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Impact of Emerging Marketing Channels in Agricultural Marketing – Benefits to Producer–Seller and Marketing Costs and Margins of Agricultural Commodities in Haryana

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INTRODUCTION

Agriculture contributes around 15 per cent to Gross Domestic Product (GDP) of India but its performance is vital for inclusive growth since it provides livelihood security to more than 50 per cent of work force. Traditionally, India's agriculture development has been based on protected policy environment, which included controls on market, pricing, trade, storage, transport, and quantitative restrictions on foreign trade. The policy was primarily intended to attain long term food security and stabilize agricultural prices. During 1970s, huge public investments were made on irrigation, research and extension to augment food production by increasing cropped area and productivity. The 'Green Revolution" technology initially introduced in resource endowed areas in late 1960s spread into other parts of the country during 1980s. The agricultural sector observed spectacular growth of over 4 per cent per annum during 1980-81 to 1989-90. However, this growth optimism did not last as growth of agricultural GDP declined to less than 3 per cent per year during the 1990s. The poor growth recorded further platued to 1.8 per cent per year during the Tenth Five Year Plan period (2002-2007). It is estimated around 3 per cent per year during the Eleventh Five Year Plan period (2007-2012). Several factors including slowdown in public investment, low yield growth, declining water table, environmental problems and marketing constraints led to poor performance. Higher and sustainable growth in agriculture is possible through reforms in general and marketing reforms in particular.

During the 1950s, producers of agricultural commodities were exploited by intermediaries. In order to eliminate exploitation of farmers from market functionaries and traders and to provide remunerative prices for their produce, the Government of India passed the Agricultural Produce Marketing Act, 1963. Since then, all rural markets across the country are being governed by this Act. All the governments in States and Union Territories were directed by the Centre to implement the APMC Act, 1963 in their respective states to safeguard the interest of farmers. Consequently, all sale/purchase activities have been channelized through regulated markets and licensed traders.

The economic reforms initiated in the early nineties and the WTO agreement in 1995 has changed the environment and priorities for the agricultural sector in the country. Also, there has been an effort to liberalize agriculture trade and markets since 2002. Nonetheless, growth of agriculture has been a serious concern in the post reform period.

Despite policy changes in liberalizing border measures related to agriculture trade, the private entry and investment in this sector has been limited. The government interventions in agricultural markets cover wide range of activities. However, a series of domestic market reforms were introduced since 2000 to improve the efficiency of the marketing system and to attract private investment. These included reform of Agriculture Produce Marketing Regulation (APMR) Act, futures market, direct marketing, private markets and contract farming. Since then, several domestic and multinational firms have entered into marketing and processing of agricultural products.

India endeavors to revolutionize agriculture, especially horticulture in order to provide nutritional security to the poor and vulnerable sections of the population. Horticulture is gradually emerging as an important opportunity both for the farmers and corporate sector. The corporate sector is primarily engaged in collection, retail and post harvest value addition. Since, this sector includes a wide range of fruits, vegetables, spices, medicinal and aromatic plants, it has huge potential for the future. The unique feature of horticulture has attracted the attention of corporate sector which is developing innovating models for its development.

As a result, corporate houses such as Reliance, Godrej, Birla, Bharti, ITC etc, forayed into horticulture sector. These ventures are expected to make best efforts to create infrastructure such as cold storage and cold chain, processing, retailing and exports. These have also started collecting horticultural products like grapes, mangoes, pomegranate mushrooms, baby corn, broccoli, cauliflower, cucurbits and leafy vegetables. But most of these ventures are at a modest scale and hence, there is vast scope to increase the business.

Special care is needed in development of horticultural sector due to inherent constraints like perishability. The markets of horticultural products in the country lack a systematic approach of supply management. Mostly growers realize a fraction of the price paid by the consumer. A sizeable fraction of the price is cornered by the functionaries/traders or lost in the long marketing chain. This is due to lack of availability of infrastructure. Moreover, all stake holders beginning from growers to consumers are not well integrated. The post harvest losses in case of horticultural crops range between 30-40 per cent. These are primarily due to inefficient handling, transportation and lack of storage. Thus, efficient cold storage and cold chain are essential which is grossly inadequate to meet the growing demand in future.

The objective with which the regulated markets were established in the 1950s needs to be reviewed. The marketing system has to respond effectively to the changing requirements in the domestic and international markets. The role of state should change from controller of the market to regulator/facilitator for ensuring competition in the marketing system. With gradual liberalization of the markets, it is expected that the country would witness flurry of activities by the private traders. In general, output markets are characterized by large number of sellers and small number of middle men /traders. Their collusion affects the interest of farmers by lowering the price. Agricultural input markets for seeds, pesticides and machinery are controlled by a few dominant players. There should be an effective policy to ensure efficient functioning of agricultural markets which would deliver efficient outcomes thus, protect the interests of both producers and consumers.

1.1 Traditional vis-à-vis Emerging Marketing Channels

Manifold changes have been introduced in the marketing of agricultural produce after the enactment of the APMC Act, 1963. The two important policy changes i.e. introduction of economic reforms in early nineties and the WTO agreement in 1995 have changed incentive structure in the agricultural sector in India. The government

intervention in the marketing of agricultural produce, private entry, future markets, direct marketing and investment emerged as the issues of serious concern.

The government of India intervenes in the agricultural markets to achieve twin objectives of food security and price stability. It operates through measures such as procurement and distribution, fixing MSP for important agricultural commodities, price support, commercial purchases and input subsidies. This environment has helped the producers but marketing efficiency in agriculture still remains low. As a result, producers and consumers remained losing partners. Consumer pay higher prices for agricultural commodities while producers receive lower prices leading to low profitability in agriculture.

India's traditional agricultural marketing system has experienced significant changes during the past one decade. The emergence of private players is one of these developments. They are expected to spend heavily on the back end infrastructure, from farm to store shelves. This would help to minimize the wastage of farm produce which is estimated to be as high as 30%. Although, India is the second largest producer of fresh produce, about Rs. 1 trillion worth of production is lost in wastage and a significant per cent of this is avoidable wastage. Also, a huge gap between retail and wholesale prices means that removing intermediaries will reduce retail prices.

The corporate led fresh food retailing has been emerging fast in the urban areas. They are helping in strengthening the retail supply chain. It is anticipated that farmers supplying to corporate will not only get higher prices but quality of their produce will also include.

Most of the retail chains in Delhi are sourcing 30-40% of their requirement from farmers in states around Delhi. As a result, farmers are provided an alternative marketing arrangement with these corporate. Sometimes, these farmers also learn better agricultural practices from the experts appointed by these companies, thus leading to a better quality of produce. It is expected that these Emerging Marketing

Channels (EMCs) will bring improved quality and better after sales services and will be beneficial to the consumers as well as producers.

1.2 Objectives:

A beginning has been made in creating infrastructure by the government and private sectors. The government has launched several programmes to encourage cultivation of horticultural crops. The progress is however, slow and inadequate. There is a great need to harness the potential of this sector with long term vision through joint efforts of government, public and private sectors.

In view of immense potential of horticulture in India due to varied agro climatic conditions, it is imperative to compare benefits to producers, marketing costs and margins by selling horticulture produce through traditional and emerging marketing channels. The research input on the related issues is an urgent need to draw in future course for the development of this sector through innovative models. In order to achieve this objective, this study seeks to analyse the related issues. The specific objectives of the study are as under:

(i) to determine the share of the farmer in the consumer's rupee in an emerging marketing channel vis-a-vis traditional marketing channel;
(ii) to compute the degree of marketing efficiency and incidence of post harvest losses in emerging marketing channel vis-à-vis traditional marketing channel;
(iii) to analyse the market practices and services of agencies involved in the emerging marketing channel and observe if they are superior to that of traditional channels;
(iv) to indicate the constraints faced by farmers and different market functionaries in the emerging marketing channel as compared to the traditional marketing channel.

The Reliance Fresh has been selected as a case study to analyse the emerging marketing channel and compare it with traditional marketing channel for tomato and muskmelon in Haryana.

1.3 Literature Survey:

Much of discussion in the literature in recent times has been around the marketing reforms in agriculture. Numerous seminars, conferences, workshops and studies pointed out pros and cons of organized food retail and direct purchase of agricultural commodities from farmers in order to reduce gap between prices paid by the consumers and prices received by the producers. Some studies have shown that corporate involvement in farming through direct purchase is a source of advantage for all stake holders. A recent study has revealed that growers received at least 20% higher prices from organized retail in comparison to traditional channel. But, the production and price risks were entirely born by the producers (Bathla & Singh, 2011). Another study (Minten et al, 2010) has mentioned that price difference offered by modern retail chain was not very different. Thus, in view of market imperfections, organized food retail may not provide higher prices to farmers and lower prices to consumers. The major issues concerning benefits of the TMC and EMC to all stake holders are related to increasing efficiency in the supply chain of agricultural commodities. On the other hand, it is contended that organized food retail may not provide higher prices to farmers and lower prices to consumers. At the outset, we review a few macro level studies (Acharya, 1998, 2011; Dev, 2007; Hashim, 2009 and Deshpande and Gopalappa, 2003) and then survey other related studies.

Acharya, (1998 and 2011), has evaluated the performance of the existing marketing system, institutions and policy in accelerating agricultural development in the country. The article and book contain an incisive analysis with special emphasis on marketing functions, institutions, efficiency, costs and margins, government efforts in the development of agricultural marketing and market research.

Dev (2007) has examined macro reforms needed for achieving higher and sustainable growth in agriculture, including the “Second Green Revolution” through crop diversification and development of processing. It discusses the market reforms needed for achieving higher agricultural growth and food security. The paper also examines role of other agricultural and non-farm policies. Basically, domestic market reforms involve removing all controls relating to domestic trade and processing. However, recent experience on hoarding of wheat and pulses indicate that some kind of regulation is necessary on storage limits. On WTO and globalization, the government has to be vigilant about the international price fluctuations. The government plans to have a second ‘green revolution’ by diversifying agriculture in crop sector and allied activities. There is a lot of demand for high value products like fruits, vegetables, milk and meat products. Marketing of these products is the major problem apart from credit and extension. Other issues for agriculture development are land and water management, research and extension, input supply including credit and development of rural non-farm sector.

The presidential address by Hashim (2009) states that efficiency of market, possibility of its discovery and its expansion depends on hardcore physical infrastructure. The most crucial of which are roads (transport links) and electricity. Electricity supply to rural areas, excepting some regions, is inadequate. Cold storage do not work. Transport links in rural India are weak and therefore, cost of transporting perishables is prohibitive. Fortunately, communication system has improved. Infrastructure, efficient information system and availability of credit can go a long way in developing markets for agricultural produce without which the next phase of agricultural development will remain stunted.

Deshpande and Gopalappa (2003) advised to establish an effective price monitoring system including market information kiosks involving information on prices, quality, international trade centres and technology. Statistical system and database should be strengthened to improve the coverage and quality of agricultural marketing related information and to reduce the time lag in its availability. Cooperatives and group

marketing by farmers should be encouraged. Market intervention system either by private agencies or by the state agencies. PRIs, NGOs and Self-Help Groups be effectively involved in improving awareness about post harvest handling methods and creation and maintenance of infrastructure at primary market level. A selective MIS needs to be put in place for commodities, which are not covered by the minimum price support programme.

Singh and Suhag (2010), conducted a study for Haryana by using secondary data from 1965-2006. Results show that number of regulated markets in the state has increased from 100 to 106 during the study period and these regulated markets cover on an average about 417 sq km of area. The study has further revealed that each market committee served 68 villages in 1995-96 which fell to 64 in 2005-06. The district wise analysis pointed out that each regulated market of Rewari district served maximum number of villages (201) while this figure was minimum (34) for Fatehabad district. The market arrivals of paddy in Haryana were about 89.8 per cent of the production in 1995-96 which rose to 95 per cent in 2005-06. For wheat, market arrivals were about 48.6 per cent of production in 1995-96 which significantly increased to 52.03 per cent during 2005-06. The Agricultural Marketing Board for Haryana was established in 1969 and its main source of income has been market fee. It may be noted that share of income from market fee in total income has drastically declined from 79.95 per cent in 1995-96 to 65.10 per cent in 2005-06, while income from other sources has increased from 20.05 per cent in 1995-06 to 34.90 per cent in 2005-06. The article states that major expenditure of the Board was on the development of market infrastructure in the form of construction of link roads, development of mandis and other activities of the Board, which helped in bringing socio-economic change in the rural economy of the state.

Saran and Goyal (2009) observed in their paper that retail is India's largest industry accounting for over 10% of the country's GDP and around 8% of the employment. It has emerged as one of the most dynamic and fast paced industries with several players entering the market. Retailing in India is gradually inching its way towards becoming the next boom industry. The whole concept of shopping has altered

the format and consumer buying behavior, ushering in a revolution in shopping in India. In a developing country like India, a major portion of consumer spending goes into basic amenities, particularly food products. The food retailing sector is at an inflexion point where growth of organized retail and consumption by the population is going to take a higher growth trajectory. A large number of young working population, nuclear families in urban areas, along with increasing working-women population and emerging opportunities in the service sector are going to be the key growth drivers of the organized food retail sector in India. Owing to the requirement of heavy initial investment, break even is difficult to achieve and many of the players have not tasted success so far due to erratic supply. However, future is promising. The market is growing. Government policies are becoming more favourable and emerging technologies are facilitating operations.

According to Singh (2011) linking small primary producers with markets is indentified as one of the major issues in policy and practice in improving livelihoods for millions of poor farming households in India like other developing countries. There are several alternative marketing channels in India which are making attempt to link farmers with markets. These channels existed in the pre-supermarket expansion period and still co-exist with modern food retail chains. This paper also examines the inclusiveness and effectiveness of the fruit and vegetable retail chains in linking farmers with the consuming markets with the help of a case study of two non-private retail chains (HOPCOMS and MDFVL's SAFAL). It compares and contrasts organization and the functioning of the two retail chains from a smallholders perspective. At the end, this paper book highlights major issues emerging from the case studies and suggestions for more effective and inclusive interface and role of the alternative food retail chains.

Arora (2010) in his paper on food retail suggests that the Indian food retail is going to be the major driving force for the retail industry growing at the rate of 30%. The changing life style, taste, higher disposable income, growing need for convenience, higher aspirations among youth, exposure to the western lifestyle and increasing number of working women have revolutionized the food retail scenario in the country.

More and more corporate houses such as HLL, ITC, Godrej and Reliance are now making inroads into food retail, with some even exploring the integrated approach via agribusiness and food processing. Huge proliferation is expected from the corporate players, which will help entire retail pie to grow. Entrenched players such as Subhiksha, Food Bazaar and Spencer's Daily are also tapping into backward linkages, while trying to match their expanding geographies with retail formats.

Singh and Toppo (2010) conducted a study based on forty sampled farmers in Kanke Block of Ranchi district of Jharkhand during 2005-06. The average cost of cultivation per hectare of kharif and rabi tomato was estimated as Rs.26011 and Rs.23523, respectively. The average productivity per hectare was 100 quintals and 96 quintals in these seasons. This crop fetches Rs.16963 and Rs.20303 as net profit per hectare in kharif and rabi seasons. The cost return ratio was 1:1.86 for tomato in the two seasons. It was further observed that selected farmers were disposing tomatos through three marketing channels. Marginal farmers preferred to sell their produce through channels I, while small farmers sold their produce through all these channels. At the overall level, 40 per cent of them sold their produce through channel-III, 35 per cent through channel-I and 25 per cent through channel-II.

Dileep et al. (2002) conducted a study on contract farming of tomato cultivation. The major findings of this article indicate that holding size of the sample contract farmers was important. Farmers informed that processing firms favoured large farmers while selecting for contract. The cost incurred, yield and gross returns obtained by the contract farmers were almost double than that of non-contract farmers. Among various categories of farmers, large contract farmers obtained higher net returns followed by small and medium ones. The functional analysis revealed that there is a substantial scope to increase production of tomato through making judicious use of critical inputs particularly, fertilizer, irrigation and plant protection chemicals. The contract farming system for tomato considerably reduced yield uncertainty and completely removed price uncertainty among farmers, whereas it was very high in case of non-contract farmers. The average price received by the non-contract farmers was much higher than contract

price for tomato. The price received through direct sale to the consumers was the highest followed by retailers and wholesalers in the case of non-contract farmers. Transportation charges formed major component of marketing cost, which was severely felt by the farmers. Also, cut in weight, rejection of the produce, lower contract price, lack of adequate number of processing units were found to be the major constraints in the marketing of tomato.

In brief, all the reviewed studies appeared to be useful and informative. The concerns raised are wide ranging, but none of the above studies has looked into details of costs, price spread and marketing efficiency of traditional vis-à-vis emerging marketing channels. The present study aims to fill this gap.

1.4 Research Methodology:

The methodology adopted for the selection of study area, sampling design, data collection and analytical framework used in the light of specific objectives of the study is discussed in this section. The study was conducted in the state of Haryana. It is based on published and un-published sources of secondary and primary data. The relevant information about the state and districts was obtained from various issues of the Statistical Abstract of Haryana, Government of Haryana, Panchkula. The required preliminary information regarding the agricultural marketing in Haryana was obtained from the officials of the Haryana State Agricultural Marketing Board, Panchkula. The districts and crops for the study were decided in consultation with them. Meetings with the HSAMB officials and the APMC market officials were useful and informative.

The scope of the study is confined to two horticultural crops i.e. one fruit (muskmelon) and one vegetable (tomato). Three districts namely, Gurgaon, Sonepat and Kurukshetra with the presence of Traditional Marketing Channel (TMC) and Emerging Marketing Channel (EMC) were selected for in-depth study. The Reliance Fresh was selected as Emerging Market Channel. A questionnaire was canvassed to the farmers selling their produce through these channels. An effort was made to cover

all farm size categories in the sample. These were divided into marginal (less than one hectare) small (1-2 hectares), medium (2-4 hectares), and large (more than 4 hectares). The primary data pertaining to the year 2010-11 were collected from 200 farmers (100 TMC + 100 EMC). In view of the main objective of the study, it is found necessary to compare the price, cost and economics of the selected crops and benefits of Emerging Marketing Channel to the farmers and consumers. The detailed sampling design of the study is given below;

Crop	Traditional Marketing Channel (No. of Farmers)	Emerging Marketing Channel (No. of Farmers)
Tomato	50	50
Muskmelon	50	50

The sample size for other intermediaries is as follows:

Particulars	Traditional Marketing Channel	Emerging Marketing Channel
Intermediary	5	5
Retailer	5	5
Consumer	5	5

1.5 Analytical Framework

The study is analytical in nature and therefore, simple measures such as percentages, shares and compound growth rates have been utilized to derive results. The methodology followed for each aspect is different. For measuring the growth rates of area, production and yield of fruit and vegetable crops at the all India and state level for available period, the semi-log equation of the form log y = a + bt was used where -

y = area/production/yield of the crop

a = intercept

b = slope

t = time

The marketing efficiency is computed by using the formula given by Acharya, 2011. The formulation is as under:-

MME = FP ÷ (MC+ MM)

Where,

MME = Modified Measure of Marketing Efficiency

FP = Net Price Received by the Farmers

MC = Total Marketing Cost

MM =Total Net margins of Intermediaries

1.6 Organization of the Study:

At the outset, literature survey, objectives and research methodology of the study are presented in Chapter-1. Next Chapter is devoted to the analysis of the status of APMC Act in India and Haryana. Chapter-3 deals with background of the selected districts, horticultural crops in Haryana and the Reliance Fresh. The issues related to marketing of muskmelon and tomato are discussed in Chapter-4. The findings of the study and policy implications are presented in the final chapter.

Chapter-2

Status of Agricultural Marketing in India and Haryana

Introduction

During the 1960s and 1970's, India's agricultural policy was framed with the objective of attaining food security and price stability. These policies were based on controls on marketing, pricing, storage, transport, and quantitative restrictions on trade. Public investment in the agriculture sector, spurred by "The Green Revolution" of the 1960s, and agriculture grew by over 4 percent per annum in the 1980s. This rate, however, was not sustainable. A slowdown in public investment, low yield growth, and environmental problems including declining water table led to poorer agricultural performance in the 1990s. During this period, domestic economic reforms and the WTO Agreement on agriculture constituted two important policy changes. The impact of the economic reforms was indirect by raising per capita income which led to change in food consumption pattern. The WTO Agreement brought about some tariff reforms through liberalizing agricultural trade, by removal of quantitative restrictions on imports. India's focus on liberalizing agricultural trade is partially set out in the Tenth Five Year Plan (2002-07). The strategies to raise agricultural output included increasing crop intensity adoption of modern technology to increase productivity and diversification of cropping pattern.

India has an Agricultural Produce Market Regulation Act (APMRA) in which every regulated market has a market committee where farmers, traders, commission agents, local bodies and the state government are represented. Prices are fixed through an open auction in a transparent manner in front of an official of the auction committee. The main criticism of regulated markets is that they do not reduce the long chain of intermediaries between the farmer and the consumer, which adds to the cost of agricultural commodities to consumers on the one hand, and decreases returns for farmer on the other.

2.1 APMC Act in India:

Agricultural Marketing is covered under State List in Article 245 of Constitution of India. The State Agriculture Produce Marketing (Regulation and Development) Act promoted by respective state government regulates the agriculture marketing within the state, divides the entire state into various notified areas and delegates the responsibility for regulating agricultural markets in respective areas to specific APMCs. The biggest hindrance in providing a modern and suitable marketing system had been limiting provisions in the State Agriculture Produce Marketing (Regulation and Development) Act. A state APMC Act divides the entire state into various notified areas to the specific APMCs. Essentially, the state APMC Act treats agricultural marketing to be a localized subject confined to a specific notified area and, therefore, it endeavors to create a mechanism to regulate sale of agricultural produce grown in that area by the farmers to the traders located within such notified area. In fact, it goes to the extent of prohibiting the end-users and processors located elsewhere from buying from the farmers directly in the absence of license from respective Agricultural Produce Market Committee (APMC).

Over the last sixty years, growth in the agriculture sector in India had been phenomenal but Agricultural Marketing sector could not keep pace with the changing pattern of production, distribution, processing and retail marketing. Due to evolution of a fragmented Agricultural Marketing System in the country under the Regulatory Framework of the State APMC Acts, a robust common national market for agricultural commodities could not take shape so far and a strong need is being felt to facilitate such development through a Central intervention. The need of development of an integrated National Market for agricultural commodities has been emphasized on several occasions. This is presently being tried to be achieved in a limited manner by making the amendments in State APMC laws on the basis of the Model Act and Model Rules circulated by the Central Government, but some states are hesitant to amend their Marketing Regulations.

Agricultural commodities are produced in specific parts of the country depending upon topography and climate conditions, while the demand for the same spreads on pan-India basis. Hence, there is a need to move the agricultural produce from specific supply centers to various consumption centers in the country in fastest possible way at a least cost in order to ensure supply of quality produce to consumers at affordable price. Under the present system, marketable surplus of one area moves out to consumption centers through a network of middlemen and traders and institutional agencies. Thus, there exists national level physical market though there is no national level regulation for the same. While the state APMC Act provides for regulation including redressal of dispute within the state being a state Act, there is no such inter-state mechanism in the absence of a national level Act to regulate and redress the issues relating to inter-state trade of agricultural produce and corresponding redressal of dispute. In other words, APMC act does not deal with a national level market for agriculture marketing due to its restricted jurisdiction under Article 245 of the Constitution of India. This has prevented development of an efficient and cost effective physical National Market due to absence of a legal provision to facilitate its inter-state movement and transaction. In order to control price inflation at retail end, effective control and regulation on the supply chain of sensitive commodities across the state boundary is essential. Cost of intermediation and multilayer levies in inter-state and multi state transactions constitute a major chunk of consumer paid price, which needs to be substantially reduced.

Therefore, there is an urgent need to regulate the trade and commerce of the agricultural commodities and products through a national level legislation for promotion and development of a common Indian market. This will help to avoid multiple licensing requirements. This will also remove internal trade barriers and bottlenecks and enable development and growth of internal trade and commerce seamlessly across the country, in all commodities. Further, in the current scenario, in case of dispute or defaults in such trade, there is no administrative or regulatory mechanism available for redressal, as existing in many developed countries. This drawback can also be removed through the new legislation. Such an ideal and much required law can be made by the

Government of India, only if agricultural marketing is made a central subject or a subject under the concurrent list. However, in the present circumstances, the subject of 'market' being a state subject under the Constitution, a limited purpose Central Legislation is possible to be achieved without causing any conflict with the provisions of existing state APMR Acts or other state laws.

Notification of rules is important for operationalising the provisions of the Act. In order to guide the States/U.T.s for framing of APMC Rules, Ministry of Agriculture framed the Model APMC Rules, 2007 and circulated to all States/U.T.s. Model APMC Rules embody provisions, regarding contract farming, regulation of trading, levy of market fees and its collection, establishment and functioning of private market yard/private market/private e-market, consumer/farmer market and direct market, etc. Under contract farming, provisions for its registration, model agreement, recording the agreement and dispute settlement and appeal mechanisms are also provided.

