables. Further only few respondents expressed they purchase fruits and vegetables twice in a week because both the spouses are working and very little time to purchase daily at HOPCOMS retail outlet.

5.2.8 Reasons for purchasing at HOPCOMS

From the results it can be observed that consumers purchasing fruits and vegetables at HOPCOMS due to availability of fresh fruits and vegetables. Further fruits and vegetables available at HOPCOMS are reasonably priced compare to other retail chains and open market followed by easy to access from their residents to the HOPCOMS retail outlet (third) and lack of choice (forth) as shown in table 4.17.

5.3 Logistic structure of HOPCOMS

The logistic structure for fruits and vegetables in HOPCOMS involves procurement of fruits and vegetables from procurement centre, transportation to godowns, grading, pricing, storage and finally distribution to it retail outlets. These issues are discussed below.

5.3.1 Procurement centres

HOPCOMS Procurement centres are located at **Hoskotae & Malur, Doddabalapur, Devanahalli, Kankapur and Channapatna** in and around 50 kms radius of Bangalore (figure 4.5). The produce is either collected from the member's field or the growers bring their produce directly to designated places. The produce is procured from farmer members are transported to central godown from where it is distributed to the retail outlets and to the institutions. Each procurement centres collect nearly 3 tons of fruits and vegetables per day from the farmer-members for supplying it to retail outlets.

5.3.2 Process for the Procurement and Sale of Produce

The famers who wish to sell fruits and vegetables to HOPCOMS have to be a member. Secondly while procuring fruits and vegetables from farmer members HOPCOMS follows indenting system. The indent system is based on the demand for fruits and vegetables by the consumers. On receiving the indent order for the required quantity, the famer-members have to bring the produce to the procurement centre, or to HOPCOMS main centre at Bangalore. The produce is checked with regards to it quality. Further the produce is graded and a receipt for the same is given to the farmer member to encash money from Bank branch within the procurement centre or godown, thus enabling farmers to take cash immediately (figure 4.6). On an average nearly 195-200 farmers bring their produce daily directly to the HOPCOMS. At present the

HOPCOMS handling about 110 MT of fruits and vegetables out of which about 75 percent is distributed through retail outlets and 25 percent is distributed to the institutions like Hostels, Government hospitals, Clubs and to industrial establishments. It also undertakes bulk supply of fruits and vegetables on bulk basis to the marriages and other social functions. The present system ensures that farmers who bring their produce to the procurement centres can sell it to HOPCOMS for a reasonable price and get cash on the same day. This system of selling and realization of cash on the same day is better than other channels particularly compared to farmers selling their produces to local traders, commission agents and wholesalers.

5.3.3 Quantity and Value of fruits and vegetables procured by HOPCOMS

The Table 4.18 clearly shows that decreasing trend in procurement of fruits and vegetables over the months by HOPCOMS. During the months of April to June the quantity of fruits procured is high particularly Grapes and Mangoes. During this period HOPCOMS procure large quantity of Grapes and Mangoes directly from farmers in various production areas like Grapes from Bijapur, Devanahalli and parts of Chikkaballapura district and mangoes from Srinivaspura and other parts of Kolar district to supply to consumers at reasonable rate. Subsequently procurement of fruits and vegetables reduced due to lean season. Similarly prices were high during the month of April to June due to less production of vegetables during summer followed by prices falls to low due to high production of vegetables during kharif and consequently low prices to fruits and vegetables.

5.3.4 Share of quantity procured from farmer-members and market

HOPCOMS procure fruits and vegetables from farmers as well as market (Table 4.19). HOPCOMS procure large quantity of fruit and

vegetables from farmer member which accounts to nearly 80 percent and remaining 10 to 20 percent is procured from market depending on availability of produce from farmers. Hence procuring from farmers is more advantageous compared to market because HOPCOMS can get fresh good quality of fruits and vegetables. However the quantity procured from farmers is decreased over the months on other hand quantity procured is increased from market over the month from April to December. This is mainly scarcity of water in many vegetable producing areas as farmers stopped cultivation of vegetables. Only in few areas where assured irrigation is available farmers take up production vegetables.

5.3.5 Go downs operation

The procurement centres purchase vegetables from farmer-member based on the indent received from HOPCOMS main office. The vegetables procured by procurement centres are transported to HOPCOMS godown on the next day. In the godown there are nearly 11 compartments (table 4.20) to store fruits and vegetables separately. In each compartment godown store keeper record the quantity of arrivals from procurement centres. The fruits and vegetables stored in compartment is graded and the same is distributed to retail unit through HOPCOMS vehicles and also through private vehicles. Since fruits and vegetables are highly perishable in nature HOPCOMS has made a provision for wastages. At the godown level provision for wastage is up to 2 percent and at the retail level the wastage up to 3.5 percent.

5.3.6 Grading of various fruits and Vegetables followed by HOPCOMS

HOPCOMS at present follows eye sight grading for grading various fruits and vegetables (Table 4.21). HOPCOMS at present is not using any specifications for grading of fruits and vegetables. For example highest quality of 'Apple' was graded as 'A' grade apple ('A' grade apple with big

size, medium size and small size having red colour) followed by 'B' grade apple('B' grade stands next having big size, medium size and small size slightly dull red colour).

In case of Mango 3 grades are followed. They are A grade, B grade, C grade. The A grade (having big size weighing 280-338 gms) yellowish colour and B grade (having medium size weighing 222-280 gms dull yellowish colour). Grade 'C' (having big and medium size weighing 163-222 gms with shaded colour.

In Banana 2 grades are followed. They are A grade and B grade Banana. The A grade Banana having big size greenish white colour with no wrinkles. The grade B Banana having small and medium size, green colour.

In Papaya 2 main grades are followed. They are A grade and B grade. The A grade Papaya has big size, with bright yellow patches. The B grade Papaya having medium size and small size.

In HOPCOMS, eye sight grading was followed for vegetables. For Ridge guard there are 2 grades followed, they are 'A' grade Ridge guard having straight length, normal size, greenish to dark green colour. 'B' grade Ridge guard having slightly aged, light wrinkle shape.

For Brinjal, 2 grades followed. 'A' grade Brinjal having medium size, shining white strips colour and on top must be green. 'B' grade Brinjal having abnormal size, shining white strips colour, but whitish strips, tip greenish.

For cluster bean there are 2 grades namely 'A' grade cluster bean having medium size, greenish yellow colour and tip on top. 'B' grade cluster bean having small size, greenish yellow colour.

In case of Chilli, 2 main grades were followed. 'A' grade chilli having dwarf size is Chameli variety and long size in Jwala variety, colour must be green and dark green. 'B' grade variety size is also same, with light green colour.

The Cucumber has 2 grades 'A' grade having medium size, greenish yellow strip colour, 'B' grade having big size, green yellow strips colour

5.3.7 Distribution of fruits and vegetables

HOPCOMS procures on an average 110 tons of fruits and vegetables daily both from farmer-members and at open market depending on demand from customers and supply from farmers. Nearly 80 percent of its requirement has been procured from farmers and the remaining quantity is procured from open market. Out of its total procurement 70 percent of fruits and vegetables have been sold in its retail outlets which are located in different areas of Bangalore city, and the remaining 30 percent is distributed to institutions like College canteens, company canteens, hospital canteens and hostels on contract basis. Further HOPCOMS also sell bulk quantity of fruits and vegetables to like marriages and religious ceremonies based on request (table4.22 and chart 4.4).

5.3.8 Pricing policy of HOPCOMS

The regulated markets play a major role in setting market trends and in determination of prices of fruits and vegetables. The regulated markets are established by the Department of Agricultural Marketing. The price at which HOPCOMS buys the produce from the farmer-members is based on the rates and prices indicated by Department of Agricultural Marketing. The department collects the maximum, minimum and model prices for the various commodities sold in the

previous day at APMC markets like Yaswanthpura market, KR market and the same is published in the news paper in the next day. Based on the rates released by the department, HOPCOMS fixes the procurement and sale price for fruits and vegetables. Hence these rates form the basis of the price offered by HOPCOMS to its members. Further the officials of HOPCOMS meet every morning at HOPCOMS and arrive at a price based on the prevailing prices in the market at APMCs. In general the prices fixed by HOPCOMS to members produce are less than the prevailing market price. In general the prices offered by HOPCOMS to its members are almost equal to or less than the prevailing market price. As a result HOPCOMS is able to supply fruits and vegetables to consumers at a reasonable price which is normally on par with the competitors or less than the market price.

5.3.9 Wastages

Fruits and vegetables are highly perishable in nature. During summer months (April to June) the wastages are about 28 to 30 percent. During the months of July to December the wastage are about 17 percent due to cool temperature (table 4.23). However the losses can be kept to minimum by keeping in cooling chamber during the month of April to June. The fruits and vegetables procured from farmers reaches to the consumers almost after 24 hrs. Further at present fruits and vegetables procured from farmers are transported and distributed in open air condition without any cooling facility. As a result nearly one-third of vegetables are wasted before reaches to the consumers. Further climatic variation also affects the quality of the fruits and vegetables.

5.3.10 Transportation arrangements

HOPCOMS logistics has two wings for transportation of fruits and vegetables from procurement centers to godown and to retail outlets. The first wing is operated by HOPCOMS itself with its own vehicles. The

second wing is operated through private vehicles. The details of transportation arrangements are presented in table 4.24. In HOPCOMS first wing owned vehicles are used to carry the fruits and vegetables from different procurement centres to godowns and to retail outlets. These procurement centres are located in and around Bangalore within a radius of 50 kms. The sales persons of all HOPCOMS retail units assemble at godown usually between 4 to 5 AM. They select the fruits and vegetables required for the day. The selected fruits and vegetables are loaded to vehicle at 7 AM within one or two hours and the Vehicles unload the fruits and vegetables at all retail units in the Bangalore city. After unloading fruits and vegetables the vehicles move to respective procurement centres by 12 noon. After loading fruits and vegetables the vehicle moves to godown by 6 PM. This process is continued regularly on every day.

In second wing only hired vehicles are used to distribute the fruits and vegetables to retail units. Every morning the vehicle reach godown at 6 AM. All the sales persons they will buy the required fruits and vegetables in godown and they will load the material into the vehicle. The vehicle will dispatch the fruits and vegetables to the respective outlets and bring back the empty trays to the godown.

The present transportation arrangement followed by HOPCOMS as its own advantages and disadvantages. The drivers manning the HOPCOMS vehicle do not work on holidays. Further their working hours are restricted to 8 hours per day. Hence the drivers do not work as and when it is required by HOPCOMS. To overcome this drawback HOPCOMS is at present using private vehicles to distribute fruits and vegetables to retail units. However the efficiency in the cost of operation has come down drastically due to use of both own and private vehicles. This clearly indicates that owned vehicles are not being effectively used by HOPCOMS

in transporting vegetables from procurement centres to godown and from godown to retail units in a very effective manner.

5. 3.11 Private Vehicle Expenditure

From the table 4.25 it is clear that substantial amount is spent on hired vehicles (Rs 3, 14,245) and number of trips (1463) was high during the month of May to June because of Mango and Grapes melas. This is because during these melas large numbers of vehicles are hired for transportation of fruits from production belts. During in other months the amount spent on hired vehicle remains same. The cost of operation of owned vehicles is very high due to high repairs because of old vehicles.