So far, six states (Andhra Pradesh, Rajasthan, Maharashtra, Orissa, Himachal Pradesh and Karnataka) have framed the APMC Rules for implementing the provisions of their respective state APMC Act. Three states, viz Madhya Pradesh, Haryana and Mizoram have partially framed the rules. Haryana has notified the Rules for contract farming only while Mizoram has notified the rule of single point levy of market fee. Madhya Pradesh has framed the rules for direct marketing/special license for more than one market and contract farming only. Unless the corresponding APMC. Rules are framed and notified, various provisions of the APMC Act cannot be operationalised in the state and the market reforms may remain unrealized. Some of the states have imposed restrictions which are not provided in Model APMC Rules such as states of Andhra Pradesh, Maharashtra and Karnataka prescribing minimum investment requirement for setting up of private markets and states of Gujarat, Orissa and Karnataka providing for minimum distance criteria for private markets from existing APMCs. In Gujarat, minimum distance requirement is 5 kms while in Orissa, it is 1 km. In Karnataka, such restriction is for Bengaluru only for foodgrains, pulses, spices, etc, and private markets handling these commodities would not be established within the

radius of 25 kms from the existing market. The other restrictions are compulsory registration of contract farming, short validity of licenses for private mandies (H.P.). The states of Assam, Gujarat, Madhya Pradesh, Haryana and Uttrakhand have not notified the APMC rules. Those states have already notified the APMC rules for review and make the provision in conformity with the Model Rules. Hence, it is urgent to align the APMC Rules keeping in mind the Model Rules.

To sum up, in order to provide competitive choices of marketing to farmers and to encourage private investment for the development of market infrastructure and alternative marketing channels, a Model Act on agricultural marketing was formulated and circulated to the states/UTs by the Ministry of Agriculture in 2003 to guide them on the removal of barriers and monopoly in the functioning of agricultural markets. Seventeen states have already amended the APMC Act as per provisions of the Model Act. Seven states have also notified APMC Rules under their Act. Details regarding present status are indicated in Table 2.2.

Contract Farming:

States need to make the provisions under contract farming as suggested under the Model Act. Furthermore, it should be ensured that disputes may be settled within 15 days and the decretal amount of appeal should not be more than 10 per cent of the amount of goods purchased under contract farming. Appeal should be disposed off within 15 days instead of 30 days. APMC should not be the authority for registration/dispute settlement under contract farming. The district level authority may be set up for registration of contract farming and no market fee should be levied under it.

Table 2.1

Progress of Reforms in Agricultural Markets (APMC Act) as on 31.10.2011

Sl. No.	Stage of Reforms	Name of State/Union Territory
1	States/UTs where APMC Act reforms have been done for Direct Marketing; Contract Farming and Markets in Private/ Cooperative Sectors.	Andhra Pradesh, Arunachal Pradesh, Assam, Goa, Gujarat, Himachal Pradesh, Jharkhand, Karnataka, Maharashtra, Mizoram, Nagaland , Orissa, Rajasthan, Sikkim, Uttrakhand and Tripura
2	States/UTs where APMC Act reforms have been done partially	a) **Direct Marketing:** NCT of Delhi, Madhya Pradesh and Chhattisgarh b) **Contract Farming:** Chhattisgarh, Madhya Pradesh, Haryana, Punjab and Chandigarh
3	States/UTs where there is no APMC Act and hence not requiring reforms	Bihar*, Kerala, Manipur, Andaman & Nicobar Islands, Dadra & Nagar Haveli, Daman & Diu, and Lakshadweep
4	States/UTs where APMC Act already provides for the reforms	Tamil Nadu
5	States/UTs where administrative action is initiated for the reforms	Meghalaya, Haryana, J&K, West Bengal, Puducherry, NCT of Delhi and Uttar Pradesh.

Note: * APMC Act is repealed w.e.f. 1.9.2006.
Source: Ministry of Agriculture, Government of India, New Delhi

Regulation of Trading:

Model Act suggested that states need to provide the provision of registration in place of licensing for market functionaries and unified single registration should be issued by the Director or independent authority designated there of market functionaries desirous to trade in more than one market area. Producer-seller should not be forced to sell their produce through commission agent and producer-seller willing to sell their produce directly to the buyer should be facilitated by the market committee in terms of infrastructure and service both.

Transparent Auction System:

Transparent Auction System through an electronic platform and immediate cash settlement with seller needs to be provided in all the mandies. Also, states are required

to make provisions for single point levy of market fee as suggested in Model Act. A commodity once having been subjected to market fee in the first transaction anywhere in the state or in other state should not be subjected to payment of market fee in subsequent transactions. However, user charges may be levied in such cases.

Check Posts/Gates set up to recover market fee under APMC regulations in states such as Gujarat and Orissa must be done away the immediate effect as they serve impediments in smooth supply and distribution of agricultural produce across the state and country.

2.2 Marketing of Agricultural Produce in Haryana

Now we analyse marketing of agricultural produce in Haryana.

The Royal Commission on Agriculture (1928) pointed out that there was no common yardstick to measure the quality of produce, the weights and measures were un-standardized and the private market operators exploited the farmers. It recommended enactment of market legislation to curb rampant malpractices and realize better returns. In that context, the Haryana state being a part of undivided Punjab enacted the Punjab Agriculture Produce Markets Act, 1939. This act was further amended in 1961 and operational in the state as per Manual of Haryana State Agricultural Produce Marketing Law published by Haryana State Agricultural Marketing Board, Panchkula. According to model APMC rules, 2007 circulated by the Ministry of Agriculture, Government of India, Haryana has notified the rules for contract farming only under the state APMC Act. Under this act, all the markets of the state have been regulated. The transactions in these markets are conducted under set rules on regulations. A large number of market committees were set up by the state government to supervise the functioning of agricultural produce markets. The Haryana State Agricultural Marketing Board was established in 1969 under this market Act to guide, supervise and control the market committees of the state for better and efficient marketing of agricultural produce.

Table-2.2
STATUS OF REGULATED MARKETS IN HARYANA (2009-10)

District	Number of Regulated markets	Number of Sub-yards	Average number of villages served per regulated market	Average area served per regulated market (Sq.Kms.)
Ambala	7	9	69	225
Panchkula	3	3	75	299
Yamunanagar	7	10	88	253
Kurukshetra	7	13	58	219
Kaithal	7	16	39	331
Karnal	10	8	42	254
Panipat	5	4	36	254
Sonepat	3	9	107	707
Rohtak	3	4	49	582
Jhajjar	2	3	126	917
Faridabad	2	3	69	358
Palwal	4	1	N.A.	N.A.
Gurgaon	4	4	88	346
Mewat	4	3	N.A.	N.A.
Rewari	2	6	200	791
Mahendragarh	4	8	92	465
Bhiwani	7	9	63	683
Jind	6	10	51	450
Hissar	6	22	45	664
Fatehabad	7	15	35	360
Sirsa	6	18	54	713
Total	**106**	**178**	**64**	**417**

Source: Statistical Abstract of Haryana, 2009-10

It is evident from Table 2.2 that Haryana has unevenly spread net work of regulated markets across the districts. The highest number of regulated markets was observed in Karnal district while Jhajjar, Faridabad and Rewari districts have shown as low as two markets each. In the table, information is also presented on average number of villages served per regulated market. In Rewari, each regulated market covered 200 villages that is too high. It implies that most of the farmers have to carry their agricultural produce for sale to far off to the regulated market which increased cost of transport, wastage of energy and time.

The Haryana State Agricultural Marketing Board (HSAMB) has been facilitating and addressing the marketing problems of farmers in Haryana.

Objectives

- Add and get better value for the farmer's produce.
- Set up efficient marketing services.
- Integrate diversification of crops and promote judicious and profitable use of land resources.
- Introduce knowledge and technology based interventions.
- Improve skill sets and awareness of the farmers.
- Develop quality control and standards in agriculture sector.

The primary objective of the Board was to set up a modern integrated marketing infrastructure, improve accessibility to the markets and to provide the farmers with opportunities to achieve better value for their produce. Now adopting a philosophy of "Samridh Kissan, Hamari Pehchan", this organization endeavours to assist farmers, thus helping them to reap a rich future by achieving better value. Hence, Haryana State Agriculture Marketing Board with 3000 employees, headed by a chairman and a Chief administrator as CEO, strives for one solitary aim to support, promote and enhance the agriculture production and marketing keeping interest of the farmers in mind.

The vision of the HSAMB is to bring ample number of opportunities and set up efficient and knowledge based marketing systems and services to increase the net income in the agriculture segment. In turn, creating a prosperous and progressive farmer.

The Chain Reaction (Marketing Network)

In 1969, there were only 58 Market Committees and 60 Sub-yards in the State. The farmers had to travel long distances to sell their produce. Today, HSAMB has come a long way, after dedicating 37 years to the welfare of the farmers. There are

- 106 Market Committees
- 178 sub-yards
- 181 Purchase Centres

To further facilitate marketing there are provisions for the following:

- 30 Subzi Mandies,
- 25 fodder Markets
- 33 Cotton Mandies

have been established in the state. As a result, today farmers don't have to travel more than 8 kms on the average to sell their produce.

In the mandis, the Board provides facilities like

- Shops for traders, dealers, etc.
- Individual platforms for commission agents
- Covered sheds
- Kiosks
- Kissan Rest Houses
- Drinking Water
- Tower Lights
- Washrooms
- Sewerage/drainage, etc.

Connectivity:

HSAMB has also systematically strengthened its construction wing and has been pioneer in construction of link roads and approach roads of the state. Initially, 65% of the market fee was deposited with PWD for this purpose. Since 1989, the construction wing of the Board has taken up the construction of the roads. The Board has constructed 9333 kms of roads as on 31.3.2007, with sole objective of providing better connectivity to the mandis. As a result, every village is connected by more than two roads.

Storage Capacity:

The Board has established Covered Shed Storage Capacity of 7,97,300 MT. The food storage capacity of Godowns is 4,26,850 MT. In addition, 22 covered sheds are under construction with additional storage capacity of 12850 MT.

Incentives & Welfare Schemes:

Financial Assistance to the Victims of Agricultural Operations:

This scheme commenced in July, 1990 provides special assistance to the accident stricken victims of an agricultural operation. Under this scheme, an amount of Rs. 50,000/- is given to the grief stricken family of the victim and upto Rs. 30,000/- is given to the victim. The Board has already disbursed a sum of Rs. 27.39 crore granted to 15572 victims upto 31st March 2007.

Krishak Uphar Yojna:

Krishak Uphar Yojna seeks to encourage farmers to bring their produce to the mandi. Under the modified Krishak Uphar Yojna, 4244 farmers will get a cash prize of Rs. 5000/- each annually, against 836 prizes earlier. Under new scheme, it is ensured that farmers of each Market Committee get a chance to win one special prize of Rs. 20,000/- and many others. HSAMB spends about Rs. 2.5 crore on this scheme annually.

Works Undertaken with Central Assistance:
Development/renovation of Cotton Markets under TMC

Fifteen Cotton Markets have been completed/renovated with the assistance of Technology Mission on Cotton, Ministry of Textiles, Government of India with a cost of Rs. 21.91 crore. TMC has given an assistance of Rs. 11.05 crore.

Computerization:

With the assistance of the Directorate of Marketing & Inspection Department, Ministry of Agriculture, Government of India, computers in 106 Market Committees and 25 sub yards have been provided. Necessary basic training/software training has already been imparted to about 1000 officers and field staff. Information on daily arrivals is being sent by all Market Committees to AGMARK NET.

New Initiatives and Schemes:

Modernization and Remodeling of Existing Markets:

In phase one, markets are being modernized and remodeled with a budget of 500 million rupees. Pack Houses, cooling & ripening chambers, sorting/grading lines, etc. are being provided besides promoting agri-business activities through Agri-Business & Information Centres (ABICs).

Setting up of Agri-Business & Information Centres:

Two ABICs have been opened at Sirsa and Hisar. These provide information on market, agronomic practices and organize seminars, workshops, buyer-seller meets, etc. These centres also house the Agriculture Development Officers and provide regular training to farmers and help in improving the quality of the agricultural products. It is planned to have ABICs at all District Headquarters in the next three years.

Contract Farming:

Necessary amendments have been made in the Punjab agricultural Produce Markets Act to introduce contract farming.

Setting up of Modern Fruits & Vegetables Markets:

New Modern Fruit and Vegetable Markets will provide separate retail and wholesale sections with better facilities for the convenience of consumers, market information, storage facilities and cooling chambers.

Farmer's Marketing Assistance Scheme:

Scheme has been formulated recently to adopt practices for value addition. Under this scheme, assistance for grading/sorting and packing material and transportation is provided.

Setting up of Farmers' Markets:

In order to provide opportunity to the farmers for selling their produce directly to the consumers and realize better prices, a network of farmer's markets is being set up.

Special Commodity Hubs:

With the help of NHM, Special Commodity Hubs of potato, tomato, kinnow are being developed where all facilities of grading, sorting, packaging, etc. will be provided.

Export Promotion:

The board has launched export promotion policy which seeks to provide technical and financial assistance to the farmers for upgrading the quality of produce and take up value addition activities. It promotes formation of grower's groups/ societies for this purposes. An Export Promotion council is also proposed to be created.

Setting-up of Lab Facilities:

In order to increase competitiveness of the grower's produce, a network of labs for quality testing and certification is being created in PPP mode.

Strengthening training for the Farmers:

Training of the growers in post harvest management and marketing has been taken up in a big way this year. First batch of master trainers is already out. The Board seeks to train 2000 farmers every year.

Proposed Mega Projects:

World Class Terminal Market:

HAS proposed to set up a world class terminal market of fruits and vegetables at Rai 30 km. from Delhi. This market will cater to not only Delhi but to whole of Northern India.

Flower Market of International Standards:

It is also proposed that flower market catering whole of North India and Delhi is to be set up near Delhi. It will also have export facility centre.

Joint approach and Steps taken for Marketing, Export of Fruits, Flowers and Vegetables:

In addition, state of Haryana has taken up a number of steps for marketing, export of fruits, flowers and vegetables. During the year 2010-11, production of fruits, flowers, vegetables, spices, mushroom and medicinal plants was 374675, 61320, 4372730, 70540,7720,588 MT respectively.

Fresh fruits, flowers and vegetables are highly perishable and for interstate domestic marketing and export, we farmers quality produce and use of Post Harvest Management infrastructure for bulk storage. In this direction, state government has taken initiatives as under:

A. Effort for quality production and productivity enhancement:

1. Establishment of Centre of Excellence for Vegetables:

Due to shrinking cultivable area, vertical farming and productivity enhancement is to be taken up on a large scale. In this direction, department has taken an initiative and has established a Centre of Excellence for Vegetable (CEV) Crops at Gharounda, Karnal in the year 2010-11 under Indo-Israel Project Centre of

Excellence for Vegetables at a cost of 6 crore. It demonstrates quality vegetable seedling production and quality produce of cherry, tomato, capsicum of different colours and cucumber in poly houses and shed net. In addition, open cultivation of vegetables is also going on under drip and Micro Sprinklers to demonstrate the optimum use of water and enhancement of productivity and quality.

2. **Establishment of Centre of Excellence for Fruits:**

   The Centre of excellence for fruits has been established at Managiana (Sirsa). The total cost would be Rs. 9.70 crore. At the centre, different cultivars of citrus, mango, guava have been demonstrated. In addition, olive plantation has also been done.

3. **Establishment of Front Line Demonstration Centre (FLDC)**

   On the pattern of CEV, Gharaunda, 12 front line demonstration centres under NHM at the cost of Rs. 300 lac are going to be established at district Head Quarters in the State to disseminate the latest technology to the farmers. In these centers, quality vegetable seedlings, cherry, tomato, capsicum and cucumber will also be produced. In addition, different vegetables under drip and Micro Sprinklers will be grown.

4. **Establishment of Vegetable Seedling Production Unit**

   2 vegetable seedling production units at the cost of Rs. 208 lac will be established to provide quality vegetable seedlings of different vegetables to the farmers in the state to enhance productivity and quality.

5. **Intervention of New Technology:**

   Different schemes have been launched in the state for increasing productivity and quality. The interventions are: use of Micro Irrigation system, use of soluble fertilizer, Integrated Nutrietent Management (INM) and Integrated Pest Management (IPM), use of hybrid vegetable seeds, horticulture mechanization, use of packing material, etc.

B. Effort for PHM Infrastructure:

1. Pack House:

During the first phase, 11 pack houses have been established for packing fruits, flowers and vegetables, which are nearing completion. In second phase, establishment of 18 pack houses is planned.

2. Modernization of 11 fruit & vegetable wholesale markets with CC plate forms, garbage disposal system and refrigerated vans.

3. Terminal Market Complex at Ganaur is under progress at the cost of Rs. 1230 crore. This will be a point for storage and marketing, export of fruits, flowers and vegetables. This is the largest terminal market complex in the Asia.

4. Establishment of National Institute of Food Technology Entrepreneurship & Management (NIFTEM) under the Ministry of Food Processing and Industries, Government of India, New Delhi.
   The vision of NIFTEM is to be an International Center of Excellence, which integrates all aspects of food Technology, Entrepreneurship, Research and Management and be recognized as the focal point for catalyzing the growth of the food processing industry in India with respect to global scenario.

   NIFTEN would play a pivotal role in developing food standards, quality, accreditation and certification; keeping a repository of international and national standards and also advising the Government on the matters related to International Food standards. This Centre will be established in 100 acre area in Sonepat district in Haryana.

In addition, some organizations like Mother Dairy are engaged in assisting the farmers in producing good quality fruit and vegetables. The state government has

already amended the APMC Act to make provision for contract farming to encourage diversification of crops.

At the end, Government of Haryana is making substantial efforts to improve the scenario related to marketing aspects of agriculture produce. But, immediate efforts to further reform the Act is the need of hour.

Chapter-3

Selected Districts, Fruit and Vegetable Crops and EMC (Reliance Fresh):

A Background

Introduction:

After presenting research methodology adopted for the selection of study area, sampling design, data collection and analytical framework used in the light of specific objectives of the study in Chapter-1, we provide a brief background of the selected districts, the Reliance Fresh and status of fruit and vegetable crops in the state of Haryana in this chapter which is divided into three sections. One section is devoted to each aspect.

Section-1

Selected districts

SONEPAT

Sonepat comprises three sub-divisions namely, Ganaur, Sonepat and Gohana and covers seven blocks. It was carved out of Rohtak and was made a full-fledged district in 1972. Sonepat is the largest tehsil in the district followed by Gohana.

Sonepat with an area of 2,13,080 hectares lies in the south-east of the state of Haryana, north of the Union Territory of the Delhi and is bounded by the districts of Rohtak, Jind and Panipat. The district shares an inter-state boundry with district Meerut of Uttar Pradesh. The river Yamuna runs along the eastern boundary of the district and separates it from Uttar Pradesh. The entire district is a part of the Punjab plain, but area is not leveled at several places. The soil is fine loam of rich colour. Some areas, however, have sandy soil and others are comprised of Kallar. The plain has a gradual

slope to the south and east. The district is divided into three regions – the Khadar, the upland plain and the sandy region.

The climate of district Sonepat is dry with an extremely hot summer and a cold winter. The weather becomes comparatively mild during the monsoon period (July to September). The post-monsoon months October and November constitute a transition period, prior to the onset of winter. The cold season starts towards the later half of November when day and night temperatures fall rapidly. January is the coldest month when mean daily minimum temperature is 6 to 7^0C. During the summer months of May and June, maximum temperature sometimes reaches 47^0C. Temperature drops considerably with the advancement of monsoon in June.

Humidity is considerably low during the greater part of the year. The district experiences high humidity only during the monsoon period. The period of minimum humidity (less than 20%) is between April and May. The annual rainfall varies considerably from year to year. However, the maximum rainfall is experienced during the monsoon season, which reaches its peak in the month of July. In fact, the monsoon period accounts for 75% of the annual rainfall in the district.

According the 2001 Census, total population of district was 1279 thousand persons (6.05% of the state). Of this, urban population formed a small part and was around 25%. The district is primarily rural in nature and main activity of the people is agriculture. The rural population of the district was 958 thousand persons. The male and female ratio was about 839. Total workers in Sonepat according to 2001 Census comprised of 36.26% cultivators, 16.71% agricultural labourers and remaining 47% as non-agricultural workers.

Sonepat, comprising of Sonepat, Gohana and Ganaur sub divisions, has 343 villages. The irrigated area by canals and tubewells is 2,86,504 acres and un-irrigated/ rainfed area is 43,979 acres. Water logging is a serious problem affecting the productivity of land. The problem of water logging is imminent. There has been an

alarming rise in the water table during the last two decades, especially in the areas adjoining canals.

The soil in the district Sonepat is rich and quite suitable for all types of agricultural crops as well as forest cover. The types of soil may be classified according to textures as: 1.Sandy (Raitali), 2.Sandy loam (Bhuri), 3.Loam (Rausli), 4.Clay loam (Karti) & 5. Clay (Dakar). The main soil of the district is a good alluvial loam with sufficient moisture and is mostly rausli in texture.

The main river system in the district comprises of river Yamuna and the canals flowing out of it. There is no perennial river in the district. The underground water resources differ from area to area. The depth of the water table is the lowest in the Khader area along the Yamuna, where it is below 10 ft. It increases from 30 to 40 ft. in some of the Western and South Eastern part of the district. The ground water in some areas is saline and brackish. The ground water conditions indicate that the district faces the problem of occurrence of brackish water and water logging in eastern parts of the district.

Foodgrains followed by vegetables are the main crops grown in the district Sonepat. The yield rate of foodgrains is slightly lower than the state. This is despite the fact that fertilizer consumption per hectare in the district is higher than the state level.

Infrastructure in the district comprises banks, primary agriculture cooperative credit societies and regulated markets. The road length per lakh population was 110 kilometers against 128 kilometers in Haryana (Table-3.1).

KURUKSHETRA:

Kurukshetra is a place of great historical and religious importance, revered all over the country for its sacred associations. It was here that the battle of Mahabharta was fought and Lord Krishna preached his philosophy of “KARMA” as enshrined in the

Holy Geeta to Arjuna at Jyotisar. Kurukshetra is situated in the north eastern part of Haryana and is surrounded by Ambala district in the north, Karnal in the north eastern side, Yamunanagar district in the east and Kaithal district in the west. It is situated on the Grand Trunk Road and main Ambala Delhi Railway Line. The district has been divided into 2 subdivisions namely Thanesar and Pehowa. It has five development blocks viz., Thanesar, Pehowa, Ladwa, Babain & Shahabad. It has 4199 villages, all of which are electrified and linked with metalled pucca roads.

The land is totally plain with slope from north east to south and south eastern direction. The climate is extremely hot and dry in summer and the temperature touches 45^0C in the month of May and June. It is hot and humid in the rainy season (July, August and early September) while it is extremely cold in the months of November to February and temperature goes down to as low as 4^0C. District has average rainfall of 740 mm. The land of district Kurukshetra is plain and fertile. Soils are medium to heavy in texture and pH varies from 7.5 to 8.9. The alluvial clay loam soil is ideal for crops grown in the district.

In Kurukshetra district, tubewells are the main source of irrigation. The entire net sown area is irrigated. This is much higher than the state average of 82%. The gross irrigated area is 270000 ha. which constitutes 5.1% of state's total gross irrigated area. The cropping intensity of the district was found 183. Out of the total irrigated area, majority is irrigated by canals and remaining is irrigated by tube wells. Around 89% of the geographical area is cultivated. The percentage of net sown area to total cultivable area is 99.3% which is much higher than state average of 93.1%.

There are 14995 tractors, 11833 harrows, 2688 zero till seed cum fertilizer drills, 7280 power threshers, 300 combine harvesters, 14943 sprayers, 139 dusters, 478 straw reapers, 2 laser levelers, 2 bed planters in the district. In cropping pattern, foodgrains covered 86.72% followed by fruits and vegetables covering 5.37% of the GCA during 2009-10. The per hectare productivity of foodgrains in the district is higher than the state level.

Table-3.1

Major Indicators Related to Population and Agriculture in the selected Districts in Haryana

S. N	Particulars	Sonepat	Kurukshetra	Gurgaon	Haryana
I	**Population**				
	Population (2001) ('000)	1279175	825454	870539	21144564
	Rural	957800	609943	560836	15029260
	% of Rural Population	74.88	73.89	64.42	71.08
	Urban	321375	215511	309703	6115304
	% of Urban Population	25.12	26.11	35.58	28.92
	Population Density (per sq. km)	603	540	612	478
	Sex Ratio	839	866	850	861
	% of SC Population to Total Population	18.09	20.52	14.75	19.35
	Rural Literacy Rate 2001 (percent)	44.16	41.45	40.71	37.5
II	**Agricultural Workers (% to total workers) 2001**				
	Cultivators	36.26	23.7	31.09	36.03
	Agricultural Labourers	16.71	22.73	9.2	15.26
	Agricultural Workers	52.97	46.43	40.29	51.29
	Non-Agricultural Workers	47.03	53.57	59.71	48.71
III	**Land Use**				
	% of Net Area Sown to Geographical Area	72.77	89.29	69.17	82.22
	Average size of Holdings (2000-01)	1.6	2.36	1.77	2.32
	Percentage of Gross Area Irrigated to Total Cropped Area (2008-09)	98.3	100	94.8	85.3
	Percent of Net Irrigated Area to Net Area Sown (2008-09)	96.1	100	92.8	80.5
	Cropping Intensity (%) 2008-09	194.19	182.66	137.35	181.76
IV	**Area under major crops (percent to GCA): 2008-09**				
	Total Cereals	85.45	86.42	78.51	68.26
	Total Pulses	1.86	0.29	0.61	2.83
	Total Foodgrains	87.31	86.72	79.12	71.09
	Total Oilseeds	0.80	2.12	12.81	8.12
	Sugarcane	1.93	4.12	0.00	1.39
	Cotton	0.20	0.00	0.00	7.02
	Fruits and Vegetables	4.47	5.37	6.44	1.99
V	**Productivity of Important Crops (kg/ha): 2008-09**				
	Total Cereals	3513	3852	3240	3606
	Total Pulses	1214	1000	1000	965
	Total Foodgrains	3464	3842	3223	3501
	Total Oilseeds	1250	1983	1870	1727
	Sugarcane	6810	6088	0	5752
	Cotton	Negligible	Negligible	Negligible	Negligible
VI	**Input Use**				
	Fertilizer (kg/ha) (2008-09)	285.82	369.33	146.61	208.56
	Hives Coverage (2008-09)	83.44	85.73	91.97	88.45
	Number of Tractors (per 000 ha of NSA) (2008-09)	80	92	63	72
	Electricity use in Agriculture (% to total in 2008-09	31.43	73.38	33.37	39.45
VII	**Credit Societies, Bank and Roads**				
	No. of Primary Agriculture Cooperative Societies	33	49	33	628
	No. of Banks per lakh population	0.01	0.01	0.03	10.13
	Total Road Length per lakh Population (2008-09)	109.84	142.47	81.9	127.94
VIII	**Regulated Markets**				
	No. of Regulated Markets per lakh ha of Net Sown Area (2008-09)	2	5	5	3

Source: Statistical Abstract Haryana, 2009-10

The level of fertilizer consumption per hectare was also observed higher than the state. Around 33% of electricity is used for agricultural purposes. The road length per lakh population was found above the state. There are five regulated markets under the APMC.