5.3.12 Expenditure per Kilometer

In respect of hired vehicle HOPCOMS had fixed the transportation rate ranging from Rs 195(<15 kms) up to Rs 385(>50 kms) (table 4.26). However it is observed that the sales persons who carry fruits and vegetables from godown to retail units are not able to use private vehicles to the expected level. For example in majority of the cases sales persons often carry small quantity of fruits and vegetables ranging between 100-150 Kgs. As a result if one worked out the transportation cost with the sale of fruits and vegetables in a retail unit it worked out to be costly proposition for HOPCOMS. This clearly indicates that only in few retail units where procurement and sale of fruits and vegetables exceeds 400 Kgs, the transportation cost are cheaper but in the vast majority of cases the transportation cost are proportionately high.

5.4 Constraints in the present logistic structure

The various constraints related to procurement of fruits and vegetables, storage, distribution of fruits and vegetables to retail outlets, transportation aspects are discussed below.

5.4.1 Procurement

- Procurement centres are located far away from production areas and as a result affects the profitability of HOPCOMS due to high transportation cost.
- Compare to retail chains like Reliance fresh, Food world HOPCOMS Procurement centres are not well equipped to grade the fruits and vegetables and as a result the fruits and vegetables are transported to godown. The grading is done only at godown level that too based eye sight which is not scientific.
- Safal market (unit of NDDB) dealing with fruits and vegetables provides plastic crates to farmers at free of cost who regularly use to carry fruits and vegetables inturn Safal also uses crates to transport produce from procurement centre to godown and to retail store there by transportation losses were reduced to minimum. HOPCOMS at present is collecting vegetables in gunny bags from procurement centres to godowns and as a result the wastages are very high
- There is no proper system for packaging of fruits and vegetables. Hence there is no scientific way of handling the produce and as a result the retail outlets are not able to attract well to do urban consumers.
- HOPCOMS is basically a cooperative organization. Hence its business activity needs to revolve around members. For the success of any organization member's involvement is very important. However if we look at HOPCOMS activities the members participation is negligible. Out of 16000 members hardly 200 to 250 members are selling their produce to produce HOPCOMS. The main reason for this is total sale of fruits and vegetables by HOPCOMS in Bangalore city are very marginal. Added to it are also procuring fruits and vegetables from non-members as well as in the open market. Hence there is a

fundamental flaw in the policy of HOPCOMS towards its own members. Hence it is high time that HOPCOMS makes thorough changes in their procurement policies by insisting that fruits and vegetables are procured only from members. Otherwise HOPCOMS as a cooperative organization remain only in paper.

- HOPCOMS is not using electronic weighing scale at the procurement level. As a result majority of the farmer- members are not happy about the weighment since it is not accurate.
- Sometimes procurement centres are unable to procure sufficient quantity of fruits and vegetables. As a result the vehicle which brings the produce from procurement centres to godown is not used optimally resulting in high transportation cost which affects the earnings of HOPCOMS.
- The communication between officials at procurement centres and store level is rather absent. As a result there is a mismatch between of demand and supply of fruits and vegetables thereby losing the chance in selling their produce optimally or not able to disposable the produce procured from the farmers by procurement centres.
- At present HOPCOMS is procuring fruits and vegetables on indent basis based on demand in the HOPCOMS retail store. However this indent system has got its own drawbacks. A farmer member who harvests 200 to 300 Kgs of vegetables is supposed to supply only 30 to 40 Kgs to HOPCOMS. This has created mistrust among the farmer members. Added to it there is no proper guidance to farmers for harvesting of fruits and vegetables at appropriate time. This system is not enthusiasing the farmers to grow vegetables on a large scale, since HOPCOMS is procuring hardly 10 percent of produce grown by the members. As a result large number farmer-members are selling

vegetables to the traders either at the farm gate level or at the wholesale market level.

- HOPCOMS staff responsible for logistics aspects of fruits and vegetables is not exposed to operational aspects of supply chain and logistics management. Hence there is no proper planning in arrangement of vehicles for transportation of fruits and vegetables. This has created problems in transportation, storage and distribution of vegetables.
- At present HOPCOMS transporting fruits and vegetables procured from farmers in open air conditions without any provision for cooling chambers. Hence the quality of fruits and vegetables procured at procurement centres deteriorate very fast in the absence of cooling chambers. Besides the products also not very attractive in HOPCOMS retail stores since they do not look fresh. As a result the retail units are not able to dispose the full quantity of fruits and vegetables procured from godowns resulting in losses to the organization.

5.4.2 Godown

- The infrastructure facilities for handling of fruits and vegetables at HOPCOMS is rather absent and also lack of exposure to modern methods of storage.
- In organized retail chains like Reliance Fresh all the fruits and vegetables are graded and packed at godowns and as a result they are selling good quality fruits and vegetables to customers. In HOPCOMS the retail stores are also selling to the customers without any proper grading and packing. At present majority of urban consumers preferred to buy graded and standardized products. Since HOPCOMS retail units are not focusing on proper grading and packing the opportunity to reach large number of customers is not possible.

5.4.3 Distribution

- On an average 3 to 3.5 tons of fruits and vegetables can be loaded to utilize the full capacity of the vehicle by using the crates for transportation of fruits and vegetables. However the vehicles owned by HOPCOMS are not using crates to transport the produce from procurement centres to godown and also to retail units (Plate 4.3). This has resulted in high logistics cost. Instead most of the vegetables are carried in gunny bags resulting in huge wastages
- Most of the HOPCOMS owned vehicles are almost 18 to 20 years old. As a result the efficiency of the vehicle has come down drastically thereby cost of operation is high due to frequent repairs and also due to less mileage.
- Since the employees are treated as government servants they are working on fixed working hours from 9 AM to 4 PM. However the activities undertaken by HOPCOMS involve working at odd hours and also during holidays. As a result the organization is not able to use employees effectively resulting in poor management of staff and further adding to cost of operation.