GURGAON:

Gurgaon district falls in the southern most region of the state of Haryana. Its headquarter is at Gurgaon. Gurgaon falls under National Capital Region. It lies in between 27° 39' and 28° 32'25'' latitude, and 76° 39' 30'' and 77° 20' 45'' longitude. Its boundary touches Rajasthan and south Delhi and it makes Gurgaon to be an important strategically located place. On its north, it is bounded by the district of Jhajjar & the Union Territory of Delhi; Faridabad district lies to its east. On south, it shares boundary with Mewat whereas Rewari lies in its west.

The district comprises of hills with irregular and diverse nature of topography. Two ridges i.e. Firojpur Jhirka-Delhi ridge forms the western boundary and Delhi ridge forms the eastern boundary of the district. These hills are continuation of Aravalli hills. The north-western part of the district is covered with sand dunes lying in the western direction due to southwestern winds. The extension of the Aravalli hills and the presence of sand dunes collectively form the diverse physiography of the district. The drainage of the district is typical in arid and semi-arid areas. It comprises of large depressions and seasonal streams. Important depressions of the district are Khalilpur lake, Chandani lake, Sangel-Ujhina lake, Kotla dahar lake and Najafgarh lake. Sahibi and Indrani are two important seasonal streams of the district.

The alluvium in the area comprises silt, sand, gravel, clay and kankar. It has been divided into older alluvium and newer alluvium. The old alluvium is present in the most part of the district. It comprises of poor silt, sand, gravel and clay. The silt constitutes fine wind blown variety along with kankar. The presence of kankar in the

formation reduces the pore spaces, which in turn reduces the capacity to store and transmit water thus making them poor water bearing formations. The recent alluvium covers the eastern part of the area, east of the Sohna ridge. It comprises mainly stream laid silt, sand clay and calcareous modules. It is also found in the west of Sohna ridge where streams have deposited in the form of discontinuous bands and at the foothill slopes.

In Gurgaon, temperature begins to increase from February and rises rapidly till May. May and June are the hottest months with mean daily temperature about 40^0C and the mean minimum daily temperature of about 25^0C. The daily mean maximum temperature varies from 21.4^0C in January to 40^0C in May. From April onwards, hot westerly dust ladden winds cause heat wave conditions and weather of the district becomes intensely hot and unpleasant. With the advancement of monsoon currents into the district by the end of June, there is appreciable drop in day temperature and the weather becomes comparatively cool in the day. After the withdrawal of the monsoon in the middle of September, day temperature remains high but night temperature begins to drop progressively. The fall in temperature of day and night are rapid from October to January. January is the coldest month. During the cold weather season, district is affected by cold waves in association with the western disturbances.

The normal rainfall in the district is about 578 mm spread over monsoon months. The southwest monsoon sets in the last week of June and withdraws towards the end of the September and contributes about 80% of the annual rainfall. July and August are the wettest months. 20% of the annual rainfall occurs during the non-monsoon months in the wake of thunder storms and western disturbances. Rainfall distribution in the district is quite uneven which increases from 450 mm in the south at Farukhnagar to 750 mm in the east.

Gurgaon is considered as the most densely populated district of Haryana. According to the Census 2001, total population of Gurgaon district was 871

thousand persons. Out of which 471 thousand were males and 400 thousand were females. The rural population of Gurgaon district was around 64% and the urban population was around 36%. The density of population was 850 persons per sq km in the district. The occupational structure of the population revealed their social, cultural and educational levels. The higher work participation rate may reflect larger opportunities of employment available in the district. The occupational structure of the district indicated that share of cultivators and agricultural labourers in total workers was observed around 31 and 9% respectively. Non-agricultural workers constituted around 60% of total workers. Like state, foodgrains are the major crops which occupied 79% of GCA. In addition, around 13% of GCA was observed under oilseeds. The productivity of foodgrain crops in the district was lower than the state level while vice versa was true in case of oilseeds (Table-3.1).

The fertilizer consumption was 147 kg/ha that is much lower than the state level. Other infrastructural facilities such as banks, primary agricultural cooperative societies were common like other districts of Haryana. It is surprising that road length per lakh population was found lowest among the selected districts for the study.

Section-2
Reliance Fresh: A Background

We have mentioned in Chapter-1 that fruits and vegetables under the Traditional Marketing Channel are marketed through the regulated APMC markets and distributed across the consumption centres through a chain of intermediaries, starting from producers to commission agents, wholesalers, traders, retailers/vendors and finally to consumers. The problems and constraints in the traditional marketing system are leading to emergence of super markets and organized food retail chains such as the Reliance Fresh in urban locations. Now, we present a brief background of the Reliance Fresh.

Reliance Retail Limited (RRL), a subsidiary of RIL (Reliance Industries Limited), was set up to lead Reliance Group's foray into organized retail. The RF, a wholly owned subsidiary of RRL was born in November, 2006 with its first store in Hyderabad. RF was evolved from Ranger Farms which wholesaled Fresh Fruits and Vegetables (FFV) to push-cart vendors and other bulk customers.

Reliance Retail today ushered in a new retail culture in the National Capital Region by opening nine western-style food stores as it hoped to become the preferred supplier of their push-cart vendors and kirana stores. The launch of nine Reliance Fresh stores in Noida, Greater Noida, Gurgaon, Ghaziabad and Faridabad took the number of such outlets that sell fruits, vegetables, groceries and dairy products to 49 in the country with an investment of close to Rs 3,000 crore.

Reliance Fresh stocks fresh fruits and vegetables, staples, fast moving consumer goods and dairy products. The stores are already selling over 1,000 tonnes of fresh produce daily and also 250 categories of commodities. The company is approaching farmers directly for the procurement of produce, seeking to reduce sizable wastage that occurs through the traditional supply chain.

All RF outlets deal in fruits and vegetables (F&V). RF had 700 stores in India and 110 in National Capital Region (NCR) alone, by early 2009. All the RF stores were owned stores and varied in size. Number of F&V Stock Keeping Units (SKU) per store ranged between 65 and 70, occupying about 15-25% of store apace. Each of the RF stores was managed by one store manager and 18 store staff working in two shifts. The average footfalls in weekdays were around 400 while on week-ends increased to 600. The City Processing Centre (CPC) for F&Vs was located in Naroda. The F&Vs were classified into 8-10 product categories; leafy vegetables, tropical F&Vs, basic vegetables, cuts and sprouts, melons, mangoes, apple and citrus fruits, etc. Only 2% of its FFVs were cut and packed. All city indents were consolidated and demands placed by the Cost Per Click (CPC) to the Collection Centre (CC).

The share of sales of F&Vs in total sale of RF stores was about 2.5%. On an average, a RF outlet sold one tonne of F&V/day which was 0.5 tonne/day earlier. The RF claimed that its share in organized F&V retail was 50%. The employees at the store trained specifically for F&Vs were called F&V champions'. Although, stores sold pre-packed vegetables like tomato, onions, potatoes, cut vegetables and other imported items. It was difficult to sell them as they had to be declared "Best before" and their "Expiry dates" were to be mentioned. For tomato, potato and onion, prices are expected to be lower in the stores than un-organized retailers. The product promotion was done through leaflets, banners and bi-weekly promotional schemes. The Reliance food processing solutions Pvt. Ltd. was another arm of Reliance Industries Ltd, which was into wholesaling and export. It focused on selected Stock Keeping Units (SKUs) like onions, grapes, etc. Sometimes, it supplied to the RF stores. More recently, a 'market down' strategy has been used in all the stores to clear the unsold F&Vs at lower price. After that, unsold F&Vs were dumped. The RF stores also stocked their own private label in staples and food under 'Reliance Select" label.

During the time of harvest, CC in-charge posted the 'offer price' based on which farmers decided whether or not to supply their produce by comparing the revenue realization (gross price net of transaction costs) from alternative channels. Agreements were reached wholly on the basis of oral assurances. Thus, without contracts or similar committed obligations to lock in farmer supply, CC managers faced a messy task of matching supply and demand. RF procured F&Vs of 'A Grade' only. It paid higher price at their dispatch door in return for better quality, but with efficiencies in logistics and handling, the effect of these cost on final (supermarket shelf) prices is discounted (vis-à-vis the fragmented transactional arrangements of wet markets). Some farmers mentioned that the entry of super markets into their local growing areas had been good for prices. The weighted average price paid by RF as percentage of that paid by traders was higher in most of the vegetables.

Since RF procured only A grade of the produce, farmers had to bear cost of finding an alternative buyer for the rejected produce. Rejection rates for grapes and green beans were less than 2%, as compared to 23% in tomatoes. Though RF paid a premium for 'A' grade tomatoes, but growers run a greater risk of having their produce rejected. Farmers also undertook sorting and grading, prior to delivery which imposed an additional cost on growers, but farmers did not have to pay commissions or' unloaded fees' unlike in mandi. Deliveries at CCs were subjected only to visual tests (checking for damage from insects, disease, etc) and requirement that produce met the criterion of uniformity of size. Thus, the role of quality parameters in supermarkets procurement remained quite rudimentary

Section-3
Status of Fruit and Vegetable Crops in Haryana

Economy of Haryana is largely agriculture based and the state is viewed as grain bowl of India, being one of the largest contributors of food grains to the central pool. Moreover, it ranks first in the country in the export of Basmati rice. Green revolution in the state has been synonymous with farm mechanization, development of irrigation infrastructure and use of fertilizers. Consequently, overall productivity per unit of land has risen significantly.

Dominance of wheat and paddy rotation in the crop pattern of Haryana has started creating problems such as soil degradation. Significantly; water table is receding with each passing year due to over exploitation of water. Both these crops are input intensive and therefore, cause imbalance in nutritional structure of soil and pollute the underground water. To overcome these problems, horticulture can play an important role through diversifying land use pattern.

Diverse agro-climatic conditions of the state are conducive for cultivation of horticultural crops including fruits like citrus, grapes, mango, guava, etc. Since, one third of the state territory falls within the geographical coverage of the National Capital Region, there is a tremendous scope for commercial cultivation of vegetable crops, fruits, flowers, etc. In addition, establishment of agro-processing industries has a good potential. Especially, owing to its proximity to Delhi, there is vast potential for processing of fruits and vegetables.

In view of this background, we first present the status of horticultural crops in Haryana in terms of area, production and yield during 2007-08, 2008-09 and 2009-10. In addition, we present statistics related to horticultural crops at the crop and district level.

Status of Horticultural Crops in Haryana

Agricultural economy of Haryana is foodgrains based with 66.7 per cent of GCA under their cultivation. Wheat followed by paddy has been observed as the most important cereal crops with 36.7 and 15.9 per cent of GCA in the state during the triennium ending 2008-09. In addition, mustard and cotton are also grown on sizeable proportion (10.4 and 8.9 per cent) of GCA. It is essential to mention that area under pulses became as low as 2.7 per cent of GCA during the reference period.

We have presented information on status of Haryana in all India area under fruits and vegetables from 1996-97 to 2004-05 in Table-3.2. It is evident that share of this state in all India area under fruits was less than 1 per cent throughout these years despite higher potential. Moreover, it grew at the rate of 2.91 per cent per annum during this period.

A look at the share of Haryana in all India area under vegetables reveals a far better status. It constituted 1.71 per cent of all India area during 1996-97 and

reached to 3.08 per cent in 2004-05. The annual growth rate of area under vegetables was commendable and crossed 10 per cent mark. These figures indicate a distinct achievement of the state. When fruits and vegetables are clubbed together, Haryana showed 1.28 per cent share in all India area during 1996-97 which reached to 1.98 per cent during 2004-05. The area expansion appeared to be commendable by indicating a growth rate of 9.5 per cent per year during the above-mentioned period.

Table-3.2
Area under Fruits and Vegetables in Haryana

Year	Fruits		Vegetables		Fruits and vegetables	
	Area (000 ha)	Per cent of all India	Area (000 ha)	Per cent of all India	Area (000 ha)	Per cent of all India
1996-97	21.8	0.61	94.5	1.71	116.3	1.28
1997-98	23.9	0.65	96.8	1.73	120.7	1.30
1998-99	26.2	0.70	120	2.05	146.2	1.52
1999-00	28.6	0.75	135	2.25	163.6	1.67
2000-01	30.7	0.79	141.7	2.27	172.4	1.70
2001-02	31.3	0.78	150.4	2.44	181.7	1.79
2002-03	31.9	0.84	163.1	2.68	195	1.97
2003-04	31.6	0.68	203.9	3.23	235.5	2.14
2004-05	24.1	0.49	207.8	3.08	231.9	1.98
Growth rate	2.91		10.71		9.5	

Source: CMIE, 2008-09

Table-3.3

Percentage of GCA under Horticultural crops in Haryana

District	Percentage of GCA
Ambala	5.07
Panchkula	2.09
Yamunanagar	2.05
Kurukshetra	3.30
Kaithal	0.38
Karnal	1.15
Panipat	2.00
Sonepat	2.56
Rohtak	0.87
Jhajjar	0.42
Faridabad	2.00
Gurgaon	1.77
Rewari	0.33
Mahendragarh	0.59
Bhiwani	0.08
Jind	0.56
Hissar	0.71
Fatehabad	0.57
Sirsa	0.68
Haryana	**1.11**

Source: Ministry of Agriculture, Government of India, New Delhi

Figure:1

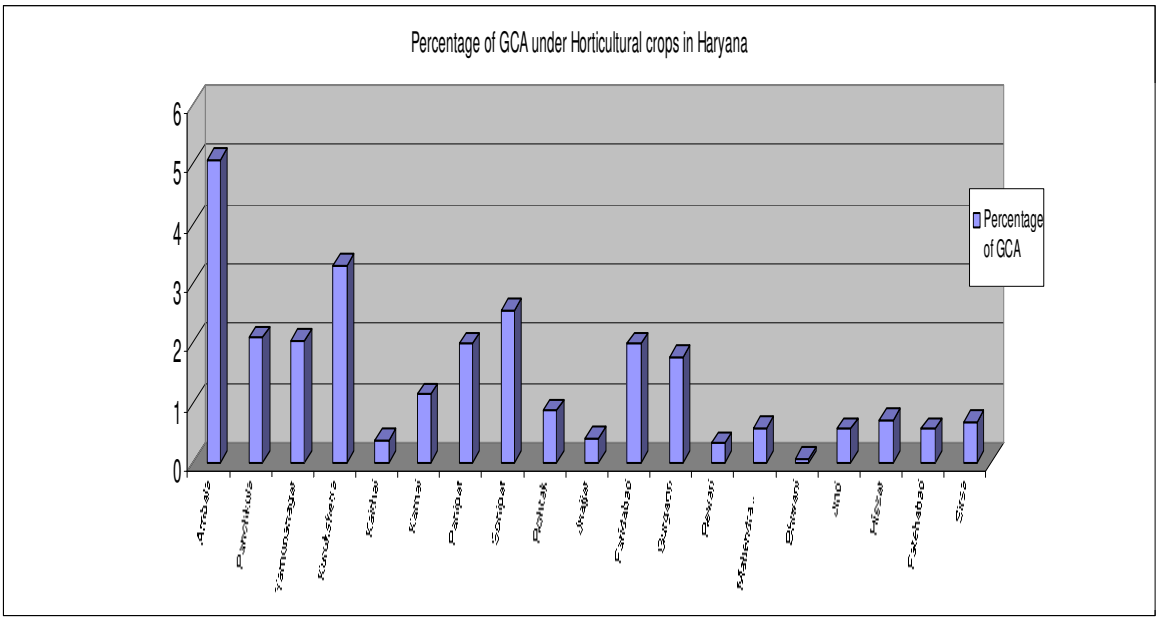
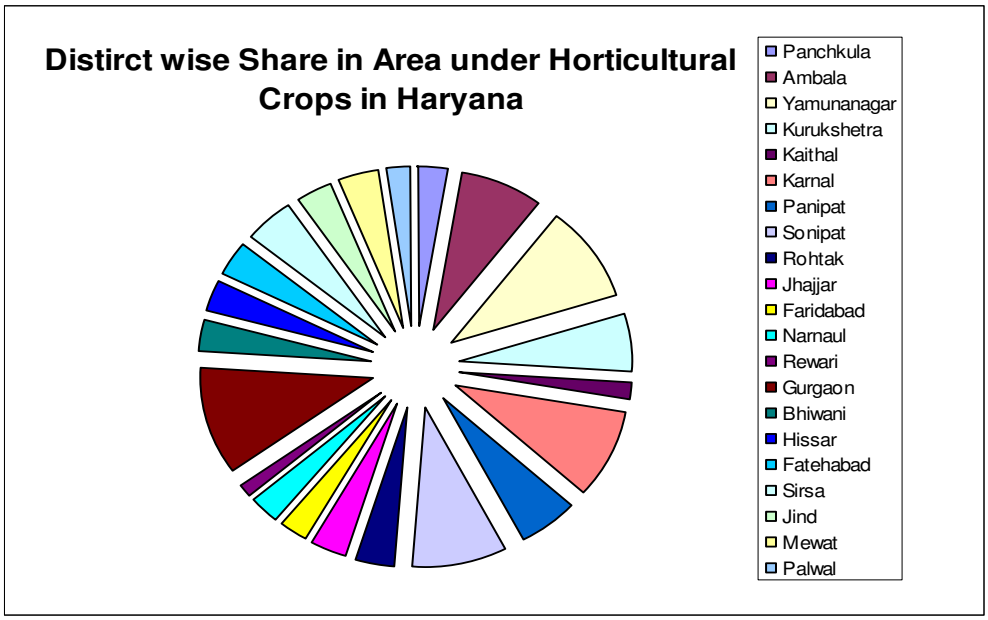


Table- 3.4
District wise Share in Area under Horticultural crops in Haryana

Sl. No.	District	Fruits and Vegetables
1	Panchkula	2.74
2	Ambala	7.72
3	Yamunanagar	9.85
4	Kurukshetra	5.77
5	Kaithal	1.68
6	Karnal	8.82
7	Panipat	5.73
8	Sonepat	8.68
9	Rohtak	3.73
10	Jhajjar	3.24
11	Faridabad	2.97
12	Narnaul	2.64
13	Rewari	1.31
14	Gurgaon	10.98
15	Bhiwani	3.44
16	Hissar	2.90
17	Fatehabad	3.73
18	Sirsa	4.53
19	Jind	3.40
20	Mewat	4.05
21	Palwal	2.10
	State	100.00

Source: Ministry of Agriculture, Government of India, New Delhi

Figure:2



Only 1.11 per cent of GCA was devoted to horticultural crops in Haryana during 2007-08. A district-wise scenario presented in Table-3.3 indicates that highest share of total cropped area was devoted to horticultural crops in Ambala followed by Kurukshetra and Sonepat. Gurgaon and Faridabad were lagging behind these districts despite their close proximity to Delhi. In contrast, there are districts such as Rewari which exhibited around 1 per cent of total cropped area under horticultural crops.

Although, agro climatic conditions of Haryana are suitable for growing horticultural crops, progress of horticulture in terms of area devoted has been rather slow and does not commensurate with the availability of excellent natural and efficient human resources. In fact, higher yields and better returns through assured marketing from wheat-rice cropping system has been one of the major reasons for reluctance of the farmers to shift to fruit crops which have a long gestation period. In the past, public policy, at state and central levels has paid inadequate attention to the development of horticultural crops. Now, policy makers have realized growth potential of horticultural crops and proactive steps have been undertaken by the

Government through implementation of programmes like the National Horticulture Mission.

Having analysed share of horticultural crops in allocation of acreage at the district level, it would be useful to examine the share of each district in total area under these crops. Table3.3 suggests that Gurgaon is leading with more than 10 per cent share in the overall area. Further, share of Yamunanagar (9.85 per cent), Karnal (8.82 per cent), Sonepat (8.68 per cent), Ambala (7.72 per cent), Kurukshetra (5.77 per cent) and Panipat (5.73 per cent) was observed more than 5 per cent. These districts together formed more than 60 per cent of the state area under horticultural crops during 2009-10 (Table 3.4).

Composition of Horticultural Crops:

Horticultural crops comprise a large variety of crops including fruits, vegetables, spices, flowers, medicinal and aromatic plants. In view of the large genetic base available, crops adapt to diverse conditions of soil and climate Table-3.5 presents share of individual crops in total area and production of horticultural crops in Haryana. The scenario is dominated by vegetables. The share of vegetables in area and production of horticultural crops was as high as 82.57 and 90.31 per cent respectively. Fruits occupied second rank with 11.38 per cent share in area and 6.83 per cent share in production. A low contribution in production indicates low productivity of fruit crops in the state. Increase in productivity has to come from crop improvement as well as enhanced cropping intensity.

Spices are well known as appetizers. These are also considered essential in the culinary art all over the world. Some of the spices possess anti-oxidant properties and others are used as preservatives. India is the largest producer as well as consumer of spices in the world. Even in Haryana, there is no cuisine without addition of one or more spices. Spices formed around 4 per cent of area under horticultural crops and contributed 1.44 per cent to total production. The low contribution in production could be due to low yield.

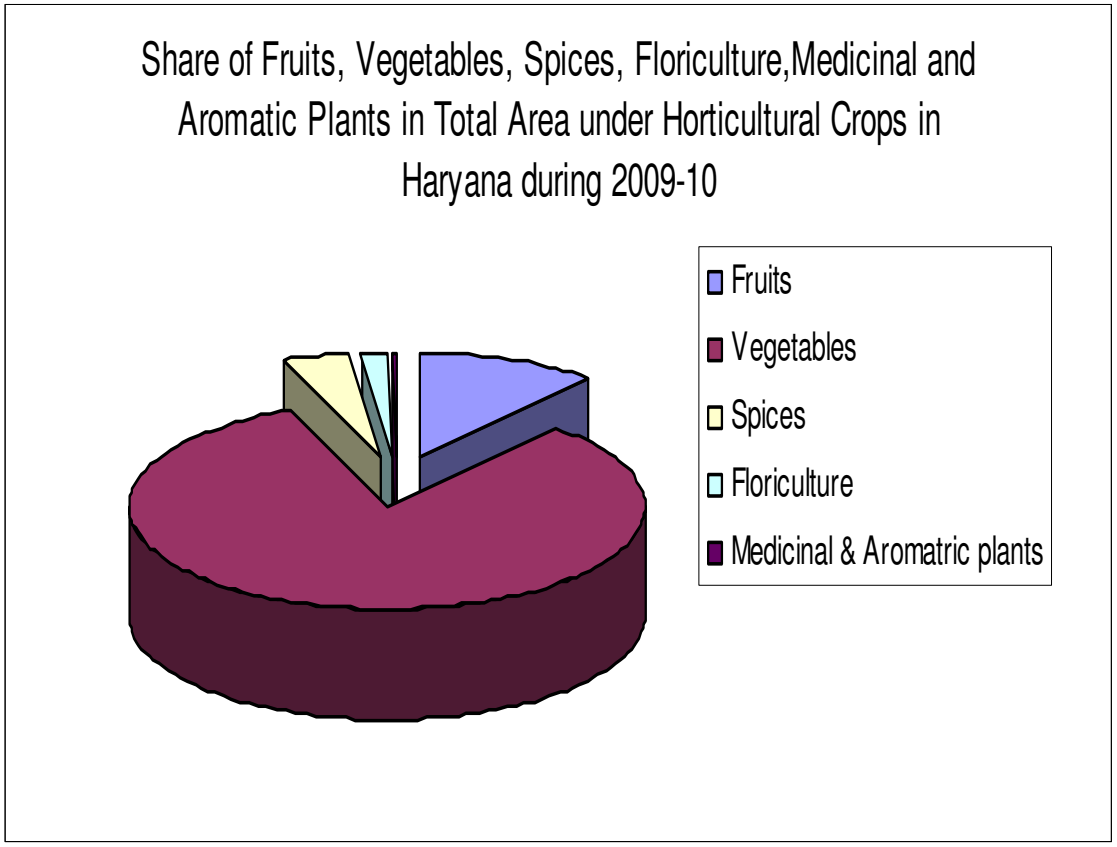
Table-3.5

Share of Fruits, Vegetables, Spices, Floriculture, Medicinal and Aromatic Plants in Total Area under Horticultural Crops in Haryana during 2009-10

Sl. No.	Crop	Share	
		Area	Production
1	Fruits	11.38	6.83
2	Vegetables	82.57	90.31
3	Spices	4.08	1.44
4	Floriculture	1.70	1.36
5	Medicinal & Aromatic plants	0.28	0.06
	Total	100.00	100.00

Source: Ministry of Agriculture, Government of India, New Delhi

Figure:3



In Haryana, floriculture is getting popular among the farmers. These are being grown in peri-urban areas and 1.70 per cent of area under horticultural crops was devoted to flowers. Medicinal and aromatic plants are not popular in Haryana and a marginal share of total area under horticultural crops was devoted to them.

Share of Individual Vegetable and Fruit Crops in Total Area under these Crops:

Since vegetable and fruit crops together constituted around 94 per cent of area and 97 per cent of production of horticultural crops in Haryana, it would be useful to examine share of individual crops in total area allocation. Table-3.6 reveals that citrus (33.38 per cent), mango (22.01 per cent) and guava occupied around 75 per cent of area devoted to fruit crops in the state. Next ranking fruits are mango, ber and aonla. Fruits such as grapes and litchi does not appear to be popular among farmers and therefore, proportion of area under these crops is less than one per cent.

Vegetables form core of the horticultural crops in Haryana. Among vegetables, cucurbits (22.67 per cent), cauliflower (8.54 per cent), leafy vegetables (8.34 per cent), potato (7.66 per cent), tomato (7.51 per cent) and radish (7.25 per cent) are the main crops grown in the state and constituted more than 60 per cent of area under vegetables during 2009-10. On the other hand, arbi among vegetables indicated as low as 0.12 per cent of area under total vegetable crops in Haryana.

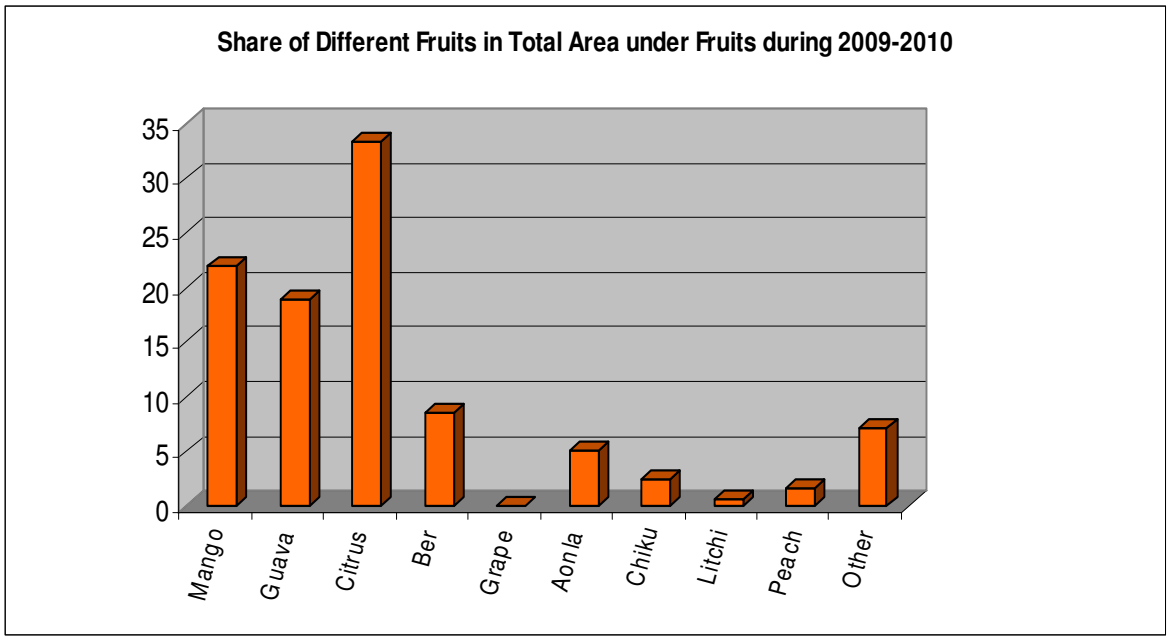
Table-3.6

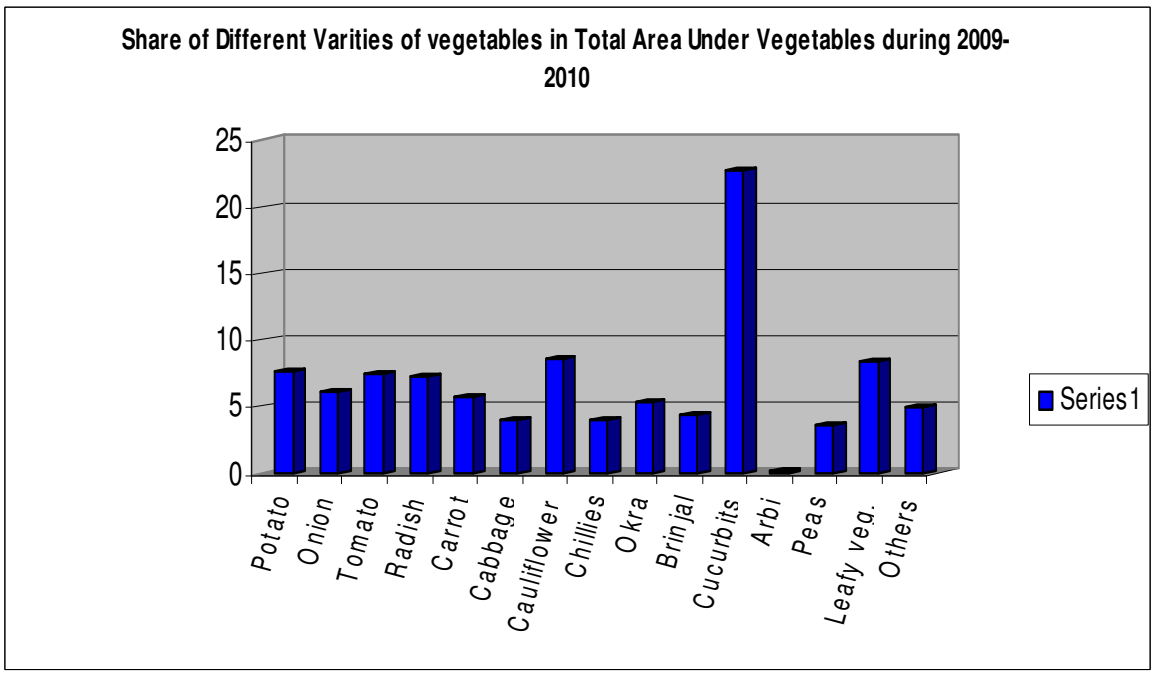
Share of Different Varieties of Fruits and Vegetables in Total Area under Fruits and Vegetables during 2009-2010

Sl. No.	Particulars	Percentage Share
	Fruits	
1	Mango	22.01
2	Guava	18.86
3	Citrus	33.38
4	Ber	8.62
5	Grape	0.12
6	Aonla	5.05
7	Chiku	2.53
8	Litchi	0.59
9	Peach/Pear/Plum	1.63
10	Other	7.20
	Total	100.00
	Vegetables	
1	Potato	7.66
2	Onion	6.13
3	Tomato	7.51
4	Radish	7.25
5	Carrot	5.78
6	Cabbage	4.07
7	Cauliflower	8.54
8	Chillies	3.96
9	Okra	5.28
10	Brinjal	4.31
11	Cucurbits	22.67
12	Arbi	0.12
13	Peas	3.52
14	Leafy vegetables	8.34
15	Other	4.86
	Total	100.00

Source: Ministry of Agriculture, Government of India, New Delhi

Figure:4


Share of Different Fruits in Total Area under Fruits during 2009-2010
35
30
25
20
15
10
5
0
Mango
Guava
Citrus
Ber
Grape
Aonla
Chiku
Litchi
Peach
Other


Share of Different Varities of vegetables in Total Area Under Vegetables during 2009-2010
25
20
15
10
5
0
Potato
Onion
Tomato
Radish
Carrot
Cabbage
Cauliflower
Chillies
Okra
Brinjal
Cucurbits
Arbi
Peas
Leafy veg.
Others
Series1

Change in Area and Production of Horticultural Crops:

It may be noted that time series detailed data on individual vegetable and fruit crops are available since 2007-08. Therefore, we are unable to calculate growth rates of area and production. Instead, we have computed percentage change in area and production of individual vegetable and fruit crops between 2007-08 and 2009-10. Results presented in Table-3.7 indicate that citrus fruits are most prominent gainers in area and production (68.46 and 47.11 per cent) during the reference period. Next is chiku which has shown an increase 39.63 per cent in area and 50.82 per cent in production during this period. Guava also gained significantly in area as well as in production. On the other hand, grapes are the biggest losers in area as well as in production. The extent of loss was 42.53 per cent in area and 34.19 per cent in production. In terms of area, another loser crop was aonla despite an increase of 6.89 per cent in production. Litchi and peaches group indicated positive gains in area but production losses were as high as 35.49 and 31.30 per cent, respectively.

Among vegetables, leafy vegetables, tomato and potato indicated more than 15 per cent increase in area and production between 2007-08 and 2009-10. Particularly, increase in production of tomato and potato was impressive by indicating more than double production in case of potato and almost five times in case of tomato. It could be possible due to increase in yield rates. The similar pattern of gains has been noticed in case of cucurbits, cabbage and cauliflower.

Okra emerged as a special case with 7 per cent increase in area and less than 1 per cent gain in production.

District-wise Scenario of Area, Production and Yield of Fruit Crops:

After analyzing change in area and production of vegetables and fruit crops at the state level, it would be prudent to analyse the scenario at the district level. The information related to area, production and yield of fruit crops in 2007-08 to

2009-10 is presented in Table-3.8 Yamunanagar and Sirsa were the leading districts in area under fruit crops cultivation and together accounted for 37 per cent of total cultivated area. Ambala, Narnaul, Bhiwani and Faridabad showed more than 5 per cent share in overall area under fruit crops
during 2007-08. Further, share of Yamunanagar in state acreage under fruit crops has declined from previous level in 2007-08 while it has increased in the case of Sirsa district in

Table-3.7

Percentage Change in Area and Production of Horticultural Crops between 2007-2008 and 2009-2010

Sl. No.	Particulars	Percentage Change	
		Area	Production
	Fruits		
1	Mango	5.52	8.20
2	Guava	27.46	32.58
3	Citrus	68.46	47.11
4	Ber	1.74	1.16
5	Grape	-42.53	-34.19
6	Aonla	-14.32	6.89
7	Chiku	39.63	50.82
8	Litchi	4.74	-35.49
9	Peach/Pear/Pulam	3.52	-31.30
10	Other	1.70	124.38
	Total	23.33	26.42
	Vegetables		
1	Potato	15.81	40.49
2	Onion	3.90	5.02
3	Tomato	17.85	87.73
4	Radish	9.13	9.60
5	Carrot	5.50	4.91
6	Cabbage	7.76	42.99
7	Cauliflower	6.06	39.38
8	Chillies	11.54	3.17
9	Okra	7.00	0.70
10	Brinjal	-3.68	-17.56
11	Cucurbits	2.77	30.24
12	Arbi	-2.95	-3.72
13	Peas	5.86	-9.23
14	Leafy vegetable	28.72	13.65
15	Others	39.59	7.49
	Total	9.57	22.69

Source: Ministry of Agriculture, Government of India, New Delhi

2009-10. As far as, share of these leading districts in production of fruits is concerned, it as declined from 17.57 per cent in 2007-08 to 16.13 per cent in 2009-10 in Yamunanagar. While, it has increased from 19.93 per cent to 24.01 per cent in Sirsa district during the same period due to improvement in productivity. It is interesting to note that yield rate of fruits was observed highest in Panipat district during 2007-08 which is a low ranking district in terms of area allocation. Second rank was attained by Hissar and third by Kaithal. After two years, Kaithal and Gurgaon attained first and second ranks in productivity of fruit crops during 2009-10.

In Table-3.9, we have compared district-wise status of vegetable crops in terms of area, production and productivity during 2007-08, 2008-09 and 2009-10. The spatial pattern of area allocation presented in this Table suggests that Karnal, Sonepat, Gurgaon, Ambala and Yamunanagar together constituted almost 50 per cent of total area under vegetable cultivating in the state during 2007-08. After one year, share of Gurgaon dropped marginally while share of Yamunanagar increased by almost one per cent. Yamunanagar also contributed highest share in production. During 2009-10, share of Gurgaon has increased while vice versa was observed in case of Yamunanagar. It is surprising that yield rates of vegetable crops were observed highest in Narnaul, a lowering ranking district in area and production. Next was Yamunanagar which maintained its rank in area, production and yield.

The level of productivity of vegetable crops changed after one year in 2009-10 and Kurukshetra became a leader in terms of yield rates of vegetable crops. Panchkula shifted from third rank to second rank by indicating an increase in productivity from 14.82 to 17.31 tonnes/ha. To conclude, performance of vegetable crops in Haryana in terms of productivity was appreciable which has risen from 11.93 tonnes/ha in 2007-08 to 13.36 tonnes/ha in 2009-10.

Table-3.8

District wise Area, Production and Yield of Fruit Crops in Haryana (2007-2008 to 2009-2010)

Sl No.	District	2007-08			2008-09			2009-10		
		Area (ha)	Production (tonnes)	Yield (tonnes/ha)*	Area (ha)	Production (tonnes)	Yield (tonnes/ha)	Area (ha)	Production (tonnes)	Yield (tonnes/ha)
1	Panchkula	1533 (4.56)*	6865 (2.86)*	4.48 (19)*	500 (3.85)*	3650 (7.60)*	7.30 (1)*	1629 (3.93)*	9514 (3.13)*	5.84 (16)*
2	Ambala	1940 (5.77)	12498 (5.20)	6.44 (14)	608 (4.68)	1232 (2.56)	2.03 (15)	2193 (5.29)	15551 (5.12)	7.09 (11)
3	Yamunanagar	6862 (20.42)	42240 (17.57)	6.16 (15)	2035 (15.66)	12009 (25.00)	5.90 (2)	7511 (18.12)	49032 (16.13)	6.53 (13)
4	Kurukshetra	980 (2.92)	6618 (2.75)	6.75 (12)	978 (7.53)	3870 (8.06)	3.96 (6)	1065 (2.57)	6774 (2.23)	6.36 (14)
5	Kaithal	337 (1.00)	3557 (1.48)	10.55 (3)	319 (2.46)	894 (1.86)	2.80 (10)	333 (0.80)	4120 (1.36)	12.37 (1)
6	Karnal	1895 (5.64)	12963 (5.39)	6.84 (11)	1551 (11.94)	8091 (16.84)	5.22 (4)	2087 (5.03)	18694 (6.15)	8.96 (9)
7	Panipat	668 (1.99)	7322 (3.05)	10.96 (1)	156 (1.20)	490 (1.02)	3.14 (8)	707 (1.71)	6359 (2.09)	8.99 (7)
8	Sonepat	1262 (3.75)	10185 (4.24)	8.07 (7)	1526 (11.74)	3957 (8.24)	2.59 (11)	1419 (3.42)	14372 (4.73)	10.13 (5)
9	Rohtak	945 (2.81)	4816 (2.00)	5.10 (17)	462 (3.56)	1068 (2.22)	2.31 (13)	1293 (3.12)	9629 (3.17)	7.45 (10)
10	Jhajjar	1154 (3.43)	6667 (2.77)	5.78 (16)	193 (1.49)	330 (0.69)	1.71 (17)	1511 (3.65)	9153 (3.01)	6.06 (15)
11	Faridabad	955 (2.84)	9110 (3.79)	9.54 (4)	312 (2.40)	188 (0.39)	0.60 (20)	687 (1.66)	7807 (2.57)	11.36 (3)
12	Narnaul	420 (1.25)	2934 (1.22)	6.99 (9)	665 (5.12)	1385 (2.88)	2.08 (14)	1485 (3.58)	3484 (1.15)	2.35 (21)
13	Rewari	390 (1.16)	2717 (1.13)	6.97 (10)	170 (1.31)	300 (0.62)	1.76 (16)	490 (1.18)	2781 (0.92)	5.68 (18)
14	Gurgaon	1379 (4.10)	10080 (4.19)	7.31 (8)	449 (3.46)	1063 (2.21)	2.37 (12)	1298 (3.13)	15129 (4.98)	11.66 (2)
15	Bhiwani	1973 (5.87)	10001 (4.16)	5.07 (18)	260 (2.00)	875 (1.82)	3.37 (7)	2622 (6.33)	6321 (2.08)	2.41 (20)
16	Hisar	1812 (5.39)	19225 (8.00)	10.61 (2)	622 (4.79)	946 (1.97)	1.52 (18)	2412 (5.82)	15936 (5.24)	6.61 (12)
17	Fatehabad	1701 (5.06)	14723 (6.12)	8.66 (6)	675 (5.19)	3700 (7.70)	5.48 (3)	1908 (4.60)	20029 (6.59)	10.50 (4)
18	Sirsa	5528 (16.45)	47923 (19.93)	8.67 (5)	433 (3.33)	1817 (3.78)	4.20 (5)	7919 (19.10)	72978 (24.01)	9.22 (6)
19	Jind	973 (2.89)	6441 (2.68)	6.62 (13)	455 (3.50)	1350 (2.81)	2.97 (9	890 (2.15)	7976 (2.62)	8.96 (8)
20	Mewat	903 (2.69)	3515 (1.46)	3.89 (20)	626 (4.82)	825 (1.72)	1.32 (19)	1247 (3.01)	4003 (1.32)	3.21 (19)
21	Palwal	NA	NA	NA	NA	NA	NA	744 (1.79)	4278 (1.41)	5.75 (17)
	Total	33610 (100)	240400 (100)	7.15	12995 (100)	48040 (100)	3.70	41450 (100)	303920 (100)	7.33

*Figures in parenthesis indicate percentage share of the district and rank of the district in yield

Source: Ministry of Agriculture, Government of India, New Delhi

Table-3.9

District wise Area, Production and Yield of Vegetable Crops in Haryana (2007-2008 to 2009-2010)

Sl.No.	District	2007-08			2008-09			2009-10		
		Area (ha)*	Production (tonnes)*	Yield (tonnes/ha)*	Area (ha)*	Production (tonnes)*	Yield (tonnes/ha)*	Area (ha)*	Production (tonnes)*	Yield (tonnes/ha)*
1	Panchkula	7600 (2.77)	112664 (3.44)	14.82 (3)	7000 (2.35)	113683 (2.92)	16.24 (1)	7750 (2.58)	134176 (3.34)	17.31 (2)
2	Ambala	24250 (8.83)	253325 (7.73)	10.45 (16)	25558 (8.58)	278679 (7.16)	10.90 (18)	24225 (8.05)	294878 (7.33)	12.17 (16)
3	Yamunanagar	21503 (7.83)	335882 (10.25)	15.62 (2)	26975 (9.04)	345001 (8.86)	12.79 (13)	26192 (8.71)	362600 (9.02)	13.84 (4)
4	Kurukshetra	13225 (4.82)	188401 (5.75)	14.25 (6)	19865 (6.66)	313042 (8.04)	15.76 (2)	18700 (6.22)	327180 (8.14)	17.50 (1)
5	Kaithal	6588 (2.40)	64091 (1.96)	9.73 (19)	6049 (2.03)	83538 (2.15)	13.81 (7)	5410 (1.80)	71470 (1.78)	13.21 (9)
6	Karnal	26965 (9.82)	271374 (8.28)	10.06 (17)	28337 (9.50)	403041 (10.35)	14.22 (6)	28116 (9.35)	371374 (9.24)	13.21 (10)
7	Panipat	16175 (5.89)	233093 (7.11)	14.41 (4)	15610 (5.23)	214640 (5.51)	13.75 (9)	18900 (6.28)	214451 (5.33)	11.35 (18)
8	Sonepat	26691 (9.72)	313512 (9.57)	11.75 (12)	26800 (8.98)	369949 (9.50)	13.80 (8)	28295 (9.40)	369344 (9.19)	13.05 (12)
9	Rohtak	6250 (2.28)	77168 (2.35)	12.35 (10)	8897 (2.98)	95868 (2.46)	10.78 (20)	11460 (3.81)	113129 (2.81)	9.87 (21)
10	Jhajjar	8425 (3.07)	104025 (3.17)	12.35 (9)	9343 (3.13)	118531 (3.04)	12.69 (14)	9576 (3.18)	126870 (3.16)	13.25 (8)
11	Faridabad	11276 (4.11)	151969 (4.64)	13.48 (7)	13725 (4.60)	186929 (4.80)	13.62 (10)	9482 (3.15)	118166 (2.94)	12.46 (13)
12	Narnaul	5187 (1.89)	83403 (2.55)	16.08 (1)	6396 (2.14)	79120 (2.03)	12.37 (15)	7542 (2.51)	75614 (1.88)	10.03 (20)
13	Rewari	4010 (1.46)	57569 (1.76)	14.36 (5)	4021 (1.35)	57281 (1.47)	14.25 (5)	4002 (1.33)	54354 (1.35)	13.58 (5)
14	Gurgaon	37745 (13.75)	395085 (12.06)	10.47 (15)	37642 (12.61)	413627 (10.62)	10.99 (17)	36294 (12.06)	574302 (14.28)	15.82 (3)
15	Bhiwani	11270 (4.10)	130359 (3.98)	11.57 (13)	9613 (3.22)	117166 (3.01)	12.19 (16)	9145 (3.04)	98514 (2.45)	10.77 (19)
16	Hisar	8520 (3.10)	105464 (3.22)	12.38 (8)	8760 (2.94)	94912 (2.44)	10.83 (19)	7515 (2.50)	90539 (2.25)	12.05 (17)
17	Fatehabad	10050 (3.66)	99568 (3.04)	9.91 (18)	10854 (3.64)	155694 (4.00)	14.34 (4)	10875 (3.61)	146121 (3.63)	13.44 (6)
18	Sirsa	6048 (2.20)	72985 (2.23)	12.07 (11)	7380 (2.47)	97635 (2.51)	13.23 (11)	7575 (2.52)	99433 (2.47)	13.13 (11)
19	Jind	10150 (3.70)	112024 (3.42)	11.04 (14)	10825 (3.63)	159857 (4.11)	14.77 (3)	10745 (3.57)	144066 (3.58)	13.41 (7)
20	Mewat	12652 (4.61)	115139 (3.51)	9.10 (20)	14780 (4.95)	195237 (5.01)	13.21 (12)	12614 (4.19)	154454 (3.84)	12.24 (15)
21	Palwal	NA	NA	NA	NA	NA	NA	6447 (2.14)	79685 (1.98)	12.36 (14)
	Total	274580 (100)	3277100 (100)	11.93	298430 (100)	3893430 (100)	13.05	300860 (100)	4020720 (100)	13.36

*Figures in parenthesis indicate percentage share of the district and rank of the district in yield

Source: Ministry of Agriculture, Government of India, New Delhi

Changes in Area and Production of Fruit Crops:

So far, we have analysed area, production and yield of vegetable and fruit crops at the state and district levels. The importance of change in area and production of fruit crops at the district level has overwhelming importance for analyzing development of these crops. When we look at percentage change in area and production of fruit crops between 2007-08 and 2009-10, Narnaul, Sirsa, Rohtak, Hissar, Bhiwani, Mewat and Jhajjar exhibited more than 20 per cent increase in area under fruit crops. The overall, increase in area in Haryana between 2007-08 and 2009-10 was observed 23.33 per cent. This indicates growing popularity of fruit crops in agriculture in Haryana. Like area, increase in production during the reference period is impressive. Fruit production in Haryana grew by 26.42 per cent in this period. Among the districts, highest increase was observed in Rohtak (99.4 per cent). Other districts with impressive increase were Sirsa, Karnal, Gurgaon, Sonepat, Panchkula, Jhajjar and Ambala (Table-3.10).

Table-3.10
Percentage Change in Area and Production of Fruit Crops between 2007-2008 and 2009-2010

Sl No.	District	Percentage Change	
		Area	Production
1	Panchkula	6.26	38.59
2	Ambala	13.04	24.43
3	Yamunanagar	9.46	16.08
4	Kurukshetra	8.67	2.36
5	Kaithal	-1.19	15.83
6	Karnal	10.13	44.21
7	Panipat	5.84	-13.15
8	Sonepat	12.44	41.11
9	Rohtak	36.83	99.94
10	Jhajjar	30.94	37.29
11	Faridabad	-28.06	-14.30
12	Narnaul	253.57	18.75
13	Rewari	25.64	2.36
14	Gurgaon	-5.87	50.09
15	Bhiwani	32.89	-36.80
16	Hissar	33.11	-17.11
17	Fatehabad	12.17	36.04
18	Sirsa	43.25	52.28
19	Jind	-8.53	23.83
20	Mewat	38.10	13.88
21	Palwal	NA	NA

	Total	23.33	26.42

Source: Ministry of Agriculture, Government of India, New Delhi

Change in Area and Production of Vegetable Crops:

Table-3.11 illustrates district-wise percentage change in area and production of vegetable crops in Haryana between 2007-08 and 2009-10. This helps us in understanding expansion in area and production of these crops at the district level. There are districts with overwhelming increase and decrease. Area allocation to vegetable crops increased by 83.36 per cent in Rohtak. Other districts with impressive increase were Narnaul, Kurukshetra, Sirsa and Yamunanagar. The overall increase in area under cultivation of vegetable crops was observed 9.75 per cent between 2007-08 and 2009-10. The production of vegetable crops appears to be expanding at more than double rate in the state during this period. This could be possible due to more than 10 per cent increase in twelve districts out of 21 districts. The change in production of vegetable crops was highest in Kurukshetra (73.66 per cent). In addition, significant increase in production was noticed in Rohtak, Gurgaon, Sirsa, Karnal, Jhajjar, Fatehabad and Jind.