5.4.4 Retail outlets

- Shortage of staff in the HOPCOMS outlets thereby difficult to monitor.
- HOPCOMS retail outlets buildings are not attractive unlike other organized retailers such as Reliance fresh, Safal etc (Plate 4.4).
- No shelters in front of HOPCOMS retail shop (Plate 4.5). Due to shortage of space fruits and vegetables displayed outside the store which looses freshness and moisture due to directly exposed to sunlight during summer season also during rainy season rain will directly penetrates inside the store due to lack of protection..

Provision of shelters is very crucial to some retail outlet to minimize losses.

- Fruits and vegetables in HOPCOMS retail outlets are not displayed properly (Plate 4.6). Also lot of unutilized space in the store, displaying in shabby manner.

5.4.5 Issues related to Management of HOPCOMS

At present government involvement in management of HOPCOMS is very high. This is mainly because of government participation in share capital is very high (90 percent). As a result government is nominating board of directors to represent the government in the management of HOPCOMS. This has resulted high government involvement and less member participation. Consequently the HOPCOMS has become virtually a government organization even though in reality it is a cooperative organization.

5.5 Factors influencing selection of logistic system for fruits and vegetables

5.5.1 Back end operation

- There is lot of competation from other retail chains at the back end. Many organized retailers have entered into this sector like Reliance fresh, Fresh @, Food World, Safal etc. Since HOPCOMS is procuring from its own members sourcing of vegetables regularly is not a problem. However HOPCOMS should provide extension services regarding crop planning, selection of variety, market information etc at the village level. This will lead to farmers producing fruits and vegetables as per the market requirement their by HOPCOMS will get all the required fruit and vegetables locally.

  HOPCOMS can explore the replication of successful models like ITC e-Choupal by providing advice to farmer-members on the crop

planning, pest and diseases control measures, market information etc at free of cost to see that famer-members produces fruits and vegetables as per the requirement of consumer.

In this respect HOPCOMS can learn through Safal market (unit of NDDB) for creating backward linkages, this may lead to sourcing good quality of fruits and vegetables at less price thereby supplying to customers at cheaper price with good quality.

- HOPCOMS should employ persons having good exposure about procurement operations for procurement of fruits and vegetables at procurement centre. This will lead to providing technical knowledge to the farmers and also procuring the right quantity of fruits and vegetables from farmer-members.

5.5.2 Front end operation

5.5.2.1 Procurement

- Many retail chains like Reliance fresh, Safal, have designed their procurement centres with modern facilities like electronic weighing, grading and billing and the same may be replicated by HOPCOMS to create transparency in the system and trust among the farmers about HOPCOMS. Further display of quantity required and daily prices of fruits and vegetables in the procurement centres will also help the farmer members to bring the quantity required for the procurement centres.
- Information flow is very important in the logistics management. The procurement manager should have good information about demand from retail units to procure required quantity of fruits and vegetables from farmer-members. Further while procuring fruits and vegetables from farmer-members on indent basis, the indent need to be given to the farmers one day prior to the procurement to keep losses to

minimum. Besides the number of vehicles required to transport fruits and vegetables from procurement centre to godown, need to be taken into account for planning procurement of fruits and vegetables and also planning for distribution the same to the consumers at right time.

5.5.2.2 Grading, sorting and cooling chambers

- Grading and sorting can be under taken at procurement centre since this is the first step to maintain quality of fruits and vegetables in the logistic and supply chain management. This will help in proper screening of quality fruits and vegetables, since urban customers are highly quality conscious and demand good quality fruits and vegetables.
- In this respect replication of Safal mechanical graders to grade all fruits and vegetables may be thought of. Mechanical graders are one time investment and economical compared to manual grading.
- The availability of some Fruits and vegetables is seasonal but the demand for these fruits and vegetables is throughout the year. HOPCOMS may procure sufficient quantity of fruits during season and store it in cold storages units to increase shelf life and can sell the same to consumer during lean season.

5.5.2.3 Transportation

- Transportation of fruits and vegetables is an important step in the logistics management, since fruits and vegetables are highly perishable in nature. Handling and transportation through plastic crates can reduce the physical damages to fruits and vegetables.
- The normal life of the goods vehicle is 10 to 15years for achieving the economic efficiency of operation of vehicle but many HOPCOMS vehicles are old due to long use. HOPCOMS can plan for replacement

of old vehicles by purchasing new vehicles in order to increase the efficiency of transportation of fruits and vegetables. This will lead to lowering the operation cost.

5.6 Designing suitable logistic system

The proposed model to HOPCOMS is **"farm to city"** (figure 4.7) based on investing in the complete chain – starting from the input level to the front end retail. The main components of this model are: i) Rural business hub, ii) Procurement centre and iii) Retail end.

i) Rural business hub

The rural business hub is essentially a "rural store" proposed to be set up by the HOPCOMS can undertake multiple activities like providing inputs and farm support services including seeds, fertilizers, plant protection chemicals, extension support and other services such as lab testing, water testing etc and serve as procurement centers for Fresh Fruits and Vegetables.

ii) Procurement centre

The procurement centres need to procure fruits and vegetables only from farmer-members. HOPCOMS can provide sufficient crates to members to bring their produce from field to procurement centre. Further HOPCOMS can educate and train farmer-members to grade their produce and bring it to procurement centre. After collection of sufficient quantity of fruits and vegetables, the vehicles belonging to HOPCOMS can transport it to godown. The fruits and vegetables collected in this manner from all procurement centres can be keep at cool chambers. This process can reduce the wastages to a minimum level and also saves time.

iii) Retail end

Next day during morning time the graded fruits and vegetables need to be distributed to the retail outlets as well as institutions like hostels, company canteens etc by using crates. The capacity of the vehicle can be fully utilized by using crates. The concept of using crates for handling of fruits and vegetables from farm-end till sales to the final consumer should catch up in the system. By using crates, post harvest loss could be reduced drastically. In retail outlets the membership cards may be introduced to keep the consumers as regular customers of HOPCOMS. Special discounts should be given to the membership holders for purchasing of fruits and vegetables there by sales volume can be increased. The low cost zero energy cool chambers can be used even in store level to keep the fruits and vegetables there by wastage can be reduced to minimum. It is one time investment and no electricity is required. On an average the whole supply chain / logistics takes 20 hrs from field to end consumer. In this proposed system we can reduce losses also maximize the profit.

Summary and conclusion

CHAPTER VI

SUMMERY AND POLICY IMPLICATIONS

India is one of largest producer of fruit and vegetable in the world (12 per cent of fruits and 13 per cent of vegetables). Out of 370 million tons of fruit production in the world, India accounts for 30 million tons. Similarly out of 450 million tons of vegetables produced in the world, India produces as much as 59 million tons with 13 percent share in the world's production. Among fruits India is the largest producer of mango and Banana with a share of 54 percent and 27 percent in the world production. Among vegetables, India occupies the first position in cauliflower and Brinjal (with a share of 37.7 % and 67 % respectively), second in onion (11.1 %). Third in cabbage (7.3 %), and sixth in potato (6.1 %) in the world production. Inspite of these impressive figures in the production of fruits and vegetables, producers are always disadvantage position vis-à-vis market functionaries, traders. As a result the producers are not able to realize remunerative prices to their produce. To overcome these constraints an attempt has been made to establish producer's organizations in the form of farmers associations, commodity interest groups and cooperatives. HOPCOMS is one of the unique cooperative organization for marketing fruits and vegetables grown by producers.

Logistics and supply chain management plays a critical role in both front end and back end operations. Since fruits and vegetables are highly perishable in nature procuring fruits and vegetables from producers and supplying to consumers requires efficient logistics and supply chain management. Further logistics management cost component in India is as high as 7 to10 percent against the global average of 4 to 5 percent of the total retail price. Therefore, there is a need to reduce logistics cost by improving the supply chain and logistics management by organized retail chains and also by institutions like

cooperatives who are involved in organized retailing of fruits and vegetables in the country.

HOPCOMS is unique cooperative organization for marketing of fruits and vegetables in the state. Hence supply chain and logistics management through proper planning, can play a critical role in improving the efficiency of organization. This study is intended to examine issues relating to logistics and supply chain management at HOPCOMS and to improve the efficiency of operations by reducing the cost of operation and increasing the income of farmer-members and also to supply fruits and vegetables to consumers at a reasonable price.

The study on "Business Analysis Logistics for Fruits and Vegetables in Organized Retailing" was undertaken with a view to understand the dimension of logistics management in HOPCOMS and to examine the constraints faced in logistic management. Further in order to overcome the constraints there is a need to design suitable business model. Keeping in this mind the study was undertaken with the following objectives.

1. To study the logistic structure for fruits and vegetables in retail chains.
2. To identify the factors influencing selection of logistics system for fruits and vegetables
3. To examine the constraints in the present logistics structure.
4. To design suitable logistics system for fruits and vegetables

Methodology

6.1 Sampling framework

In order to evaluate the performance of HOPCOMS the primary data was collected from 30 producer-members and 10 non-members focusing on the quantity of vegetables sold to HOPCOMS, reasons for selling to HOPCOMS, suggestion for improvement etc. Further in order to understand the perception of consumers and also to get feedback from the end users of fruits and vegetables the primary data from 30 consumers of HOPCOMS retail units from Bangalore city was collected.

The secondary data relating to membership pattern, growth performance, cost of operations, profit or loss. The secondary data was obtained from various sources like annual reports, financial statements, and other records of the HOPCOMS. The survey was taken up during the months of January-March 2009.

6.2 Analytical techniques

The tabular analysis was used to study the procurement systems, logistic structure and distribution of fruits and vegetables. Tabular analysis was also used to determine the efficiency of retail outlets by analyzing the constraints, procurement costs, transportation costs, etc. Further Garrett ranking technique was used to test the reasons for purchasing fruits and vegetables by consumers at consumers at HOPCOMS.

6.3 Major findings

General profile of farmers and consumers

The general profile of producer-members includes age, education, crops grown, place of sale and duration of relation with HOPCOMS. Among the fruits and vegetables supplier majority are producer-members

and few are non members. Similarly profile of consumers include age, education, occupation also frequency of purchase and reasons for purchasing at HOPCOMS.

Logistic structure for fruits and vegetables

The HOPCOMS has opened five procurement centres in Hoskotae and Malur, Doddabalapur, Devanahalli, Kankapur and Channapatna near to fruits and vegetables production centres. The HOPCOMS while procuring fruits and vegetables from farmer members follows indenting system. On receiving the indent order for the required quantity, the famer-members have to bring the produce to the procurement centre, or to HOPCOMS main centre in Bangalore City. The produce is verified with regards to it quality and quantity. Further the produce is graded and a receipt (cash voucher) for the same is given to the farmer member. The cash voucher received by producer-members can be encashed at the bank near to the procurement centre or godown, thus enabling farmers to take cash immediately. During the months of April to June the quantity of fruits procured is high particularly for fruits like Grapes and Mangoes. During this period HOPCOMS procure large quantity of Grapes and Mangoes directly from farmers in various production areas like Bijapur, Devanahalli and parts of Chikkaballapura and from Srinivaspura and other parts of Kolar district to supply to consumers at reasonable rate. HOPCOMS procure on an average 110 tons of fruits and vegetables daily both from farmers and also in open market depending on demand from customers and supply from farmers. Nearly 80 percent of its requirement is procured from farmers and remaining quantity is procured from open market. There are 11 godowns for storing of fruits and vegetables in HOPCOMS. Out of its total procurement 70 percent of fruits and vegetables are sold at retail outlets and the remaining quantity is supplied directly to college hostels, company canteens, marriages and other religious functions.

HOPCOMS logistics has two wings for transportation of fruits and vegetables from procurement centers to godown and to retail outlets. The first wing is using owned vehicles are used to carry the fruits and vegetables from different procurement centres to godowns and to retail outlets. In second wing only hired vehicles are used to distribute the fruits and vegetables to retail units from godown only.