Table-3.11

Percentage Change in Area and Production of Vegetable Crops between 2007-2008 and 2009-2010

Sl No.	District	Percentage Change	
		Area	Production
1	Panchkula	1.97	19.09
2	Ambala	-0.10	16.40
3	Yamunanagar	21.81	7.95
4	Kurukshetra	41.40	73.66
5	Kaithal	-17.88	11.51
6	Karnal	4.27	36.85
7	Panipat	16.85	-8.00
8	Sonepat	6.01	17.81
9	Rohtak	83.36	46.60
10	Jhajjar	13.66	21.96
11	Faridabad	-15.91	-22.24
12	Narnaul	45.40	-9.34
13	Rewari	-0.20	-5.58
14	Gurgaon	-3.84	45.36
15	Bhiwani	-18.86	-24.43
16	Hissar	-11.80	-14.15
17	Fatehabad	8.21	46.75
18	Sirsa	25.25	36.24
19	Jind	5.86	28.60
20	Mewat	-0.30	34.15
21	Palwal	NA	NA
	Total	9.57	22.69

Source: Ministry of Agriculture, Government of India, New Delhi

Area, Production and Yield of Major Vegetables:

Before concluding this chapter, it would be useful to examine district-wise scenario regarding area, production and yield of important vegetables which contribute at least 10 per cent in total area and production of vegetable crops in the state. On the basis of this criterion, we have included five vegetables, namely potato, tomato, cauliflower, cucurbits and leafy vegetables (Table-3.12).

Table - 3.12: Area, Production and Yield of Major Vegetables in Haryana during 2009-10

*Figures in parenthesis indicate percentage share of the district and rank of the district in yield

Source: Ministry of Agriculture, Government of India, New Delhi

Sl No.	District	Potato			Tomato			Cauliflower			Cucurbits			Leafy Vegetable		
		Area (ha)	Production (tonnes)	Yield (tonnes/ha)	Area (ha)	Production (tonnes)	Yield (tonnes/ha)	Area (ha)	Production (tonnes)	Yield (tonnes/ha)	Area (ha)	Production (tonnes)	Yield (tonnes/ha)	Area (ha)	Production (tonnes)	Yield (tonnes/ha)
1	Panchkula	900 (3.91)*	22939 (4.64)*	25.49 (2)*	500 (2.21)*	11000 (2.90)*	22.00 (3)*	1000 (3.89)*	22000 (4.51)*	22.00 (4)*	1200 (1.76)*	20000 (2.94)*	16.667 (1)*	1200 (4.78)*	8600 (3.63)*	7.17 (18)*
2	Ambala	4010 (17.41)	62757 (12.68)	15.65 (17)	128 5(5.68)	18275 (4.81)	14.22 (19)	1560 (6.07)	28250 (5.79)	18.10 (15)	2850 (4.18)	29310 (4.31)	10.284 (3)	2050 (8.17)	16970 (7.16)	8.28 (10)
3	Yamunanagar	3040 (13.20)	74961 (15.15)	24.66 (4)	2930 (12.96)	43795 (11.53)	14.95 (17)	2572 (10.01)	48570 (9.96)	18.88 (12)	3217 (4.72)	26960 (3.96)	8.380 (6)	3055 (12.17)	26325 (11.11)	8.62 (9)
4	Kurukshetra	6062 (26.32)	163210 (32.99)	26.92 (1)	1515 (6.70)	38599 (10.16)	25.48 (2)	1280 (4.98)	23950 (4.91)	18.71 (13)	1077 (1.58)	7671 (1.13)	7.123 (10)	2379 (9.48)	23301 (9.84)	9.79 (6)
5	Kaithal	400 (1.74)	8036 (1.62)	20.09 (13)	300 (1.33)	4600 (1.21)	15.33 (14)	400 (1.56)	7800 (1.60)	19.50 (9)	1050 (1.54)	7100 (1.04)	6.762 (13)	450 (1.79)	3500 (1.48)	7.78 (14)
6	Karnal	2416 (10.49)	39692 (8.02)	16.43 (16)	3714 (16.43)	57599 (15.16)	15.51 (13)	2074 (8.07)	57511 (11.79)	27.73 (1)	4970 (7.29)	33426 (4.91)	6.726 (14)	2544 (10.14)	22479 (9.49)	8.84 (8)
7	Panipat	1300 (5.64)	23903 (4.83)	18.39 (15)	450 (1.99)	7500 (1.97)	16.67 (10)	3420 (13.31)	58500 (12.00)	17.11 (16)	4110 (6.02)	25000 (3.67)	6.083 (17)	1650 (6.57)	20900 (8.82)	12.67 (4)
8	Sonepat	1510 (6.56)	34135 (6.90)	22.61 (6)	1255 (5.55)	21034 (5.54)	16.77 (8)	3525 (13.72)	67600 (13.86)	19.18 (10)	5515 (8.08)	39450 (5.80)	7.153 (9)	1967 (7.84)	14655 (6.19)	7.45 (17)
9	Rohtak	645 (2.80)	6753 (1.36)	10.47 (19)	615 (2.72)	8350 (2.20)	13.58 (20)	940 (3.66)	1405 (2.88)	14.95 (19)	1570 (2.30)	8505 (1.25)	5.417 (19)	1220 (4.86)	7580 (3.20)	6.21 (20)
10	Jhajjar	160 (0.69)	3440 (0.70)	21.50 (8)	955 (4.22)	15230 (4.01)	15.95 (12)	460 (1.79)	8420 (1.73)	18.30 (14)	2000 (2.93)	14800 (2.17)	7.400 (8)	865 (3.45)	6950 (2.93)	8.03 (12)
11	Faridabad	270 (1.17)	5997 (1.21)	22.21 (7)	800 (3.54)	12960 (3.41)	16.20 (11)	750 (2.92)	17560 (3.60)	23.41 (2)	2735 (4.01)	13315 (1.96)	4.868 (21)	930 (3.71)	8275 (3.49)	8.90 (7)
12	Narnaul	22 (0.10)	473 (0.10)	21.50 (8)	320 (1.42)	5340 (1.41)	16.69 (9)	820 (3.19)	12400 (2.54)	15.12 (18)	2161 (3.17)	10700 (1.57)	4.951 (20)	450 (1.79)	3220 (1.36)	7.16 (19)
13	Rewari	12 (0.05)	258 (0.05)	21.50 (8)	305 (1.35)	5855 (1.54)	19.20 (5)	203 (0.79)	3005 (0.62)	14.80 (20)	502 (0.74)	4830 (0.71)	9.622 (5)	503 (2.00)	4080 (1.72)	8.11 (11)
14	Gurgaon	70 (0.30)	1504 (0.30)	21.49 (9)	1674 (7.41)	29850 (7.86)	17.83 (6)	1430 (5.56)	28980 (5.94)	20.27 (6)	20871 (30.60)	333185 (48.96)	15.964 (2)	1555 (6.20)	28324 (11.96)	18.21 (2)
15	Bhiwani	85 (0.37)	1826 (0.37)	21.48 (10)	552 (2.44)	16560 (4.36)	30.00 (1)	290 (1.13)	6490 (1.33)	22.38 (3)	2860 (4.19)	27910 (4.10)	9.759 (4)	317 (1.26)	1818 (0.77)	5.74 (21)
16	Hissar	480 (2.08)	8840 (1.79)	18.42 (14)	470 (2.08)	8050 (2.12)	17.13 (7)	1080 (4.20)	10170 (2.09)	9.42 (21)	1180 (1.73)	7100 (1.04)	6.017 (18)	900 (3.59)	9210 (3.89)	10.23 (5)
17	Fatehabad	510 (2.21)	11935 (2.41)	23.40 (5)	490 (2.17)	7500 (1.97)	15.31 (15)	1160 (4.51)	22000 (4.51)	18.97 (11)	1600 (2.35)	12500 (1.84)	7.813 (7)	975 (3.88)	7350 (3.10)	7.54 (16)
18	Sirsa	380 (1.65)	5669 (1.15)	14.92 (18)	586 (2.59)	11356 (2.99)	19.38 (4)	1075 (4.18)	17661 (3.62)	16.43 (17)	1708 (2.50)	12074 (1.77)	7.069 (12)	267 (1.06)	5089 (2.15)	19.06 (1)
19	Jind	610 (2.65)	15200 (3.07)	24.92 (3)	920 (4.07)	13510 (3.56)	14.69 (18)	1100 (4.28)	21555 (4.42)	19.60 (8)	1510 (2.21)	10690 (1.57)	7.079 (11)	710 (2.83)	5675 (2.40)	7.99 (13)
20	Mewat	52 (0.23)	1117 (0.23)	21.48 (11)	2340 (10.35)	35355 (9.31)	15.11 (16)	95 (0.37)	1955 (0.40)	20.58 (5)	3925 (5.75)	25850 (3.80)	6.586 (15)	325 (1.29)	2495 (1.05)	7.68 (15)
21	Palwal	100 (0.43)	2148 (0.43)	21.48 (12)	630 (2.79)	7510 (1.98)	11.92 (21)	465 (1.81)	9262 (1.90)	19.92 (7)	1605 (2.35)	10110 (1.49)	6.299 (16)	785 (3.13)	10120 (4.27)	12.89 (3)
	Total	23034 (100)	494793 (100)	21.48	22606 (100)	379828 (100)	16.802	25699 (100)	487689 (100)	18.98	68216 (100)	680486 (100)	9.975	25097 (100)	236916 (100)	9.44

Table 3.13
Area, Production and Yield of Major Fruits in Haryana during 2009-10

Sl No.	District	Mango			Guava			Citrus			Ber		
		Area (ha)	Production (tonnes)	Yield (tonnes/ha)	Area (ha)	Production (tonnes)	Yield (tonnes/ha)	Area (ha)	Production (tonnes)	Yield (tonnes/ha)	Area (ha)	Production (tonnes)	Yield (tonnes/ha)
1	Panchkula	900 (3.91)*	22939 (4.64)*	25.49 (2)*	500 (2.21)*	11000 (2.90)*	22.00 (3)*	1000 (3.89)*	22000 (4.51)*	22.00 (4)*	1200 (1.76)*	20000 (2.94)*	16.667 (1)*
1	Panchkula	950 (10.41)*	4090 (6.33)*	4.31 (16)*	196 (2.51)*	1718 (3.08)*	8.77 (7)*	75 (0.54)*	180 (0.18)*	2.40 (19)*	2 (0.06)*	5 (0.01)*	2.50 (20)*
2	Ambala	1257 (13.78)	8416 (13.03)	6.70 (14)	385 (4.93)	2735 (4.90)	7.10 (11)	154 (1.11)	640 (0.65)	4.16 (16)	6 (0.17)	30 (0.08)	5.00 (18)
3	Yamunanagar	5419 (59.39)	36708 (56.85)	6.77 (13)	516 (6.60)	1846 (3.31)	3.58 (20)	52 (0.38)	700 (0.71)	13.46 (5)	0 (0.00)	0 (0.00)	0.00 (0)
4	Kurukshetra	430 (4.71)	2154 (3.34)	5.01 (15)	249 (3.19)	510 (0.91)	2.05 (21)	7 (0.05)	125 (0.13)	17.86 (3)	5 (0.14)	60 (0.17)	12.00 (6)
5	Kaithal	1 (0.01)	9 (0.01)	9.00 (12)	135 (1.73)	2000 (3.58)	14.81 (1)	15 (0.11)	300 (0.31)	20.00 (2)	45 (1.26)	700 (1.97)	15.56 (3)
6	Karnal	629 (6.89)	8853 (13.71)	14.07 (3)	686 (8.78)	4167 (7.46)	6.07 (13)	30 (0.22)	428 (0.44)	14.27 (4)	65 (1.82)	753 (2.12)	11.58 (8)
7	Panipat	181 (1.98)	1810 (2.80)	10.00 (4)	348 (4.45)	1870 (3.35)	5.37 (16)	12 (0.09)	348 (0.35)	29.00 (1)	61 (1.71)	680 (1.91)	11.15 (10)
8	Sonepat	91 (1.00)	894 (1.38)	9.82 (5)	623 (7.97)	7896 (14.14)	12.67 (2)	30 (0.22)	224 (0.23)	7.4 7(9)	417 (11.67)	2235 (6.28)	5.36 (17)
9	Rohtak	32 (0.35)	301 (0.47)	9.41 (9)	481 (6.15)	3705 (6.64)	7.70 (9)	26 7(1.93)	1643 (1.67)	6.15 (11)	321 (8.98)	3055 (8.59)	9.52 (13)
10	Jhajjar	8 (0.09)	75 (0.12)	9.38 (10)	495 (6.33)	2813 (5.04)	5.68 (15)	322 (2.33)	1825 (1.86)	5.67 (14)	277 (7.75)	2400 (6.74)	8.6 6(14)
11	Faridabad	25 (0.27)	376 (0.58)	15.04 (2)	353 (4.52)	3611 (6.47)	10.23 (4)	166 (1.20)	1770 (1.80)	10.66 (7)	76 (2.13)	900 (2.53)	11.84 (7)
12	Narnaul	0 (0.00)	0 (0.00)	0.00 (0)	99 (1.27)	810 (1.45)	8.18 (8)	1186 (8.57)	320 (0.33)	0.27 (20)	97 (2.71)	1414 (3.97)	14.58 (4)
13	Rewari	1 (0.01)	9 (0.01)	9.00 (12)	87 (1.11)	555 (0.99)	6.38 (12)	126 (0.91)	425 (0.43)	3.37 (17)	161 (4.50)	1117 (3.14)	6.94 (15)
14	Gurgaon	2 (0.02)	19 (0.03)	9.50 (7)	539 (6.90)	5630 (10.08)	10.45 (3)	253 (1.83)	1483 (1.51)	5.86 (13)	205 (5.74)	4220 (11.86)	20.59 (1)
15	Bhiwani	24 (0.26)	226 (0.35)	9.42 (8)	26 1(3.34)	1245 (2.23)	4.7 7(17)	1314 (9.50)	350 (0.36)	0.27 (20)	202 (5.65)	3200 (8.99)	15.84 (2)
16	Hissar	34 (0.37)	329 (0.51)	9.68 (6)	614 (7.85)	2300 (4.12)	3.75 (19)	1191 (8.61)	7322 (7.45)	6.15 (12)	302 (8.45)	4000 (11.24)	13.25 (5)
17	Fatehabad	3 (0.03)	47 (0.07)	15.67 (1)	359 (4.59)	2711 (4.85)	7.55 (10)	1048 (7.57)	12821 (13.04)	12.23 (6)	198 (5.54)	1950 (5.48)	9.85 (11)
18	Sirsa	0 (0.00)	0 (0.00)	0.00 (0)	282 (3.61)	2716 (4.86)	9.63 (5)	7064 (51.05)	65114 (66.22)	9.22 (8)	302 (8.45)	3475 (9.77)	11.51 (9)
19	Jind	24 (0.26)	226 (0.35)	9.42 (8)	352 (4.50)	3250 (5.82)	9.23 (6)	182 (1.32)	1140 (1.16)	6.26 (10)	271 (7.58)	2605 (7.32)	9.61 (12)
20	Mewat	3 (0.03)	28 (0.04)	9.33 (11)	431 (5.51)	1815 (3.25)	4.2 1(18)	187 (1.35)	505 (0.51)	2.70 (18)	363 (10.16)	1643 (4.62)	4.53 (19)
21	Palwal	1 1(0.12)	0 (0.00)	0.00 (0)	326 (4.17)	1937 (3.47)	5.94 (14)	156 (1.13)	670 (0.68)	4.29 (15)	198 (5.54)	1140 (3.20)	5.76 (16)
	Total	9125 (100)	64570 (100)	7.08	7817 (100)	55840 (100)	7	13837 (100)	98333 (100)	7.11	3574 (100)	35582 (100)	10

*Figures in parenthesis indicate percentage share of the district and rank of the district in yield
Source: Ministry of Agriculture, Government of India, New Delhi

We begin with potato which is the dominant vegetable crop in Haryana. Kurukshetra followed by Ambala and Yamunanagar are the leading districts and together constituted more than 50 per cent of total area in the state. Gurgaon and Faridabad exhibited marginal share despite having proximity to the Capital city of Delhi. The share of Kurukshetra in total production of potato in the state is around one third due to yield advantage. Among the leading districts, Ambala has shown lower contribution in production in comparison to its share in total acreage because of relatively lower level of yield. It is essential to mention that only seven districts experienced yield rates above the state level. It implies that there is a vast scope of yield improvement in the lagging districts.

In order of importance, tomato is the next vegetable grown in Haryana, Karnal, Yamunanagar, Mewat and Gurgaon districts are leading producers of tomato and formed around 50 per cent of total tomato area in the state. On the other hand, Rewari, Narnaul and Kaithal have shown less than 2 per cent share in the overall area. Again, four districts namely, Karnal, Yamunanagar, Mewat and Gurgaon contributed around 50 per cent to total tomato production in the state. It is may be pointed out that Bhiwani attained first rank in productivity. Other two districts with higher productivity were Kurukshetra and Panchkula.

The pattern of cauliflower area and production is quite different as shown in Table 3.11. There is a clear cut case of geographical concentration. Cauliflower production is found concentrated primarily in Sonepat, Panipat, and Karnal. These districts contributed around 35 per cent in area and 38 per cent in total production of cauliflower in the state Rewari and Mewat reported the lowest share in area and production. Yield rate of cauliflower was observed highest in Karnal during the year 2009-10.

Cucurbits production is concentrated in Gurgaon with 48.96 per cent contribution in the state. It is higher than its share in area allocation due to higher level of productivity. All other districts show relatively lower contribution in area as well as in production.

As shown in Table-3.12, most of the leafy vegetables production is concentrated in Gurgaon, Kurukshetra, Kaithal, Karnal and Panipat. Each one of them contributed around 10 per cent in overall area allocation. Gurgaon emerged as exception by showing almost 6 per cent share in area and around double contribution in production due to relatively higher yield rates in comparison to other leading districts. Among lower contributing districts, Sirsa is exemplary where contribution in production was double than area allocation due to exceptionally high yield rates.

In a nutshell, geographical pattern of area, production and yield of major vegetable crops grown in Haryana was found quite different. In many cases, contribution of a particular district varied significantly in area allocation and production.

Pattern of Area, Production and Yield of Major Fruit Crops:

After presenting the pattern of above mentioned indicators for major five vegetable crops grown in Haryana, we will examine the same for fruit crops. The criterion adopted for selection of vegetables i.e. at least 10 per cent contribution in the state in terms of area and production has been also applied in this case. On the basis of this criterion, we have included four fruits namely, mango, guava, citrus and ber in the district-wise analysis. This information is presented in Table-3.13.

Mango production is concentrated in Yamunanagar by indicating around 57 per cent contribution in overall production of the state. Other important districts are Ambala and Karnal which contributed around 27 per cent. Thus, these three districts together produced around 84 per cent of mangoes in Haryana. In these cases, share in area allocation was higher than production except Karnal which contributed almost double in production due higher yield rates. But, leading districts in productivity were Fatehabad, Faridabad and Karnal.

Next fruit crop in order of importance in terms of production, guava is largely grown in Karnal, Sonepat, Hissar, Gurgaon, Yamunanagar, Jhajjar and Rohtak. These districts showed around 50 per cent of overall area allocation in the state. Further, Sonepat is leading in production despite being second ranking district in terms of area allocation. It could be possible due to higher level of productivity that is next to Kaithal. Most of the districts in the state showed less than 5 per cent contribution to the production of guava in the state.

The pattern of citrus production is quite different as shown in Table-3.12. It is heavily concentrated in Sirsa district. This district alone contributed 66.22 per cent to the total production in the state with 51.05 per cent share in area allocation. Fatehabad and Hissar are also important and these together exhibited around 20 per cent share in production of the state during 2009-10. It may be noticed that none of these districts is leading in productivity. Panipat with marginal share in area and production exhibited the highest productivity which is almost three times in comparison to Sirsa, a leading district in production and area allocation under citrus crops during 2009-10.

Chapter-4

A Comparison of Economics, Price Spread and Marketing Efficiency of Selected Crops under Traditional vis-à-vis Emerging Marketing Channels

Introduction

In the earlier Chapters, we have discussed about the APMC Act and its implementation in Haryana. This Chapter is devoted to the results of field survey regarding various aspects related to disposal of tomato and muskmelon through Traditional Marketing Channel (TMC) and Emerging Marketing Channel (EMC) during the reference year 2010-11. It is divided into four sections. Section-1 deals with socio-economic characteristics of selected farmers while Section-2 focuses on economics, operational cost and labour utilization. Section-3 presents survey results regarding price spread and marketing efficiency. The perceptions of farmers regarding selection of marketing channel and other related issues have been discussed in the final section.

Section-1

Socio-economic Characteristics of Sample Households

The issues related to agricultural marketing at the micro level considered for analysis in this study are complex and cannot be taken up for investigation in isolation without regard for some of the basic characteristics of the sampled households. We have included those characteristics that have a definite bearing on production and marketing decisions of the farmers. Specifically, we will look into demographic details such as caste, family size, level of education and ownership of assets by the selected households under TMC and EMC during the year 2010-11. The other major characteristics such as land owned, leased in, leased out and irrigation status are covered as important correlates of the main theme.

We begin with presenting the distribution of surveyed households in the selected categories under TMC and EMC. These are presented in Table 4.1. It is indicated that marginal and small farmers together constituted 68 and 46% of tomato cultivating households using TMC and EMC. The medium and large categories formed at least 10% of the sample in each case. The case of muskmelon growers under TMC and EMC was found different since marginal plus small categories of farm households were observed around 32 and 44%, respectively. It is evident from these results that nature

of tomato and muskmelon cultivation in Haryana was found small farm based like Indian farming. Further, these results substantiate that involvement of small holders in fruit and vegetable cultivation was relatively higher due to availability of family labour and expected higher returns by opting for these crops as alternative to foodgrain crops.

Table-4.1

Distribution of Sampled Farmers by Farm size

(Percentage)

Sl. No.	Classification	Tomato			Muskmelon		
		TMC	EMC	Total	TMC	EMC	Total
1	Marginal (< 1 ha)	52	36	44	20	24	22
2	Small (1-2 ha)	16	10	13	12	20	16
3	Medium (2-4 ha)	14	24	19	22	24	23
4	Large (4 and above)	18	30	24	46	32	39
5	Total	100	100	100	100	100	100

Source: Field survey

If we look at the religion of sampled tomato growers under TMC and EMC groups, it may be observed that all of them were Hindu. The case of muskmelon growers was however little different. The muslims formed 16 and 26% of sampled households in this case. The largest percentage of tomato cultivators belonged to general category followed by OBC and SC households under TMC as well as EMC. On the other hand, OBC households were observed 50 and 44% respectively among surveyed muskmelon cultivators. The sizable proportion of OBC farm households in the sample implies ownership of land by OBC households in Haryana. Among tomato cultivators, 96 and 100% TMC and EMC farm households owned a ration card. Of these, 42 and 50% of households in each group had an APL card during the reference year. The scenario was almost similar for muskmelon growers since above 90% of surveyed farm households owned a ration card. However, share of the APL card holders in the sample was found slightly different.