Constraints in the present logistic structure

Procurement

Procurement centres are not well equipped to grade the fruits and vegetables. Further HOPCOMS is also not using plastic crates. Further fruits and vegetables are transported in open conditions from procurement centres to godowns and to retail outlets resulting in high wastages and also poor quality.

Godown

In HOPCOMS godown no scientific handling of fruits and vegetables is done due to lack of facility and further the fruits and vegetables are not graded properly and sold to the customers without any proper grading. At present majority of urban consumers preferred to buy graded and standardized products. Hence retail units are unable to supply quality fruits and vegetables required by customers.

Distribution

HOPCOMS owned vehicles are not utilized to full capacity while transporting the produce from procurement centres to godown and also to retail units. This has resulted in high logistics cost. Added to it crates are not being used to carry fruits and vegetables. Instead most of the vegetables are carried in gunny bags resulting in wastages of vegetables.

HOPCOMS Retail outlet

HOPCOMS retail outlets buildings are not very well designed. As a result fruits and vegetables are directly exposed to sunlight resulting in loss in freshness and moisture. HOPCOMS store opening and closing time is also not convenient to consumer leading to shifting of customers from HOPCOMS to other organized retail shops, which have come in every part of the city.

Factors influencing selection of logistic system for fruits and vegetables

Designing suitable logistic system

In the present logistic/ Supply chain the losses are about 6 to 7 percent due to poor planning in managing the transportation of fruits and vegetables. Also HOPCOMS is incurring nearly 7.5 percent on transportation which reduces the HOPCOMS margins. Hence there is a need on the part of HOPCOMS to tie up with input agencies like seed, fertilizers, plant protection chemicals and credit agencies like banking institutions for timely supply of inputs and credit to farmers at their door step.

Further after procurement of produce partial grading and sorting is done at procurement centre itself and provision has to be made to transport vegetables to the godowns by using plastic crates. After grading and sorting the produce the fruits and vegetables can be stored at cool chambers to keep produce fresh. Besides the produce need to be distributed to the retail units through vehicles using plastic crates for effective utilization of capacity of vehicle also to reduce the mechanical damage to the produce so as to sell to the consumers good quality of fruits and vegetables.

Unlike producer-members HOPCOMS can also make consumers as their members by collecting membership fee. As a result consumer members can avail discounts for their purchase of fruits and vegetables during festival days and weekends. Further HOPCOMS can also supply fruits and vegetables to push cart vendors by making friendship. Thereby HOPCOMS can increase the quantity of procurement from farmer-members also can effectively sell the total procured quantity without any wastage.

Policy implications

- Strengthening forward and backward integration.
- There is a need on the part of HOPCOMS to use refrigerated vans, for procurement of fruits and vegetables from production centres which helps in reducing the losses during transportation and storage. Further HOPCOMS has to make a provision for cold storage facility in their godown and also at retail outlets so as to maintain the quality of fruits and vegetables.
- HOPCOMS may propose to replace all the old vehicles by purchasing few vehicles to improve the efficiency of logistics and supply chain management.
- HOPCOMS need to implement scientific grading method for procurement of fruits and vegetables. Further HOPCOMS needs to follow grade based pricing and accepts all types of produce brought by the producer member.
- The HOPCOMS as for as possible try to procure vegetables from farmer-members through procurement centres which encourages the members to bring quality graded produce.
- The motivational level of employees is very low hence training to upgrade their skills may be thought of by HOPCOMS.

- HOPCOMS may explore appointment of professional managers at all the operations for efficient performance of HOPCOMS.
- Tie up with NDDB Safal market in respect of back end operations may be explored.

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CHAPTER VII

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Appendices

Annexure I : Production of major fruits and vegetables: India's position in the World

Sl. No.	Fruits	Production (000 MT)	India's Share (in per cent)	India's Rank
1.	Mango	10000	54	1
2.	Banana	15073	27	1
3.	Pineapple	820	7.0	5
4.	Orange	2000	3.4	6
5.	Apple	1200	2.2	10
Vegetables				
1.	Brinjal	8026	67	1
2.	Onion	4058	11.1	2
3.	Cauliflower	4800	37.7	1
4.	Cabbage	3300	7.3	3
5.	Potato	17942	6.1	6

Source: Horticultural Statistics, 2007-08

Annexure II : New institutional clients

Hospitals	Factories
Victoria Hospital Leprosarium Hospital Minto Hospital NIMHANS ESI Bowring Hospital K.C. General Hospital Kidwai Hospital S.D.S. TB Hospital Sanjaya Gandhi Hospital SJIIM Hospital Government TB Hospital	Bangalore Dairy ITI BEL HMT MICO Himalaya Drugs BEML KAVIKA L&T AMCO Batteries

Source: HOPCOMS 2008

Annexure III : Private Vehicle expenditure per month (2008)

Month	Amount(Rs)	Trips
April	299900	1403
May	314245	1463
June	284625	1332
July	296190	1333
August	288685	1260
September	252285	1184
October	272210	1208
November	276520	1235
December	278860	1258

Source: HOPCOMS 2008

Annexure IV : List of HOPCOMS retail outlets in Bangalore city

SI No	Location	SI No	Location	SI No	Location
1	Cold Storage I (corporation)	105	Lakksandra	196	Kormangala 8th Stage
2	Cold storage II (Corporation)	106	Bangalore Dairy	197	Kormangala 8th Stage
3	Cold storage III (Corporation)	107	Hanumanth nagar	198	Rajajinagar 6th block
4	corporation 4	108	Banshankari I st stage	199	Rajajinagar power house
5	Sudama nagar	109	K G Park	200	Rajajinagar
6	Civil court	110	Srinagar	201	Rajajinagar
7	Cancer Hospital	111	Basavangudi	202	K R Circle
8	Jaynagar 5th block	112	Banshankari Complex	203	Legislators house
9	Raj Lakshmi nursing home	113	Jaynagar 7th block	204	Infantry Road
10	J P nagar I st stage	114	Bangalore club	205	Chowdiah Memorial hall
11	N R colony	115	Shanthinagar	206	M L V
12	Shanthi talkies	116	Jaynagar I st block	207	Sadashivanagar
13	Tyagarajnagar police station	117	Jaynagar II st block	208	Rajajinagar Sahakari
14	Sajan Rao circle	118	Nanda Talkies	209	Rammandir
15	Sajan Rao circle	119	Byrasandra	210	Rajkumar mills
16	Gardi Apartment	120	Jeevavimanagar	211	Vijaya nagar Park
16	Kempaegowda nagar	121	K S R T C	212	Vijaya nagar Tank
17	Ramakrishna Ashram	122	B A S	213	Vijaya nagar A C math
18	Uma talkies	123	Railway station	214	Vijaya nagar R C C layout
19	B H S	124	Modi road	215	Indiranagar I st stage
20	Shankar math	125	Kols park	216	Alasur
21	Mahabodi Sahakari Sanga	126	Super bazaar	217	Maleshwaram 8th cross
22	Cubban pet	127	M G Road	218	Maleshwaram link road
23	Raj Bhavan	128	Jaynagar IV stage	219	Maleshwaram railway road
24	Janatha Bazaar	129	Jaynagar IX stage	220	Maleshwaram K C Gen Hospital
25	Wilson garden	130	Sanjyagandhi	221	Sheshadripuram
26	Audigodi	131	Jaynagar T block	222	Racecourse road
27	Bangalore dairy	132	Kormangala 6th Stage	223	Subbiah layout
28	boring hospital	133	INDIRANAGAR club	224	Laggarae

29	M E G centre	134	HAL II stage	225	Kamalanagar
30	Kalahalli	135	Mayohall	226	Basaveshwarinagar
31	Boring Institute	136	R P C layout	227	Dasarahalli
32	Mapnahalli	138	Maruthibandae	228	Shankar math
33	Miranda school	139	Saraswathinagar	229	Kurubarahalli
34	Jeevanabemanagar complex	140	CBC	230	Nagsetahalli
35	Jeevanabemanagar	141	C K W layout	231	Geddlahalli
36	Kumarswamy layout	142	Rajajinagar I st stage	232	UAS colony
37	Shanthi talkies	143	Mahalakshmi layout	233	Sanjayanagar
38	ISRO layout	144	Gayathrinagar	236	Geddlahalli II
39	Kumarswamy layout	145	Gayathrinagar II	237	Whitefield
40	Channamana Kerea	146	Someshwarinagar	238	Gardarcharpalya II
41	Kathariguppae	147	Domalur	239	Gardarcharpalya I
42	Hosakerahalli	148	Domalur II	240	Whitefield
43	Channamanakerae	149	Rajarajeshwari nagar	241	Siddapura
44	Nandi Durga	150	BEML layout	242	B E L
45	Munireddy playa	151	Victoria hospital shop	243	Vidyaranpura
46	Pillappa garden	152	Victoria hospital	244	Jalahalli east
47	Palace Gutahalli	153	Victoria hospital canteen	245	Jalahalli west
48	Ganganehalli	154	CPRI	246	BEL colony
49	Dathrathreya temple	155	Yaswanthpura	247	HMT II stage
50	J P nagar	156	Mathikerae	248	K R Puram
51	B T layout	157	Dollars colony	249	Devasandra
52	N S playa	158	M S Ramiah	250	Amarajyoti school
53	I I M	159	IIM B	251	C V Ramanagar
54	BTM layout I st stage	160	Cox town	252	NGEF layout
55	BTM layout II nd stage	161	Jeevanahalli	253	R T Nagar
56	BTM layout III rd stage	162	Mahalakshmi layout	254	R T Nagar II
57	BTM layout IV th stage	163	Nandinilayout	255	Jayamahal
58	BTM layout	164	Nandinilayout II	256	Ram murthy nagar
59	Tavarekere	165	Mahalakshmi layout	257	Kamanahalli
60	Banaswadi	166	Bannerghatta	258	Kims Doctor hostel

61	Bhuvaneshwarinagar	167	Annekal	259	Kims mens hostel
62	Kamanahalli	168	Gijani		
63	Jaynagar I st block	169	J P nagar		
64	Jaynagar II nd block	170	J P nagar		
65	Jaynagar III rd block	171	J P nagar		
66	Kanakapalya	172	T B Hospital		
67	Kumarpark	173	Indiranagar 2nd stage		
86	Kumarpark II	174	Indiranagar 2nd stage		
87	Centuary club	185	Githanjali layout		
88	Anandnagar	176	Defence colony		
89	Yelahanka I	177	Agara		
90	Yelahanka II	178	Dommasandra		
91	Mother dairy hostel	179	Sarjapur		
92	J P nagar	180	Basaveshwarinagar		
93	Janatha Bazaar	181	Kirlosakar colony		
94	Yadiyur kerae	182	Kuruburahalli		
95	Janatha Bazaar	183	Kormangala		
96	Bhuvaneshwarinagar	184	Chimmana house, Hesarugutta		
97	Chikkakalsandra	185	Madiwala		
98	Sullaecircle	186	Hebbagodi		
99	Victoria layout	187	Chandapura		
100	Vivekanagar	188	BTL hostel		
101	Sullaecircle	189	Ambedkar college		
102	Jain hospital	190	Bharath nagar		
103	Shivajinagar	191	Bharath nagar II		
104	Vasanthnagar	192	Kims Eng hostel		

Source: HOPCOMS

Annexure V : HOPCOMS owned vehicle expenditure

(Year 2008)