Table 4.2
Socio –Economic Characteristics of Sampled Households-Tomato

Particulars	Tomato	
	TMC	EMC
A. Religion and Caste of Farm Household		
%Hindu households	100.00	100.00
%Muslim households	0.00	0.00
%SC households	54.00	40.00
%ST households	2.00	0.00
%OBC households	22.00	38.00
%Other households	22.00	22.00
B. Household Characteristics		
% Of households owning a ration card	96.00	100.00
% Of APL households	42.00	50.00
% Of BPL households	44.00	50.00
% Of households with Pucca Dwelling	100.00	96.00
% Of household with kuccha and semi-kuccha Dwelling	0.00	4.00
% Of households owning telephone (landline)	2.00	4.00
% Of households owning at least one mobile phone	76.00	88.00
% Of households owning a Computer	0.00	6.00
% Of households owning an Internet	0.00	0.00
% Of households owning Internet as well as Computer	0.00	0.00
C. Head of the Household		
Average age of the head (years)	42.78	42.06
% Female headed households	0.00	0.00
Years of average education of the head	6.18	7.24
D. Education of the household members (*% to total*)		
Average education of the household members(years)	6.00	6.48
% members upto primary education	18.78	17.98
% members upto matriculate education	34.29	41.23
% members upto graduation education	19.18	16.23
% members with post-graduation	0.00	0.88
E. Transport, Farm and Storage assets		
% of households owning Bullock Cart	16.00	20.00
% of households owning Tractor	22.00	36.00
% of households owning Trolly	14.00	18.00
% of households owning Harvester	0.00	0.00
% of households owning Bicycle	60.00	76.00
% of households owning Motorcycle	34.00	48.00
% of households owning Four-wheeler	10.00	12.00
% of households owning Tiller	8.00	6.00
% of households owning Pumpset	34.00	42.00
F. Landholdings		
Maximum size of the land holding (ha)	18.00	22.80
Minimum size of the land holding (ha)	0.40	0.40
Median size (ha)	0.81	2.02
% Owned land	100.00	100.00
% Leased-in land	31.79	47.93
% Leased-out land	3.83	2.22
% Farmers with irrigating facility (from Groundwater)	100.00	100.00

Source: Ibid

Table 4.3
Socio-Economic Characteristics of Sampled Households – Muskmelon

Particulars	Muskmelon	
	TMC	EMC
A. Religion and Caste of Farm Household		
%Hindu households	84.00	74.00
%Muslim households	16.00	26.00
%SC households	14.00	18.00
%ST households	0.00	0.00
%OBC households	50.00	44.00
%Other households	36.00	38.00
B. Household Characteristics		
% Of households owning a ration card	90.00	96.00
% Of APL households	44.00	40.00
% Of BPL households	34.00	44.00
% Of households with Pucca Dwelling	88.00	76.00
% Of household with kuccha and semi-kuccha Dwelling	12.00	24.00
% Of households owning telephone (landline)	12.00	8.00
% Of households owning at least one mobile phone	92.00	82.00
% Of households owning a Computer	10.00	18.00
% Of households owning an Internet	10.00	6.00
% Of households owning Internet as well as Computer	00.00	2.00
C. Head of the Household		
Average age of the head (years)	43.44	42.12
% Female headed households	0.00	0.00
Years of average education of the head	7.70	6.5
D. Education of the household members (*% to total*)		
Average education of the household members(years)	5.78	5.04
% members upto primary education	17.20	25.17
% members upto matriculate education	32.97	30.42
% members upto graduation education	16.85	10.84
% members with post-graduation	0.72	1.40
E. Transport, Farm and Storage assets		
% of households owning Bullock Cart	30.00	24.00
% of households owning Tractor	54.00	40.00
% of households owning Trolly	48.00	36.00
% of households owning Harvester	6.00	4.00
% of households owning Bicycle	78.00	74.00
% of households owning Motorcycle	76.00	72.00
% of households owning Four-wheeler	16.00	12.00
% of households owning Tiller	8.00	8.00
% of households owning Pumpset	30.00	34.00
F. Landholdings		
Maximum size of the land holding (ha)	26.32	26.32
Minimum size of the land holding (ha)	0.40	0.40
Median size (ha)	3.24	2.02
% Owned land	60.34	60.14
% Leased-in land	39.66	39.52
% Leased-out land	0.00	0.00
% Farmers with irrigating facility (from Groundwater)	100.00	100

Source: Ibid

The age of the head of the household plays an important role in adoption of technology and diversification of farming. The average age of the head of household was around 42-43 years among tomato cultivators. The same was observed in the case of muskmelon growers under both the channels. The female headed households were non-existent in the sample. The educational level of head of the household is an indicator of better organizational set up and efficient use of available farm resources. Particularly, educational status of the head of the households affects the farm management techniques which in turn leads towards the optimum use of available farm resources and accelerates the agricultural production and farm income. Survey results point out that head of sampled households attended school for less than 10 years in all cases. This is indicative of overall poor attainment in terms of education by the head of households.

Education is a catalytic factor in attaining efficiency in managing because higher level of education provides management skills and capacity to improve and innovate. Among the selected households, average education of the family members ranged between 5-6 years in case of tomato as well as muskmelon growers under TMC and EMC. More than half of the family members attained primary and matriculate level of education. It is unfortunate that only 19 and 16% family members in both groups of tomato growing households attained education upto graduation level. In case of muskmelon growers, proportion of family members with graduation level of education was around 17 and 11% respectively.

The ownership of house is one of the key determinants of economic status of the households. The economic standing of a household can be further judged from the type of the house, they live in and amenities available to them. In our sample, more than 90 per cent had pucca house. Among amenities, mobile phone was found popular. The share of households occupying a computer and internet was observed low.

Land and other resources influence the level and pattern of farm management in farm households. We have collected data on major transport, farm and storage assets

of the surveyed households. We have earlier discussed about education. Now, we will focus our attention on assets. These include tube-well, tractor, trolley, harvester, bicycle, motor-cycle and pumpset. It may be observed that bicycle followed by motor-cycle, pumpset and tractor were found the major assets owned by the largest percentage of sampled tomato growers. The similar pattern may be noticed in the case of muskmelon producers too.

We had also sought information about maximum, minimum and medium size of land in addition to land owned, leased in, leased out and availability of groundwater facility. All the tomato cultivators owned land while in case of muskmelon growers, more than half of the sampled farmers owned land and this proportion ranged around 60% under TMC and EMC.

Table 4.4 presents the detailed information about the main characteristics of head of the households surveyed in the selected districts of Haryana. It may be noticed that average age of the head of households varied between 35 and 50 years in different categories of the farmers. None of them crossed 55 years and this is true for TMC as well as EMC tomato and muskmelon growers. It may be further observed that small farmers among the EMC tomato growers were the youngest while the same category had the highest age under the TMC group. The same table also provides information about the average education of head of households. It is unfortunate that there are instances of attending education for less than five years that is below primary level and inadequate for innovative farming. When different categories are compared in this regard, large farmers were found better equipped in terms of education. TMC farmers growing tomato attended school for ten years and that was found highest among all categories. A look at the average size of family of selected categories of farmers reveals that average size of family was around five members. However, it was eight members for small muskmelon producers in TMC group.

Table 4.4

Age, Education and Main Occupation of Head of the Sampled Households

Sl. No.	Characteristics	Tomato			Muskmelon		
A	**Average Age of Head**	**TMC**	**EMC**	**Total**	**TMC**	**EMC**	**Total**
1	Marginal	42.42	42.00	42.25	37.90	38.67	38.32
2	Small	50.25	35.00	44.38	36.67	36.50	36.56
3	Medium	36.72	40.50	39.11	45.55	43.08	44.26
4	Large	41.89	45.73	44.29	46.61	47.50	46.97
B	**Average Education of Head (Years)**						
1	Marginal	5.62	5.33	5.50	7.90	5.50	6.59
2	Small	4.13	8.60	5.85	6.83	7.10	7.00
3	Medium	5.71	7.58	6.89	7.91	3.83	5.78
4	Large	10.00	8.80	9.25	7.74	8.88	8.21
C	**Average Family Size (No.)**						
1	Marginal	4.92	4.33	4.68	4.40	4.67	4.55
2	Small	4.75	5.40	5.00	7.67	5.40	6.25
3	Medium	4.86	4.58	4.68	5.27	5.08	5.17
4	Large	5.00	4.53	4.71	5.70	7.19	6.31
D	**Main Occupation (% to total)**						
1	**Marginal**						
a	Agriculture	100.00	100.00	100.00	90.00	100.00	95.45
b	Allied	0.00	0.00	0.00	10.00	0.00	4.55
c	Others	0.00	0.00	0.00	0.00	0.00	0.00
2	**Small**						
a	Agriculture	100.00	80.00	92.31	100.00	90.00	93.75
b	Allied	0.00	20.00	7.69	0.00	10.00	0.00
c	Others	0.00	0.00	0.00	0.00	0.00	6.25
3	**Medium**						
a	Agriculture	100.00	100.00	100.00	90.90	83.33	86.96
b	Allied	0.00	0.00	0.00	9.09	0.00	0.00
c	Others	0.00	0.00	0.00	0.00	16.67	13.04
4	**Large**						
a	Agriculture	100.00	93.33	95.83	86.96	87.50	87.18
b	Allied	0.00	0.00	4.17	4.35	6.25	5.13
c	Others	0.00	6.67	0.00	8.69	6.25	7.69
5	**Total**						
a	Agriculture	100.00	96.00	98.00	90.00	90.00	90.00
b	Allied	0.00	2.00	1.00	6.00	2.00	3.00
c	Others	0.00	2.00	1.00	4.00	8.00	7.00

Source: Ibid

We had also sought information about the main occupation of the head of the sampled households. The occupation has been divided into agriculture, allied and others. It may be noticed from Table 4.4 that all marginal farmers except TMC muskmelon growers showed agriculture as the main occupation. The record of head of small farm households with agriculture as the main occupation was slightly better. As a result, around 20 and 10% respectively among EMC tomato and muskmelon growers indicated allied activities as the main occupation. The medium and large farmers also had very high proportion of heads with agriculture as main occupation. The involvement of large sampled farmers in allied activities was 4 and 5% respectively. At the aggregate level also, most of the head of surveyed households were again in agriculture. Allied activities and other occupations constituted a small proportion among tomato and muskmelon growers.

Land Holding Pattern and Irrigation Status

Land details are important because they indicate the economic and social status of the farmer. The details of land owned and operated by tomato and muskmelon growers and their tenancy status are presented in Table 4.5.

We begin with average size of operational holding which is an important factor in augmenting agricultural income, marketable surplus and for adoption of improved farm management practices. The average size of holding for tomato growers as well as muskmelon producers was around 3 and 5 hectares. TMC households operated 2.34 hectares and 5.85 hectares respectively while EMC farm households operated around 4 and 5 hectares. The overall net operated area by tomato and muskmelon growers was mostly 3 and 5 hectares respectively during the reference year.

The tenancy status of the farmer is an important factor in determining his involvement in agriculture. In our sample, large majority were owner cultivators. A fraction of cultivated land was found leased in and leased out. The system of leasing in was found common among EMC tomato growers. The TMC tomato growers also leased

in on an average nearly 1 ha of land. The system of leasing in was also prevalent among muskmelon growers and they leased in around 2 ha of area. The leasing out of land was not found popular among the sampled farmers. It was totally non-existent among muskmelon growers. However, tomato growers leased out a negligible area.

Table 4.5

Area Owned, Leased-in, Leased-out and Irrigation Status of Sampled Farms

(ha)

Land Details	Tomato			Muskmelon		
	TMC	EMC	Total	TMC	EMC	Total
Total Owned Land						
Dry Land	0.00	0.00	0.00	0.00	0.00	0.00
Pumpset Irrigated	1.21	0.86	1.03	1.68	2.59	2.13
Electric Tubewell Irrigated	0.43	1.14	0.78	1.92	0.27	1.09
Total Irrigated	1.63	2.00	1.82	3.60	2.86	3.23
Total Land	1.63	2.00	1.82	3.60	2.86	3.23
Leased-in land						
Dry Land	0.00	0.00	0.00	0.00	0.00	0.00
Pumpset Irrigated	0.52	1.38	0.95	0.96	1.31	1.13
Electric Tubewell Irrigated	0.29	0.54	0.41	1.30	0.57	0.94
Total Irrigated	0.81	1.92	1.36	2.26	1.88	2.07
Total Land	0.81	1.92	1.36	2.26	1.88	2.07
Leased-out land						
Dry Land	0.00	0.00	0.00	0.00	0.00	0.00
Pumpset Irrigated	0.08	0.01	0.04	0.00	0.00	0.00
Electric Tubewell Irrigated	0.02	0.08	0.05	0.00	0.00	0.00
Total Irrigated	0.10	0.09	0.09	0.00	0.00	0.00
Total Land	0.10	0.09	0.09	0.00	0.00	0.00
Net Operated Land						
Dry Land	0.00	0.00	0.00	0.00	0.00	0.00
Pumpset Irrigated	1.72	2.23	1.94	2.63	3.90	3.27
Electric Tubewell Irrigated	0.71	1.60	1.15	3.22	0.83	2.03
Total Irrigated	2.34	3.83	3.09	5.85	4.74	5.30
Total Land	2.34	3.83	3.09	5.85	4.74	5.30
Average size of Land Holding						
Own Land	1.63	2.00	1.82	3.60	2.86	3.23
Net operated Land	2.34	3.83	3.09	5.85	4.74	5.30
%NIA to NCA	100	100	100	100	100	100

Source: Ibid

The status of irrigation of farms plays an important role in productivity per unit of land. The entire land operated by the sampled farmers was found irrigated. We had also sought information about source of irrigation during our survey. It may be observed from the table that share of pumpset irrigated land was observed higher in owned, leased in as well as leased out land.

Table 4.6
Source of Irrigation of Owned, Leased-in, Leased-out Land on Sampled Farms
(ha)

Land Details	Tomato			Muskmelon		
	TMC	EMC	Total	TMC	EMC	Total
Owned Land						
Pumpset Irrigated	1.21 (73.57)	0.86 (42.91)	1.03 (56.91)	1.68 (46.67)	2.59 (90.56)	2.13 (66.26)
Electric Tubewell Irrigated	0.43 (25.92)	1.14 (57.09)	0.78 (43.28)	1.92 (53.33)	0.27 (9.44)	1.09 (33.95)
Total Irrigated	1.74 (100.00)	2.00 (100)	1.81 (100.00)	3.60 (100.00)	2.86 (100.00)	3.22 (100.00)
Leased-in land						
Pumpset Irrigated	0.52 (64.20)	1.38 (71.88)	0.95 (69.85)	0.96 (42.48)	1.31 (69.68)	1.13 (54.59)
Electric Tubewell Irrigated	0.29 (35.80)	0.54 (28.12)	0.41 (30.15)	1.30 (57.52)	0.57 (30.32)	0.94 (45.41)
Total Irrigated	0.81 (100.00)	1.92 (100.00)	1.36 (100.00)	2.26 (100.00)	1.88 (100.00)	2.07 (100.00)
Leased-out land						
Pumpset Irrigated	0.08 (80.00)	0.01 (11.11)	0.04 (44.44)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Electric Tubewell Irrigated	0.02 (20.00)	0.08 (88.89)	0.05 (55.56)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Total Irrigated	0.10 (100.00)	0.09 (100.00)	0.09 (100.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Net Operated Land						
Pumpset Irrigated	1.72 (70.78)	2.23 (58.22)	1.94 (62.78)	2.63 (44.96)	3.90 (82.51)	3.27 (61.70)
Electric Tubewell Irrigated	0.71 (29.22)	1.60 (41.78)	1.15 (37.22)	3.22 (55.04)	0.83 (17.63)	2.03 (38.30)
Total Irrigated	2.43 (100.00)	3.83 (100.00)	3.09 (100.00)	5.85 (100.00)	4.73 (100.00)	5.30 (100.00)

Source: Ibid

Next Table 4.6 provides information regarding proportion of land irrigated by pumpsets and electric tubewells in land owned, leased in, leased out and net operated.

It may be observed that owned land of TMC tomato growers was largely irrigated by pumpsets. Only 26% of the owned land was irrigated by electric tubewells. The case of EMC tomato growers was different since around 57% of area was irrigated by electric tubewells. At the aggregate level of tomato growers, once again irrigated area by pumpsets was more than 50%. The irrigation status of owned land by the TMC muskmelon growers showed that irrigated area by pumpsets was lesser than electric tubewells while vice versa was observed in case of EMC muskmelon growers. The share of owned land irrigated by pumpsets was as high as 91%. At the aggregate level of muskmelon growers, share of owned land irrigated by pumpsets was observed around two third during the reference year. The source of irrigation regarding leased in and leased out land was found mixed. The irrigated area by pumpsets was found relatively higher for tomato as well as muskmelon growers. Further, source of irrigation in case of leased out land was mixed and share of area irrigated by pumpsets and electric tubewells was 44 and 56% respectively.

Results of table show that more than 60% of net operated land of tomato and muskmelon growers was irrigated by pumpsets and the remaining share of land was irrigated by electric tubewells.

Cropping Pattern:

Crop pattern signifies proportion of cultivated area under different crops at a point of time. Crop pattern of an area depends on soil, water and temperature. There are two important harvests in Haryana. Crops are grown mainly in two seasons kharif and rabi. With adequate availability of irrigation facility, river beds are most suitable for the cultivation of summer season crops grown between April to July. Farmers' decisions to grow a particular crop during a season are mostly based on profitability, resource availability and own requirement for consumption, payment in kind and feeding the livestock.

Since one of our main objectives is to assess the cost of cultivation and revenue generated from vegetable and fruit crops, it is pertinent to examine cropping pattern adopted by the sample households. The information about the crop pattern of sampled TMC and EMC tomato and muskmelon growers for the year 2010-11 was collected during the survey. These results are presented in Tables 4.7.

According to survey, crop pattern of tomato and muskmelon growers was dominated by paddy and wheat. These crops occupied 30.86 and 31.12 per cent of GCA. In case of TMC and EMC tomato growers, these proportions were found 38.25 and 26.3 per cent of GCA devoted to paddy in case of TMC & EMC muskmelon cultivators.

In case of tomato cultivators, other crops were also grown by the sampled farmers. Share of other crops such as sugarcane (2.78 %), mustard (2.78 %), pea (2.12 %),bajra (1.45 %) and jowar (1.57%) was found below 3 per cent of GCA. Among vegetable crops, tomato was found dominant crop in rabi (6.21 %) and summer season (5.38 %). Muskmelon occupied 1.57 per cent of GCA at the aggregate level. Muskmelon growers also devoted some area to other crops such as pea (5.90%), sugarcane (2.05%), mustard ((1.74%) jowar (1.70%), bajra (1.52%), vegetables and other minor crops. Under vegetable crops, tomato was dominant crop in rabi (3.03 per cent) and summer season (0.85 per cent). The muskmelon was grown on 12.56 per cent of GCA.

Section-2

Economics of Selected Crops

Horticulture has emerged as a core sector in agriculture passing through the various phases with coverage of nearly 22.25 million ha in 2011-12, encompassing a wide variety of crops, vegetables, root and tuber crops, medicinal and aromatic plants, etc. Within horticulture, vegetables are most important in terms of area and production. These occupied 8.49 million ha and produced of 149.61 million tones. The yield was

17.42 tonnes per ha. The area under vegetables in India has increased from 6 million ha in 2001-02 to 8.49 million ha during 2011-12. India is the second largest producer of vegetables after China. Besides, India occupied the third position in tomato production in the world. Interventions in horticulture such as the National Horticulture Mission (NHM) in the country, have led to increased per capita availability of vegetables from 279 gms/day /capita in 2005 to 316gms/day/capita in 2011. Vegetables also play an important role in the regional as well as national economy of the agricultural sector. These crops are generally of short duration hence, more than one crop can be raised on the basis of early, medium and late varieties.

Tomato:

Tomato (Lycopersicon esculentum Mill.) is one of the popular vegetables worldwide. Tomato has its origin in the South American Andes. It contributes to a healthy and well balanced diet. It is rich in minerals, vitamins, essential amino acids, sugar and dietary fibers. It is an excellent source of vitamin 'C' and also called as a 'poor man's orange'. Tomato fruits are consumed fresh in salads or cooked in sauces, soup and meat or fish preparation. It can be processed into puree, juice and ketchup. Canned and dried tomatoes are economical in lean season when prices are higher. Tomato contains the carotene lycopene that is the most powerful natural antioxidants. Tomato requires a relatively cool, dry climate for higher yield and premium quality. However, it is adapted to a wide range of climatic conditions from temperate to hot and humid to tropical. The optimum temperature for most varieties of tomato lies between 21 and 24 ^{0}C. The plants can survive a wide range of temperature, but plant tissues are damaged below 10 ^{0}C and above 38 ^{0}C. Tomato grows well on fertile soils that have proper water holding capacity, aeration and are free of salt. The deep, well drained, sandy loam soils and moderately tolerant to a wide range of pH (level of acidity) are preferred, but grows well in soils with a pH of 5.5-6.8 with adequate nutrient supply and availability.

In India, tomato has wider coverage in comparison to other vegetables. Among vegetables, tomato is one of the most popular vegetable grown all over the world. The production of tomato in India was 16826 MT and percentage of total vegetable production was 11.5 during the year 2010-11.

Area under tomato cultivation in Haryana was about 22606 ha and produced 379828 tonnes. To meet the higher demand of tomato, it is necessary to increase production. This can only be achieved by increasing productivity per unit of area as well as increasing area cultivated under tomato cultivation.

Economics of Tomato Cultivation:

Profitability of various crops is the most important determinant of production of agricultural commodities governing the behavior of producers. Farmers grow crops, which offer the highest returns per unit of the scarcest resources such as land and dearer inputs. Profitability being a catalytic factor in increased production of agricultural commodities; it is proposed to examine the same for the selected two horticultural crops (tomato and muskmelon) produced and marketed through TMC and EMC by the sampled farmers in Haryana. Results presented in Table 4.8 reveal that operational costs of tomato cultivation for sample farmers under TMC was higher than that for those in EMC. The cost of human labour was the most important item of expenditure in both cases. It was observed around 40 and 43 per cent respectively. The second important item of variable cost was manure and fertilizers in both the cases (24.19 and 25.73 per cent) followed by insecticides (12.38 and 11.14 per cent), seed (10.21 and 8.22 per cent) and irrigation expenditure (4.90 and 4.68 per cent). It may be observed that operational cost for TMC tomato growers was Rs 52335 per hectare while in case of EMC, it was Rs 48082 per hectare. The cost of labour including the imputed value of family labour was around 40 per cent of the operational cost and thus, constituted the largest item of cost under TMC and EMC.

Table 4.7

Cropping Pattern of the Sampled Farm Households

(Area in ha)

Season/Crop	Tomato						Muskmelon					
	TMC	%	EMC	%	Total	%	TMC	%	EMC	%	Total	%
Kharif	Per Farm		Per Farm		Per Farm		Per Farm		Per Farm		Per Farm	
Paddy	2.01	38.25	2.30	26.36	2.15	30.86	3.48	28.62	3.64	33.95	3.56	31.12
Brinjal	0.19	3.62	0.37	4.23	0.28	4.00	0.24	1.97	0.13	1.21	0.18	1.61
Sugarcane	0.17	3.23	0.22	2.51	0.19	2.78	0.47	3.87	0.00	0.00	0.23	2.05
Jowar	0.15	2.85	0.07	0.79	0.11	1.57	0.15	1.20	0.24	2.27	0.19	1.70
Pumpkin	0.02	0.46	0.10	1.16	0.06	0.90	0.17	1.43	0.21	1.97	0.19	1.68
Bajra	0.00	0.00	0.20	2.32	0.10	1.45	0.19	1.60	0.15	1.44	0.17	1.52
Maize	0.00	0.00	0.11	1.30	0.06	0.81	0.08	0.63	0.01	0.08	0.04	0.37
Bittergourd	0.00	0.08	0.04	0.46	0.02	0.32	0.05	0.40	0.08	0.76	0.06	0.57
Radish	0.03	0.62	0.14	1.63	0.09	1.25	0.07	0.60	0.03	0.30	0.05	0.46
Okra	0.01	0.15	0.11	1.21	0.06	0.81	0.04	0.33	0.06	0.53	0.05	0.43
Cucumber	0.01	0.15	0.05	0.60	0.03	0.44	0.00	0.00	0.06	0.60	0.03	0.28
Spongegourd	0.00	0.00	0.07	0.84	0.04	0.52	0.00	0.00	0.04	0.38	0.02	0.18
Turnip	0.01	0.15	0.04	0.46	0.02	0.35	0.02	0.13	0.00	0.00	0.01	0.07
Others	0.02	0.31	0.09	1.02	0.05	0.75	0.02	0.20	0.06	0.53	0.04	0.35
Rabi												
Wheat	1.10	20.86	2.11	24.26	1.61	23.00	2.25	18.49	2.53	23.59	2.39	20.88
Pea	0.09	1.69	0.21	2.37	0.15	2.12	0.68	5.56	0.67	6.28	0.67	5.90
Mustard	0.11	2.00	0.28	3.25	0.19	2.78	0.33	2.73	0.06	0.60	0.20	1.74
Potato	0.05	0.92	0.17	1.95	0.11	1.57	0.38	3.17	0.13	1.21	0.26	2.25
Cauliflower	0.21	3.93	0.40	4.56	0.30	4.32	0.36	3.00	0.21	1.97	0.29	2.51
Tomato	0.72	13.70	0.15	1.67	0.43	6.21	0.06	0.50	0.63	5.90	0.35	3.03
Carrot	0.03	0.54	0.05	0.60	0.04	0.58	0.11	0.93	0.00	0.00	0.06	0.50
Radish	0.04	0.77	0.14	1.58	0.09	1.28	0.13	1.07	0.06	0.60	0.10	0.85
Barseem	0.01	0.15	0.10	1.12	0.05	0.75	0.07	0.60	0.11	0.98	0.09	0.78
Bottlegourd	0.00	0.00	0.02	0.19	0.01	0.12	0.08	0.67	0.03	0.30	0.06	0.50
Brinjal	0.00	0.00	0.04	0.46	0.02	0.29	0.03	0.27	0.02	0.23	0.03	0.25
Cucumber	0.00	0.00	0.08	0.93	0.04	0.58	0.06	0.47	0.02	0.15	0.04	0.32
Barley	0.00	0.00	0.06	0.65	0.03	0.41	0.00	0.00	0.04	0.38	0.02	0.18
Capsicum	0.00	0.00	0.02	0.19	0.01	0.12	0.02	0.20	0.00	0.00	0.01	0.11
Coriander	0.00	0.00	0.01	0.09	0.00	0.06	0.06	0.47	0.00	0.00	0.03	0.25
Others	0.00	0.00	0.02	0.19	0.01	0.12	0.27	2.20	0.07	0.68	0.17	1.49
Zaid												
Muskmelon	0.08	1.54	0.14	1.58	0.11	1.57	1.85	15.26	1.02	9.49	1.44	12.56
Cucumber	0.20	3.85	0.06	0.74	0.13	1.91	0.02	0.13	0.05	0.45	0.03	0.28
Tomato	0.00	0.00	0.75	8.62	0.38	5.38	0.15	1.20	0.05	0.45	0.10	0.85
Bottlegourd	0.00	0.00	0.00	0.00	0.00	0.00	0.13	1.07	0.12	1.13	0.13	1.10
Others	0.01	0.15	0.01	0.09	0.01	0.12	0.12	1.00	0.17	1.59	0.15	1.28
GCA	5.26	100.00	8.71	100.00	6.98	100.00	12.15	100.00	10.71	100.00	11.43	100.00
Cropping Intensity	215.78		227.19		221.48		207.47		226.07		215.78	

Source: Ibid

Table 4.8

Operational Cost and Net Returns from Cultivation of Tomato on Sampled Farms in Haryana

(Rs/ha)

Item	TMC	EMC
I. Operational cost		
Family labour	7972 (15.23)	9246 (19.23)
Hired Labour	13196 (25.21)	11273 (23.45)
Total Human Labour	21168 (40.44)	20519 (42.68)
Machine Labour	3301 (6.31)	2917 (6.07)
Seed	5343 (10.21)	3952 (8.22)
Manure	5257 (10.04)	5111 (10.63)
Fertilizers	7405 (14.15)	7262 (15.10)
Insecticides	6481 (12.38)	5358 (11.14)
Irrigation	2563 (4.90)	2248 (4.68)
Interest on Working Capital	816 (1.56)	715 (1.49)
Operational Costs	52335 (100.00)	48082 (100.00)
II. Returns		
Gross Returns	154624	171130
Net Return at Operational Cost	102289	123048
Yield (qtl/ha)	302	314
Price Rs. per qtl	512	545

Source: Ibid

The Gross Returns from tomato cultivation were Rs 154624 per hectare in case of TMC and Rs 171130 per hectare in case of EMC. After deducting the operational cost, net returns were found higher in case of EMC. These tomato growers earned Rs. 123048 in comparison to Rs. 102289 per hectare by the TMC. This could be attributed to the negligible level of market functionaries and higher market price. It may be noted that marketing costs need not be incurred by farmers who sell tomato through EMC. The net price received by farmers who sold tomato under TMC was Rs. 512 per quintal whereas in case of EMC, it was Rs. 545 per quintal. The productivity of tomato was 302 quintal/hectare in case of TMC while it was 314 quintal/ hectare in case of EMC.