Month	Total KM	Diesel (lt)	Diesel (Rs)	Labour (Rs)	Spare parts (Rs)	RTO (Rs)	Insurance (Rs)	Tyres (Rs)	Oil (Rs)	Mileage (kms)	total Expenditure (Rs)
Apr	44065	6078	230162	390	761	0	7398	3000	30	7.25	248631.00
May	43962	6007	237113	230	69952	19640	25982	0	1675	7.32	352917.00
Jun	45557	6275	254418	845	8121	360	2348	0	2150	7.26	266092.00
Jul	43020	5771	229308	490	46080	0	10316	8838	20	7.45	295032.00
Aug	44612	6316	251476	100	189052	32160	0	4000	37.75	7.06	476780.00
Sep	44306	5987	232642	2575	7325	15480	48228	8708	19.25	7.4	314950.00
Oct	41813	5785	244322	490	36422	61730	86526	17373	25.25	7.23	446863.00
Nov	38072	5194	192008	505	20282	3600	6771	0	26.5	7.33	223166.00
Dec	39113	5500	204675	1280	46916	47440	29421	4000	35.25	7.11	333732.00

Source: HOPCOMS

Annexure VI : Statistics for fruits and vegetables

(Qty-mtons, Value-Rs in lakhs) (year2008)

Fruits and Vegetables		**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Total**
Fruits	Qty	902.76	869.356	835.35	730.86	779.88	754.33	750.21	670.93	744.35	7037.984
	Value	263.56	173.14	190.2	161.18	166.72	156.02	112.26	137.97	160.97	1522.02
Vegetables	Qty	1060.657	1105.965	1143.8	1123.0	1074.9	1133.3	1063.8	983.71	1024.8	9713.878
	Value	226.25	127.29	120.17	112.17	127.77	153.57	160.85	161.03	140.	1329.4
Tot procurement	Qty	1963.63	1958.32	1979.1	1853.2	1854.6	1887.5	1813.3	1654.6	1769.2	16735.09
	Value	289.81	301.13	310.38	271.35	294.49	314.59	313.81	299	301.2	2695.84
Fruits	Qty	907.247	849.08	820.38	716.02	757.73	757.85	732.61	467.07	734.62	6742.607
	Value	223.752	232.44	248.17	211.21	215.2	203.73	191.9	182.28	210.66	1919.342
Vegetables	Qty	1052.733	1103.49	1116.6	1101.8	1096.7	1113.3	1012.3	967.36	1032.4	9595.763
	Value	173.854	177.3	165.01	156.59	178	216.7	216.3	220.79	197.09	1701.634
Tot distribution	Qty	1959.97	1952.58	1937.0	1817.1	1854.2	1870	1784.9	1434.4	1767	16377.3
	Value	397.63	409.77	413.18	367.91	393.83	420.45	408.22	403.08	407.05	3621.12
Total no farmers	Total	5826	6083	5976	6393	5148	6036	5914	5447	5706	52529
Wastages	Qty	18.21	21.58	29.41	21.33	18.05	18.65	18.45	25.03	17.35	188.06

	Value	2.47	3.23	4.67	2.59	2.63	1.87	1.03	2.51	2.61	23.61
Procurement from farmers	Qty	1504.24	1822.49	1730	1650.6	1473	1669	1570.3	1305	1429	14153.91
	Value	203.2	270.99	277.61	244.92	209.81	244.62	216.28	208.12	204.8	2080.35
	Percent	76.61	92.5	87.4	89	79.44	88.44	86.57	79.144	80.82	84.45
Procurement from Market	Qty	459.39	145.83	248.97	203.06	381.76	213.34	243.61	345.19	339.37	2580.52
	Value	86.6	30.14	32.77	28.43	84.68	69.97	76.83	90.88	96.47	596.77
	Percent	23.39	30.1	12.5	10.95	20.56	11.56	13.43	20.85	19.8	18.07

Source: HOPCOMS

Business Analysis of Logistics System for Fruits and Vegetables in Organised Retailing

Farmers

1. Name and address of respondent

2. Are you member of HOPCOMS?

2. Socio economic profile

Particulars	**Farmers**	
	Members	**Non members**
Age		
Family size		
Educational level		
Illiterates		
Primary school		
Middle school		
College		

3. Place of sale of Agricultural produce by farmers

SINO	**Farmers**			
	Members		**Non members**	
	Quantity(Qtls)	**Percent**	**Quantity(Qtls)**	**Percent**
HOPCOMS				
Wholesaler				
Commission agent				
Weekly market				
Farm gate price				

4. Are you bringing produce regularly to HOPCOMS (Yes/No)

5. If yes mention the type of fruits and vegetables sold

Fruits	**Vegetables**

6. Reasons for selling at HOPCOMS

7. Are they deducting wastages if yes please mention the quantity & percent_____,_____

8. Are you bringing graded produce if yes why, if no why

9. Mode of transportation

10. Are you happy to sell at HOPCOMS?

If yes give reasons

If no give reasons

11. Suggestion to give to improve the HOPCOMS performance

12. Do you have anything to say other then listed?

Consumers

1. Location of outlet:

2. Socio economic profile of consumer respondents

Particulars	**Respondents**
Age	
Family size	
Educational level	
Illiterates	
Primary school	
Middle school	
College	

3. Average annual income of consumers (Tick)

Income level
Less than 12,000
12,000 to 24,000
24,000 to 60,000
60,000 to 1,20,000
More than 1,20,000

4. Occupation structure of consumers using HOPCOMS

Govt employees

Business man

Private company

Service persons

Labourers

5. Reasons for purchasing at HOPCOMS

6. Buying pattern of consumers in HOPCOMS

Particulars	**Quantity(Kgs)**	**Value(Rs)**
Vegetables		
Tomato		
Leafy vegetables		
Cabbage		
Cauliflower		
Carrot		
Beetroot		
Beans		
Brinjal		
Others		
Fruits	**Quantity**	**Value**
Banana		
Apple		
Grapes		
Orange		
Sapota		
Musambi		