These findings show that farmers selling tomatos through the emerging marketing channel, the Reliance Fresh in our case during the year 2010-11 realised higher price in comparison the farmers who sold tomato through the traditional marketing channel. The productivity of tomatos was also found higher on their farms. Thus, higher prices and better yield together helped EMC tomato producers in realizing better incomes per unit of land.

Utilization of Human Labour:

Tomato cultivation generated 112 days/ha and 107 days/ha in case of TMC and EMC farmers. The share of hired labour was observed higher than family labour under both cases. In the family labour, male labour contributed 22 days/ha against 19 days/ha by female labour for TMC. The EMC farmers utilized higher number of days with a large proportion of male family labour. On the other hand, female labour contributed higher number of days in hired labour in comparison to male labour. We have also assessed cost of labour. The family labour was imputed on the prevailing wage rate in the selected villages. The pattern of cost of human labour in cultivation of tomato coincided with labour utilization.

Table 4.9

Labour Utilization by Sampled Farmers for Cultivation of Tomato

SL. No.	Labour	Tomato	
		TMC	EMC
I	**No. of Labour (days/ha)**		
A	**Family Labour**		
1	Male	22	29
2	Female	19	19
3	Total Family Labour	41	48
	% to Total labour	36.61	44.86
B	**Hired Labour**		
1	Male	32	27
2	Female	39	32
3	Total Hired Labour	71	59
	% to Total labour	63.39	55.14
C	**Total Labour**		
1	Male	54	56
2	Female	58	51
3	Total Labour	112	107
II	**Cost of Labour (Rs/ha)**		
A	**Family Labour**		
1	Male	4497	5718
2	Female	3475	3528
3	Total Family Labour Cost	7972	9246
	% to Total labour Cost	37.66	45.06
B	**Hired Labour**		
1	Male	6307	5455
2	Female	6889	5818
3	Total Hired Labour Cost	13196	11273
	% to Total labour Cost	62.34	54.94
C	**Total Labour**		
1	Male	10804	11173
2	Female	10364	9346
3	Total Labour Cost	21168	20519

Source: Ibid

Muskmelon:

Muskmelon (*Cucumis melo*) is a native to hot valleys of southwest Asia. It is grown in the tropical regions for a very long time. This is a warm season crop and sensitive to cold temperatures and requires a fairly long growing season from seed to marketable fruit. Muskmelon is widely known as 'Cantaloupe'. It is round with firm, orange moderately sweet flesh and a thin reticulated light brown rind. Muskmelon is primarily cultivated in India, in the summer season from April to July. During the ripening period, the best quality melons are produced when hot, dry conditions prevail. Muskmelon being an annual plant is cultivated from the seeds. The plants have to be watered lightly. The melons are easily grown in sandy and light soil. The dry river beds are the most suitable. Manure and fertilizers are essential for a healthy growth and better production.

There are numerous health benefits of muskmelon. Its juice is effective in conditions like lack of appetite, weight loss, urinary tract infection, consumption, acidity and ulcer. It is a good source of vitamin A, B and C. Muskmelon is rich in potassium, a nutrient that may help control blood pressure, regulate heart beat and possibly prevent strokes.

Economics of Muskmelon:

The pattern of cost incurred and returns accrued to the sample farmers from cultivation of muskmelon are presented in Table 4.10. It may be observed that labour cost constituted higher share of operational cost in both cases of farmers selling through TMC and EMC. In order of importance, second and third components were manure and fertilizers (20.53 and 28.23 per cent) and seed (18.45 and 19.64 per cent). In addition, insecticides constituted 12.76 and 9.95 per cent while irrigation cost formed 9.10 and 10.14 per cent of the total operational cost at the aggregate level.

The Gross Returns for farmers selling through EMC were found higher i.e. (Rs.206080 per hectare) in comparison to TMC growers (Rs.173689). Also, net returns at operational cost were higher in case of EMC because price received was higher. Further, TMC cultivators sold muskmelon at Rs. 601 per quintal whereas in case of EMC, it was Rs 640 per quintal. It may be observed that price realized by the farmers who sold produce through EMC is higher by 6.5 per cent in comparison to price realized by farmers who sold through TMC. This is reasonable because the sale price in EMC is higher mainly due to superior quality produce purchased by the Reliance Fresh.

Utilization of Human Labour:

We have observed that human labour was found an important component in cost structure of muskmelon cultivation. The TMC and EMC muskmelon growers utilized 94 and 74 days per hectare during the production process. Further, share of female labour was observed higher in case of TMC farmers and vice-versa was observed for EMC farmers. The proportion of hired labour was more than double in both the groups. The results regarding utilization of female labour were noticed mixed across different groups.

Table 4.10

Operational Cost and Net Returns from Cultivation of Muskmelon on Sampled Farms in Haryana

(Rs/ha)

Item	TMC	EMC
I. Operational cost		
Family labour	3405 (6.10)	3645 (6.49)
Hired Labour	13178 (23.61)	10332 (18.40)
Total Human Labour	16583 (29.72)	13977 (24.90)
Machine Labour	4313 (7.73)	3043 (5.42)
Seed	10296 (18.45)	11028 (19.64)
Manure	3755 (6.73)	7585 (13.51)
Fertilizers	7695 (13.79)	8267 (14.72)
Insecticides	7119 (12.76)	5584 (9.95)
Irrigation	5079 (9.10)	5692 (10.14)
Interest on Working Capital	964 (1.73)	966 (1.72)
Operational Costs	55804 (100.00)	56142 (100.00)
II. Returns		
Gross Returns	173689	206080
Net Return at Operational Cost	117885	149938
Yield (qtl/ha)	289	322
Price Rs per qtl	601	640

Source: Ibid

Table 4.11

Labour Utilization by Sampled Farmers for Cultivation of Muskmelon

SL. No.	Labour	Muskmelon	
		TMC	EMC
I	**No. of Labour (days/ha)**		
A	**Family Labour**		
1	Male	9	11
2	Female	8	8
3	Total Family Labour	18	19
	% to Total labour	19.15	25.68
B	**Hired Labour**		
1	Male	24	29
2	Female	52	26
3	Total Hired Labour	76	55
	% to Total labour	80.85	74.32
C	**Total Labour**		
1	Male	34	40
2	Female	60	34
3	Total Labour	94	74
II	**Cost of Labour (Rs/ha)**		
A	**Family Labour**		
1	Male	1874	2221
2	Female	1531	1424
3	Total Family Labour Cost	3405	3645
	% to Total labour Cost	20.53	26.08
B	**Hired Labour**		
1	Male	4971	6017
2	Female	8207	4315
3	Total Hired Labour Cost	13178	10332
	% to Total labour Cost	79.47	73.92
C	**Total Labour**		
1	Male	6845	8239
2	Female	9738	5739
3	Total Labour Cost	16583	13978

Source: Ibid

Section-3

Price Spread and Marketing Efficiency of Tomato and Muskmelon

This section presents the survey results regarding price spread and marketing efficiency of selected crops disposed off through TMC and EMC during the reference year.

The efficiency of marketing for fruit and vegetable crops in India has been of significant concern in the recent years. Poor efficiency in the marketing and inadequate marketing infrastructure are believed to be the cause of not only high and fluctuating consumer prices, but also a reason for reaching lower share of the consumers' rupee to the farmer. Indian farmers depend heavily on middleman particularly in fruit and vegetable marketing. The producers and consumers often get a poor deal and the middleman controls the market without adding any value. There is also massive wastage, deterioration in quality as well as frequent mismatch between demand and supply both spatially and over time.

Marketing channels are routes through which agricultural commodities move from point of production to the ultimate consumer. The length of the channel for fruit and vegetable crops varies from commodity to commodity, depending on quantity to be moved, consumer demand and degree of regional specialization in production. In rural areas and small towns, many producers perform as retail sellers too. Sometimes, producers directly sell their produce to the wholesalers or processing firms. In the marketing of agricultural commodities, price spread which refers to the difference between price paid by the consumer and price received by the producer per unit of a commodity has always been a serious concern. It is generally believed that intermediaries enjoy an undue share of the consumers' rupee which ultimately affects the margin of the producer and welfare of the consumer.

Tomato:

Marketing of horticultural crops is quite complex and risky due to perishable nature of the produce, seasonal production and bulkiness. The spectrum of price from producer to consumer, which is an outcome of demand and supply of transactions between various intermediaries at different levels in the marketing system, is also unique for fruits and vegetables. Moreover, marketing arrangements at different stages also play an important role in price levels at various stages viz. from farm gate to the ultimate consumer. These features make the marketing system of fruits and vegetables different from other

TMC		**EMC**
1	**2**	**1**
Producer ⇩ Commission Agent/Trader ⇩ Wholesaler ⇩ Retailer ⇩ Consumer	Producer ⇩ Commission Agent/Trader ⇩ Retailer ⇩ Consumer	Producer ⇩ Reliance Fresh CC/Consumer

agricultural commodities, particularly in terms of time, form and space. The producers share in consumers' rupee is comparatively lower for perishable crops due to a variety of factors such as number of intermediaries, cost of various market functions rendered by intermediaries and spread of location of the producers and consumers. Further, degree of perishability, variety, quality, market imperfections, market infrastructure, etc. also influence marketing cost and price. Normally, producers' share is observed to be

relatively higher in areas where infrastructure facilities for marketing are available. The costs incurred by producer in the marketing of tomato were observed commission, market fee, loading/unloading and transport charges. Table 4.12 presents breakup of various items of cost in total marketing cost of the tomato. These shares are based on prices recorded in the field survey. The TMC tomato producers sold the produce at Rs.512/quintal while EMC cultivators sold produce at Rs.545/quintal to the Reliance Fresh. The Reliance Fresh has established Collection Center (CC) at the village level and purchased farm produce directly from the farmers after sorting and grading. Electronic balance is used for weightment and farmers are made payment next day. The purchased produce is sent to distribution centers through refrigerated vans. The survey results show that marketing cost borne by TMC farmers was Rs. 77.5/quintal whereas it was less than half (Rs.34.7/quintal) for EMC farmers. It is due to the fact that marketing cost in case of EMC was borne by the Reliance Fresh. Often, farmers harvest crop and sell the produce directly to the Reliance Fresh. The average margin at the farmer level has been estimated Rs. 217.31/quintal and Rs. 358.5/quintal for TMC and EMC farmers. The farmer's ultimate margin is Rs 332.70/ quintal for TMC and Rs 388.05 for EMC. It is worth mentioning that farmer's margin was higher in case of sale through EMC compared to TMC due to the absence of market functionaries.

Table 4.12
Sampled Farmers Margin in Marketing of Tomato in Haryana

Particulars	Tomato	
	TMC	EMC
A. Quantum Transacted		
Production / quintal	302	314
Price paid for purchase (Rs./qtl) from farmer in specified market	512	545
B. Marketing Costs (Rs./qtl)		
Packing, grading and assembling	32	26
Loading and Unloading	8.25	3.5
Transport	16.25	5.2
Commission Charges	14.5	-
Storage	-	-
Mandi Tax	-	-
Development Cess	-	-
Weighing Costs and other expenses	6.5	-
Brokerage Expenses	-	-
Other Fees	-	-
Total	**77.5**	**34.7**
C. Disposal (qtls)		
Quantum (Marketable)	302	314
Quantity sold in Specified Market	291.77	306.92
Quantity sold elsewhere	2.27	4.44
Any other Disposal (Wastage in marketing)	7.47	2.18
Total	294.04	311.36
D.Sale		
Quantity sold in Specified Market (qtls)	291.77	306.92
Price in specified market (Rs./qtl)	512	545
Sales in Specified market (Rs.)	149386.24	167271.4
Quantity sold elsewhere (qtl)	2.27	4.44
Price elsewhere (Rs./qtl)	342	368
Sales elsewhere (Rs./qtl)	776.34	1633.92
Total Farmers Sales (TFS)	150162.58	168905.32
Post Harvest Losses (% of production)	12	10
E.Cost per quintal (Rs)		
Marketing Costs (Rs./qtl)	77.5	34.7
Production Costs (Rs./qtl)	173.29	153.12
Farmers Costs (Rs./qtl)	250.79	187.82
F. Returns (Rs)		
Total Sales	150162.58	168905.32
Total Costs	52335	48082
Average Farmers Price (AFP)	486.0	535.0
Marketing Cost as % of AFP	15.95	7.14

Contd…Table-4.12

Marketing Cost as % of TFS	15.95	7.14
Average Farmer Margin (AFM) Rs./qtl	217.31	358.5
Marketing Cost per quintal	77.5	34.7
Marketing Cost as % of AFP	15.95	7.14
Quantity Sold in specified market (qtls)	291.77	306.92
Price at which it was sold (Rs./qtl sold)	512	545
Total Sales	150162.58	168905.32
Total Farmer costs	52335	48082
Margin of the Farmer (Rs.)	97828	120824
Margin per qtl sold (Rs.)	332.70	388.05

Source: Ibid

The results of assessment of the producer's share and overall margins of different groups are indicated in Table 4.13. The producer's share in consumer's rupee was observed 48.93 per cent for farmers selling through TMC and 39.63 per cent in case of EMC. The share of producer in consumer's price was computed for intermediaries such as commission agent, wholesaler and retailer). All these items together received about 42.76 per cent in case of TMC farmers. The RF received 57.08 per cent as a cost transacted for assembling, sorting, grading, transportation and other marketing costs and its own margin. The share of marketing cost in consumer's price was 8.31 per cent for the TMC farmers in comparison to 3.29 per cent for the EMC farmers.

Table 4.13

Producer's Share and Price Spread of Tomato (in Rs./qtl)

Sl No.	Particulars	TMC		EMC	
		Amount	%	Amount	%
1	Producers' Share	512	48.93	545	39.63
2	Commission Agent	166.60	15.92	785	57.08
3	Wholesalers margin	142.30	13.60		
4	Retailer margin	138.50	13.24		
5	Total Cost of Marketing	87.00	8.31	45.2	3.29
6	Consumers Rupee	1046.40	100.00	1375.20	100.00

Source: Ibid

Marketing Efficiency:

Tomato:

The marketing efficiency was examined in terms of the price difference, marketing costs and margin for tomato crop. Therefore, marketing costs and margin have been expressed as percentage to the price difference. In case of present study, marketing efficiency was calculated by using the formula of Acharya (2011).

Table 4.14 indicates marketing efficiency of tomato for farmers selling through TMC and EMC. It may be noted that ratio of marketing efficiency was 0.96 for TMC farmers whereas it was observed 0.66 for EMC farmers. Thus, marketing efficiency was found better in case of emerging marketing channel that is Reliance Fresh in our case.

Table 4.14
Marketing Efficiency of Tomato

Sl. No.	Particulars	TMC	EMC
1	Retailers Sale Price or Consumer Purchase Price (RP) in Rs/qtl	1046.40	1375.2
2	Total Marketing Cost (MC) in Rs/qtl	87.00	45.2
3	Total Net Margin of Intermediaries (MM) in Rs/qtl	447.40	785
4	Net Price Received by Farmers (FP) in Rs/qtl	512.5	545
5	Value Added (1-4) in Rs/qtl	534.00	830.2
	MME (Modified Measure of Market Efficiency) Ratio	0.96	0.66

Source: Ibid

Muskmelon:

After analyzing various aspects of marketing of tomato, now we look at the same for the second selected crop (muskmelon). Table 4.15 provides the details of quantum transacted, marketing cost, disposal, sale, cost per quintal and returns for TMC and

EMC farmers. Various costs that are incurred in the marketing of muskmelon are transport, loading/unloading, market fee and commission. Table 4.15 provides the breakup of various items of the cost in the total marketing cost of the selected fruit crop. The results show that farmer's margin for muskmelon sold was Rs.404 per quintal for TMC and Rs.461 per quintal for EMC during reference year. Further, average farmer's margin in case of TMC was estimated around Rs.149 per quintal whereas the same was Rs.221 per quintal in case of EMC cultivators. The difference in margin of the producer is due to negligible level of the market functionaries in case of EMC as compared to TMC.

The details of disposal indicated that TMC muskmelon growers sold more than 90 per cent of their produce in the traditional market and negligible amount was sold elsewhere. Similarly, EMC growers sold more than 95 per cent of their produce to the Reliance Fresh (RF). The wastage ranged between 1 and 2 per cent under both the channels. The price differential was around 7 per cent. The prices received by the farmers were observed higher under the EMC in comparison to TMC. It is essential to mention here that the EMC (RF) purchased only quality produce. A minor sum was deducted from the offered price under the EMC.

In addition, we have analysed returns in the same table that indicates that marketing cost of total farmer's sale (TFS) was 12.14 in case of TMC and 10.12 per cent in case of EMC. It may be noticed that unsold produce was nil under both the channels.

To sum up, farmers received a higher price (around 6 per cent) by selling muskmelon to the RF. But, this difference appears to be very low in view of the fact that RF purchased muskmelon directly from the farmers without involving several functionaries. Also, only quality produce is purchased and bad quality was rejected during sorting and grading. Thus, benefits received by the farmers from sale of produce to the RF were found limited. It implies that a larger share of margins accrued after shortening the chain was enjoyed by the RF.

Table 4.15
Sampled Farmers Margin in Marketing of Muskmelon in Haryana

Particulars	Muskmelon TMC	EMC
A. Quantum Transacted		
Production / quintal	289	322
Price paid for purchase (Rs./qtl) from farmer in specified market	601	640
B. Marketing Costs (Rs./qtl)		
Packing, grading and assembling	38.5	44
Loading and Unloading Costs	10.5	4.5
Transport	22.75	15.6
Commission Charges		-
Storage	-	-
Mandi Tax	-	-
Development Cess	-	-
Weighing Costs and other expenses		-
Brokerage Expenses	-	-
Other Fees paid specify bribes to market comm. Members		-
Total	**71.75**	**64.1**
C. Disposal (qtls)		
Quantum (Marketable)	289	322
Quantity sold in Specified Market	282.64	315.63
Quantity sold elsewhere	2.18	4.76
Any other Disposal (Wastage in marketing, etc may add rows)	2.27	2.31
Total Quantum Sold	284.82	320.39
D. Sale		
Quantity sold in Specified Market (qtls)	282.64	315.63
Price in specified market (Rs./qtl)	601	640
Sales in Specified market (Rs.)	169866.64	202003.2
Quantity sold elsewhere (qtl)	2.18	4.76
Price elsewhere (Rs./qtl)	420	410
Sales elsewhere (Rs./qtl)	915.6	*1951.6*
Total Farmers Sales (TFS)	170782.24	203954.8
Post Harvest Losses (% of production)	8	7
E. Cost per quintals (Rs)		
Marketing Costs (Rs./qtl)	**71.75**	**64.1**
Production Costs (Rs./qtl)	193.09	174.35
Total per quintal Farmers Costs	264.84	238.45
F. Returns (Rs)		
Total Sales	170782.24	203954.8

Contd…Table-4.15

Total Farmers Costs	55804	56142
Average Farmers Price (AFP)	590.9	633.4
Marketing Cost as % of AFP	12.14	10.12
Marketing Cost as % of TFS	12.14	10.12
Average Farmer Margin (AFM) Rs./qtl	149.2	221.19
Marketing Cost as % of AFP	12.14	10.12
Quantity Sold in specified market (qtls)	282.64	315.63
Price at which it was sold (Rs./qtl sold)	601	640
Total Sales	170782.24	203954.8
Total Farmer costs	55804	56142
Margin of the Farmer (Rs.)	114978	147813
Margin per qtl sold (Rs.)	404	461

Source: Ibid

Producer's Share and Price Spread of Muskmelon:

The results of the estimation of the producer's share and various components of price spread of muskmelon in selected households shown in Table 4.16 indicate that producer's share in consumer's rupee was greater in case of TMC than EMC. It is around 44 and 42 per cent for both the channels. It implies that producers are not benefited significantly by selling produce to the EMC that is Reliance Fresh in our case. According to Table, share of other intermediaries such as commission agent, wholesaler, etc. was 15.48 and 12.87 per cent, respectively. The retailer enjoyed the highest share (19.13 per cent) under TMC. Under the EMC retailer received 52.61 per cent of the consumer's rupee. We have already mentioned that price received by the farmer through the sale to RF was Rs 640 against Rs 601/ quintal under the TMC. The total cost of marketing was 8.39 and 5.56 per cent of the consumer's rupee under both the channels.

Next, we present our results regarding marketing efficiency of muskmelon for the TMC and EMC producers. It may be noted from Table 4.17 that marketing efficiency

was found better under the emerging marketing channel. The ratio was 0.79 and 0.72 under TMC and EMC. This finding suggests that marketing efficiency in the case of perishable agriculture commodities can be improved if farmers opt for emerging marketing channels.

Table 4.16

Producer's Share and Price Spread of Muskmelon

(Rs./qtl)

Sl. No.	Particulars	TMC		EMC	
		Amount	%	Amount	%
1	Producers' Share	601.00	44.14	640.00	41.83
2	Commission Agent	210.80	15.48		
3	Wholesalers margin	175.23	12.87	805.00	52.61
4	Retailer margin	260.45	19.13		
5	Total Cost of Marketing	114.20	8.39	85.00	5.56
6	Consumers Rupee	1361.68	100.00	1530.00	100.00

Source: Ibid

Table 4.17

Marketing Efficiency of Muskmelon

Sl. No.	Particulars	TMC	EMC
1	Retailers Sale Price or Consumer Purchase Price (RP) in Rs/qtl	1361.68	1530.00
2	Total Marketing Cost (MC) in Rs/qtl	114.20	85.00
3	Total Net Margin of Intermediaries (MM) in Rs/qtl	646.48	805.00
4	Net Price Received by Farmers (FP) in Rs/qtl	601.00	640.00
5	Value Added (1-4) in Rs/qtl	760.68	890.00
	MME (Modified Measure of Market Efficiency) Ratio	0.79	0.72

Source: Ibid

Post Harvest Losses:

The post harvest losses assume special significance in case of horticultural crops due to their perishable nature. We had also enquired from farmers during the survey about the loss of produce. Table 4.12 indicates that post harvest losses were 12 and 10 per cent of the produce for tomato. The proportion of losses was found relatively low in case of muskmelon and ranged between 8 and 7 per cent for farmers selling through TMC and EMC.

Section-4

Perceptions of Farmers on Marketing of Tomato and Muskmelon

In the previous section, various issues related to the marketing of tomato and muskmelon sold through TMC and EMC were discussed. For a deeper understanding of this phenomenon, perceptions of farmers about marketing of these crops at the grass root level should be known and understood. In order to capture this aspect, some questions were included as opinion survey in the questionnaire and related queries have been answered on this basis. This section focuses on the perceptions of sampled farmers about marketing of tomato and muskmelon in the selected districts of Haryana.

A variety of price and non-price factors influence farmers' decision regarding sale of produce through a particular marketing channel. Table 4.18 presents reasons for preferring a specific marketing channel. In case of TMC tomato growers, superior service, infrastructure, higher price and habit played a major role in decision making. These factors were also noticed equally important in case of TMC tomato cultivators. The reasons for preferring a particular channel for sale by muskmelon growers were also found more or less the same.

Table 4.18

Reasons for Preferring a Marketing Channel

Sl. No.	Particulars	(% to total responses)			
		Tomato		Muskmelon	
		TMC	EMC	TMC	EMC
1	Habit	12.92	13.08	15.74	15.45
2	Influences of friends, relatives, neighbors	4.58	1.27	2.98	0.41
3	Assured sales	8.33	8.44	6.81	7.32
4	Higher/Fair price	15.00	12.66	10.21	12.60
5	Low cost of Marketing	5.42	7.59	7.66	6.10
6	Less physical loss	0.42	0.00	1.28	0.41
7	Proximity	11.67	14.77	10.21	14.23
8	Logistic Support	4.58	5.91	6.38	6.91
9	Access to Inputs	0.00	0.42	0.85	0.00
10	Hidden cost/bribes in alternative channel	0.00	0.00	0.43	0.00
11	Longer waiting time and formalities in alternative channel	0.00	0.42	0.00	0.00
12	Superior services	19.17	20.68	20.43	19.92
13	Infrastructure	17.92	14.77	17.02	16.67

Source: Ibid

The expected price of the produce is the most important determinant in selection of marketing channel. We have presented percentage of total responses regarding source, time, difference and time of price agreement. It is amply clear that commission agents/traders followed by other farmers were the important sources of price information. Majority of the farmers reported that price information was received at the time of harvest and sale. We had also enquired during the survey about provision of price information by AG market. More than 95% of respondents reported in negative. Majority of them mentioned that price agreement was carried out at the time of sale that was similar to expected price (Table 4.19).

Table 4.20 indicates that majority of the tomato and muskmelon growers opted for the merchant/agency with higher confidence and satisfaction in addition to good record. Farmers were offered agreed price and payment was made without several visits. However, they pointed out about the quality conflict in case of TMC as well as EMC irrespective of the crop.

Table 4.19

Details about Price Information

Sl. No.	Particulars	% to total responses			
		Tomato		Muskmelon	
		TMC	EMC	TMC	EMC
A	**Source of price information**				
1	Personal information	6.00	0.00	12.00	14.00
2	Discussion with other farmers	34.00	38.00	30.00	44.00
3	Discussion with Commission Agents/Traders	58.00	62.00	58.00	42.00
4	Discussion with e-choupal agent	2.00	0.00	0.00	0.00
B	**Time of Price Information**				
1	At the time of the harvest	84.00	98.00	90.00	96.00
2	After one month of the harvest	16.00	2.00	10.00	4.00
3	> 1 month of he harvest and < 3 months	0.00	0.00	0.00	0.00
4	3 or 4 months after the harvest	0.00	0.00	0.00	0.00
C	**Price information from AGMARKNET**				
1	No	100.00	96.00	98.00	100.00
2	Yes	0.00	4.00	2.00	0.00
D	**Time of Price Information**				
1	At the time of sale	100.00	98.00	94.00	90.00
2	Number of Days before sale	0.00	2.00	6.00	10.00
E	**Differences in Price Information**				
1	Lower than expected	0.00	0.00	8.00	2.00
2	Similar to what excepted	100.00	100.00	90.00	96.00
3	Higher than expected	0.00	0.00	2.00	2.00
F	**Time of Price Agreement**				
1	At the time of sale	86.00	100.00	72.00	56.00
2	By previous agreement	14.00	0.00	8.00	6.00

Source: Ibid

Table 4.20
Transaction Cost-Enforcement Cost

Sl. No.	Particulars	(% responses to total)			
		Tomato		Muskmelon	
		TMC	EMC	TMC	EMC
A	**Difference between Agreed price and Sale price**				
1	Less	0.00	2.00	0.00	2.00
2	Same	100.00	88.00	100.00	98.00
3	A bit more	0.00	10.00	0.00	0.00
B	**No. of visits to merchant to receive payment**				
1	Nil	98.00	88.00	84.00	86.00
2	Several times	2.00	12.00	8.00	8.00
C	**Merchant Record**				
1	Bad	2.00	0.00	0.00	0.00
2	Satisfactory	50.00	32.00	50.00	46.00
3	Good	46.00	68.00	50.00	54.00
D	**Receipt for Sales of the produce**				
1	No	40.00	8.00	32.00	14.00
2	Yes	60.00	92.00	68.00	86.00
E	**Conflict on quality**				
1	Yes	90.00	94.00	82.00	94.00
2	No	10.00	6.00	12.00	4.00
F	**Any other Conflicts**	-	-	-	-
G	**Whether resolved**	-	-	-	-
H	**Confidence in the merchant**				
1	Low	22.00	2.00	18.00	14.00
2	High	78.00	98.00	76.00	86.00

Source: Ibid

We have already mentioned that most of the sampled tomato and muskmelon growers opted for a marketing channel with higher confidence providing the agreed price. The perceptions of the farmers about provision of loan facility by the agency/commission agent also influenced their preference in addition to price factor. It is reported in Table 4.21 that percentage of selected farmers availing loan facility was low in case of EMC muskmelon growers while it was noticed 12 and 16% respectively in the case of tomato cultivators. The primary sources of loan were banks followed by cooperatives. These loans were availed for saving the crops and for purchasing farm machinery. Some default cases were also reported in the case of tomato growers. None of the muskmelon growers was found a defaulter. The reasons attributed for default by the farmers included poor production and extra interest charged by the lenders.

Table 4.21

Perceptions of Farmers on Services provided by Different Agencies

Sl. No.	Particulars	Tomato		Muskmelon	
		TMC	EMC	TMC	EMC
A	**Taken any Loan(% to selected households)**	12.00	16.00	4.00	2.00
B	**Source of loan**				
	Money Lender	0.00	0.00	0.00	0.00
	Bank	83.33	87.50	100.00	100.00
	Cooperatives	16.67	12.50	0.00	0.00
	Friends/Relatives	0.00	0.00	0.00	0.00
	Self Help Groups	0.00	0.00	0.00	0.00
	Buyer of the produce	0.00	0.00	0.00	0.00
	Others	0.00	0.00	0.00	0.00
C	**Purpose of Loan**				
	Crop Loan	83.33	100.00	100.00	100.00
	For Purchase of Farm Machinery	16.67	0.00	0.00	0.00
D	**Reasons for taking loan from buyer**	0.00	0.00	0.00	0.00
E	**No. of times loan taken from the buyer in last 5 years**	-	-	-	-
F	**Total amount of loan taken from the buyer in 2009-10**	-	-	-	-
G	**Default of loan taken**				
	Yes	16.67	37.50	0.00	0.00
	No	83.33	62.50	100.00	100.00
H	**Source of loan for default loan**				
	Money Lender	0.00	0.00	0.00	0.00
	Bank	100.00	25.00	0.00	0.00
	Cooperatives	0.00	12.50	0.00	0.00
	Friends/Relatives	0.00	0.00	0.00	0.00
	Self Help Groups	0.00	0.00	0.00	0.00
	Buyer of the produce	0.00	0.00	0.00	0.00
	Others	0.00	0.00	0.00	0.00
I	**Reasons for default**				
	Poor production	100.00	66.67	0.00	0.00
	Extra interest charges	0.00	33.33	0.00	0.00

Source: Ibid

In the next table (4.21), we have pointed out that only 2% of the selected TMC tomato farmers received advance inputs in terms of seed during the reference year. It implies that majority of the respondents did not have any access to inputs from the buyers of the produce.

Table 4.22

Access to Inputs from the Buyer

Sl. No.	Particulars	Tomato		Muskmelon	
		TMC	EMC	TMC	EMC
A	Received Advanced Inputs during references year (% of response)				
1	Yes	2.00	0.00	0.00	0.00
2	No	98.00	100.00	100.00	100.00
B	Value of the inputs (Rs./farmer)	5000.00	0.00	0.00	0.00

Source: Ibid

Market infrastructure plays an important role in enhancing efficiency of the agricultural marketing. We have analysed some crucial factors relating to the market infrastructure in table 4.23. These include proximity to the market, condition of the roads, availability of cold storage and godowns, auction arrangements, supervision of sale, loading, sorting, weighing and packing facilities. Most of the surveyed farmers reported average plus good condition of the roads. Moreover, responses of the farmers regarding proximity of the markets varied significantly. The cold storage and godown facilities were reported not available or bad. Further, supervision of sale and auction arrangements in the markets were found average. The responses of the farmers about other related factors were also not found encouraging since proportion of the farmers reporting good facilities was poor. In order to modernize agriculture markets, suitable for the changed environment for agriculture in India, computer and internet facility are the utmost requirement. But, results of the survey reported their poor status. The survey results point out lacunae in the marketing infrastructure. Hence, it is imperative to improve marketing infrastructure in the agriculturally developed state of Haryana in order to improve marketing efficiency, profitability of the farmers, and availability of the agricultural commodities at the reasonable prices to the consumers.

Table 4.23
Perceptions about the Market Infrastructure

Sl. No.	Particulars	% to total selected household			
		Tomato		Muskmelon	
		TMC	EMC	TMC	EMC
1	**Condition of the road to market**				
I	Bad	0.00	12.00	14.00	18.00
Ii	Average	54.00	28.00	44.00	36.00
Iii	Good	46.00	60.00	42.00	46.00
2	**Proximity of market**				
i	Within the village	6.00	0.00	0.00	8.00
ii	Within 10 kms	34.00	90.00	28.00	50.00
iii	Between 10 to 25 kms	2.00	4.00	32.00	32.00
iv	> 25 kms<50 kms	4.00	2.00	14.00	10.00
v	>50 kms	54.00	4.00	26.00	0.00
3	**Go-down facilities**				
i	Not available	84.00	14.00	60.00	58.00
ii	Bad	0.00	28.00	20.00	24.00
iii	Average	8.00	4.00	18.00	14.00
iv	Good	8.00	54.00	2.00	4.00
4	**Cold storage**				
i	Not available	0.00	72.00	86.00	88.00
ii	Bad	88.00	14.00	10.00	4.00
iii	Average	6.00	12.00	4.00	8.00
iv	Good	6.00	2.00	0.00	0.00
5	**Auction arrangement (Open)**				
i	Bad	18.00	42.00	24.00	26.00
ii	Average	68.00	58.00	64.00	72.00
iii	Good	14.00	0.00	12.00	2.00
6	**Supervision of sale**				
i	Bad	6.00	10.00	2.00	4.00
ii	Average	76.00	54.00	84.00	82.00
iii	Good	18.00	36.00	14.00	14.00
7	**Loading facilities**				
i	Bad	16.00	12.00	18.00	14.00
ii	Average	62.00	52.00	66.00	66.00
iii	Good	22.00	36.00	16.00	20.00
8	**Sorting facilities**				
i	Bad	60.00	36.00	28.00	22.00
ii	Average	20.00	52.00	50.00	68.00
iii	Good	20.00	12.00	22.00	10.00
9	**Weighing facilities**				
i	Bad	12.00	0.00	8.00	6.00
ii	Average	46.00	30.00	34.00	38.00
iii	Good	42.00	70.00	58.00	56.00
10	**Packing facilities**				

Contd…Table-4.23

i	Bad	14.00	50.00	42.00	62.00
ii	Average	64.00	32.00	34.00	16.00
iii	Good	22.00	18.00	24.00	22.00
11	Internal Telephone			0.00	0.00
i	Bad	8.00	18.00	16.00	16.00
ii	Average	60.00	50.00	56.00	62.00
iii	Good	32.00	32.00	28.00	22.00
12	**Banking facilities**				
i	Bad	58.00	64.00	68.00	60.00
ii	Average	40.00	32.00	28.00	40.00
iii	Good	2.00	4.00	0.00	0.00
13	**Computer facilities**				
i	Bad	38.00	46.00	46.00	50.00
ii	Average	16.00	22.00	36.00	28.00
iii	Good	2.00	16.00	0.00	8.00
iv	Not available	44.00	16.00	18.00	14.00
14	**Internet**				
i	Bad	30.00	50.00	46.00	56.00
ii	Average	0.00	20.00	18.00	20.00
iii	Good	2.00	0.00	0.00	2.00
iv	Not available	68.00	30.00	36.00	22.00

Source: Ibid

Chapter-5

Summary and Conclusions

This chapter aims to present the main findings of the study and to draw policy implications. This study is a departure from earlier literature in terms of its focus on issues related to Emerging Marketing Channel (EMC) vis-à-vis Traditional Marketing Channel (TMC). The main objective of this research is to the examine the comparative operational cost, returns, price spread and marketing efficiency for selected two crops, tomato and muskmelon sold through TMC and EMC. Further, it seeks to highlight status of the APMC Act at the all India and Haryana levels. In addition, we have tried to assess human labour used in cultivation of tomato and muskmelon by the selected groups.

After the initiation of economic reforms during the early nineties and WTO agreement in mid nineties, scenario for agricultural marketing has changed significantly in the country. The entry of corporate in the retail of fresh fruits and vegetables has opened new channels in the marketing. These channels are competing with the traditional marketing channels. Under these channels, fruits and vegetables are directly sourced from the farmers and payments are made for the quality produce. This reduces supply chain. It is expected that Emerging Marketing Channels (EMCs) will bring improved quality and better after sales services and will be beneficial to the consumers as well as producers Although information related to these aspects is useful for the future policy prescriptions, evidences on these aspects are scant in literature . The present study was planned to bridge this gap.

5.1 Objectives:

We have selected two horticultural crops for in-depth study. In view of immense potential of horticulture in India due to varied agro climatic conditions, it is imperative to point out the benefits of selling horticulture produce through traditional and emerging marketing channels. The research input on the related issues is an urgent need to draw in future course for the development of this sector through innovative models. In order

to achieve this objective, the study seeks to analyse the related issues. The specific objectives of the study are as under:

(i) to determine share of the farmer in consumer's rupee in an emerging marketing channel vis-a-vis traditional marketing channel;
(ii) to compute the degree of marketing efficiency and incidence of post harvest losses in emerging marketing channel vis-à-vis traditional marketing channel;
(iii) to analyse the market practices and services of agencies involved in the emerging marketing channel and observe if they are superior to that of traditional channel;
(iv) to indicate constraints faced by farmers and different market functionaries in the emerging marketing channel as compared to the traditional marketing channel.

This study was conducted in the state of Haryana. It is based on macro and micro level data. The relevant information for the state and district level analysis was obtained from various issues of the Statistical Abstract of Haryana, Government of Haryana, Panchkula. The required preliminary information regarding the agricultural marketing in Haryana was obtained from the officials of the Haryana State Agricultural Marketing Board, Panchkula.

The scope of the study is confined to two horticultural crops i.e. one vegetable (tomato) and one fruit (muskmelon). Three districts namely, Gurgaon, Sonepat and Kurukshetra with the presence of Traditional Marketing Channel (TMC) and Emerging Marketing Channel (EMC) were selected for in-depth study. The Reliance Fresh was selected as Emerging Market Channel. A questionnaire was canvassed to the farmers selling produce through these channels. An effort was made to cover all farm size categories in the sample. These were divided into marginal (less than one hectare) small (1-2 hectares), medium (2-4 hectares), and large (more than 4 hectares). The primary data pertaining to the year 2010-11 were collected from 200 farmers (100 TMC + 100 EMC). In addition, 5 intermediaries, 5 retailers and 5 consumers were canvassed a questionnaire to understand their perspective. In view of the main objective of the

study, it was found necessary to compare, cost, economics of the selected crops and benefits of Emerging Marketing Channel to the farmers.

The study is analytical in nature and therefore, simple measures such as percentages, shares and compound growth rates have been utilized to derive results. The methodology followed for each aspect is different. For measuring the growth rates of area, production and yield of fruit and vegetable crops at the all India and state level for available period, the semi-log equation of the form log y = a + bt was used. The marketing efficiency is computed by using the formula given by Acharya, (2011).

Now, we present main findings of the study:

5.2 Main Findings

(i) Macro Scenario of APMC Act: All India Scenario

India has an Agricultural Produce Marketing Regulation Act (APMRA) in which every regulated market has a market committee where farmers, traders, commission agents, local bodies and the state government are represented. Prices are fixed through an open auction in a transparent manner in front of an official of the auction committee. The main criticism of regulated markets is that they do not reduce long chain of intermediaries between farmer and consumer, which adds to the cost of agricultural commodities to consumers on the one hand, and decreases returns for farmers on the other.

Agricultural commodities are produced in specific parts of the country depending upon topography and climatic conditions, while the demand for the same spreads across India. Hence, there is a need to move agricultural produce from specific supply centers to various consumption centers in the country in fastest possible way at the minimum cost in order to ensure supply of quality produce to consumers at affordable

price. Under the present system, marketable surplus of one area moves out to consumption centers through a network of middlemen and traders and institutional agencies. Thus, there exists national level market though there is no national level regulation for the same. This has prevented development of an efficient and cost effective national market. In order to control price inflation at retail and effective control and regulation of the supply chain of sensitive commodities across the state boundary is essential. Marketing cost constitutes a major chunk of consumer's price, which needs to be reduced.

Over the last sixty years, growth in the agriculture sector in India had been phenomenal but agricultural marketing sector could not keep pace with the changing pattern of production, distribution, processing and retail marketing. So far, robust common national market for agricultural commodities could not take shape and a strong need is being felt to facilitate such development through a central intervention. This is presently being tried to be achieved in a limited manner by making the amendments in State APMC laws on the basis of the Model Rules, 2007 circulated by the Central Government, but some states are hesitant to amend their Marketing Regulations.

So far, six states (Andhra Pradesh, Rajasthan, Maharashtra, Orissa, Himachal Pradesh and Karnataka) have framed the APMC Rules for implementing the provisions of their respective state APMC Act. Three states, viz Madhya Pradesh, Haryana and Mizoram have partially framed the rules. Haryana has notified the Rules for contract farming only while Mizoram has notified the rule of single point levy of market fee. Madhya Pradesh has framed the rules for direct marketing/special license for more than one market and contract farming only. Unless the corresponding APMC. Rules are framed and notified, various provisions of the APMC Act cannot be operationalised in the state and the market reforms may remain unrealized. Some of the states have imposed restrictions which are not provided in Model APMC Rules such as states of Andhra Pradesh, Maharashtra and Karnataka prescribing minimum investment requirement for setting up of private markets and states of Gujarat, Orissa and Karnataka providing for minimum distance criteria for private markets from existing

APMCs. In Gujarat, minimum distance requirement is 5 kms while in Orissa, it is 1 km. In Karnataka, such restriction is for Bengaluru only for foodgrains, pulses, spices, etc, and private markets handling these commodities would not be established within the radius of 25 kms from the existing market. The other restrictions are compulsory registration of contract farming, short validity of licenses for private mandies (H.P.). The states of Assam, Gujarat, Madhya Pradesh, Haryana and Uttrakhand have not notified the APMC rules. Those states have already notified the APMC rules for review and make the provision in conformity with the Model Rules. Hence, it is urgent to align the APMC Rules keeping in mind the Model Rules.

State Level Scenario:

The Royal Commission on Agriculture (1928) pointed out that there was no common yardstick to measure the quality of produce, the weights and measures were un-standardized and the private market operators exploited the farmers. It recommended the enactment of market legislation to curb rampant malpractices and realize better returns. In that context, the Haryana state being a part of undivided, Punjab enacted the Punjab Agriculture Produce Markets Act, 1939. This act was further amended in 1961 and is operational in the state. Under this act, all the markets of the state have been regulated. According to the Model Rules of the Government of India, 2007, Haryana state has so far made provision for the contract farming in the Act. The transactions in the traditional markets are conducted under set rules on regulations. A large number of market committees were set up by the state government to supervise the functioning of agricultural produce markets. The Haryana State Agricultural Marketing Board was established in 1969 under this market Act to guide and supervise farmers with the aim of better and efficient marketing of agricultural produce.

Haryana has unevenly spread net work of regulated markets across the districts. The highest number of regulated markets was observed in Karnal district while Jhajjar, Faridabad and Rewari districts have shown as low as two markets each. The

information on average number of villages served per regulated market has revealed that in Rewari, each regulated market covered 200 villages that is too high. It implies that most of the farmers have to carry their agricultural produce for sale far off to the regulated market which increased cost of transport, wastage of energy and time. The primary objective of the Board was to set up a modern integrated marketing infrastructure, improve accessibility to the markets and to provide the farmers with opportunities to achieve better value for their produce.

In addition, state of Haryana has taken up a number of steps for marketing, export of fruits, flowers and vegetables. These crops are highly perishable. For interstate domestic marketing and export, these require quality produce and use of Post Harvest Management infrastructure for bulk storage. In this direction, state government has taken several initiatives to improve the scenario:

(ii) Socio-Economic Characteristics of Sampled Districts and Households

For better understanding of the agricultural marketing, one has to look into main indicators related to population and workers, agricultural development and infrastructural development at the district level.

Sampled Districts:

(i) The total population of Sonepat, Kurukshetra and Gurgaon districts was 1279, 825 and 871 thousand persons during 2001. Surprisingly, 74 per cent population in Kurukshetra is rural based. Education, although a catalytic factor in development has exhibited poor performance in rural areas of all the selected districts. The share of agricultural workers in total workers in selected districts was between 40 and 53 per cent. The share of non-agricultural workers in Gurgaon and Kurukshetra was more than 50 per cent. It seems that growing work opportunities in these districts benefited rural population. The composition of workers in farm and non-farm sectors was markedly different. Gurgaon has shown around 60 per cent workers engaged in the non-farm sector. On the

contrary, Sonepat has exhibited 47% of the work force involved in this sector. Thus, Gurgaon is much ahead of Sonepat and Kurukshetra in rural non-farm employment.

(ii) A comparison of important indicators of agricultural development reveals wide disparities across the selected districts. The irrigation status, yield rates of important crops, input use were analysed to gauge the disparities. Out of the selected districts, Sonepat appeared to be much ahead in agricultural development than Gurgaon and Kurukshetra.

(iii) The infrastructural development of selected districts was distinctively different. Although Gurgaon is the most important industrial and commercial centre near the capital city of Delhi, is not found rich in infrastructure like roads.

Sampled Farmers

For better understanding of the agricultural marketing through traditional and emerging marketing channels, we have looked into main indicators related to population and workers, educational status of the head of households, farm size, nature of land ownership, cropping pattern and sources of irrigation, farm assets. The efficiency and success of farming is influenced to a significant degree by the socio-economic background of the households. In addition, these characteristics influence adoption of improved technology and marketing behavior. The average size of the family of selected farm households was 5 and 6 persons for tomato and muskmelon growers. There was no correlation between farm size and average size of family. The literacy rate of the selected families was not found to be impressive, however large farm households indicated higher level of literacy. These farmers owned a variety of farm assets. Tractors followed by pumpsets were the major assets owned by these families.

The nature of land ownership influences crop pattern, adoption of technology and innovation. At the aggregate level, average land owned by selected tomato and

muskmelon growers was 1.82 and 3.23 hectares. The practice of leasing-in land was common but rarely land was leased out. Like the state, cropping intensity was found to be higher in each group. It was found to be the highest in the case of EMC tomato growers. The main sources of irrigation were pumpsets and electric tubewells. In kharif season, paddy and vegetables were the main crops while rabi season was dominated by wheat, vegetables and mustard. The area under tomato and muskmelon cultivation was 6.21 per cent and 12.56 per cent of GCA on sampled farms. Variations across TMC and EMC sampled households were found significant. Further, TMC tomato cultivators devoted the highest share of GCA to this crop.

(iii) Economics of Selected Crops and Labour Absorption

The impact of the Emerging Marketing Channel (EMC) in Haryana on net returns per hectare was assessed through a comparison with the Traditional Marketing Channel (TMC) of tomato and muskmelon grown by the surveyed farmers during 2010-11. Results of sampled survey pointed out that gross returns per hectare for sampled EMC tomato and muskmelon growers were found to be higher than farmers opting for TMC during the reference year and this was true for net returns as well. This was on account of higher yield and better price realized by the EMC farmers.

Variations were common in gross returns and net returns per hectare. In case of tomato, net returns were Rs. 123048 for EMC farmers against Rs. 102289 for TMC farmers. The yield variation was around 12 qtl/ha. The difference in price realized was Rs. 33 per qtl. The scenario for muskmelon growers was also found the same and EMC farmers realized better yield and prices.

In the cost structure, human labour has emerged as component accounting for about 40 per cent of the total operational cost in case of TMC and EMC tomato cultivators. However, it was found relatively lower in case of muskmelon that is around 30 per cent. The inputs related to improved production technology such as fertilizer, insecticides and irrigation also constituted at least 10 per cent of the cost in each group.

Results show that tomato and muskmelon generated significant employment. It was noticed 112 and 107 days/ha for tomato in case of TMC and EMC farmers. Also, muskmelon generated 94 and 74 days/ha for both the groups. Findings reveal that TMC and EMC tomato cultivators utilized 37 and 45 per cent of family labour. On the other hand, TMC and EMC muskmelon growers utilized around 19 and 26 per cent of family labour. The remaining human labour was hired. The contribution of female labour was found higher across all the groups except in the case of EMC muskmelon growers.

(iv) Price Spread and Marketing Efficiency:

Surveyed farmers disposed off their tomato and muskmelon produce through a commission agent under the traditional marketing channel and to the Reliance Fresh, under the emerging marketing channel etc. The choice of marketing channel depends on variety of factors such as financial obligation to commission agent, remunerative price and proximity to the market.

We have calculated gap between prices received by the producers and prices paid by the consumers. Results show that producers received around 49% share of consumer's rupee in case of tomato and around 44% in case of muskmelon under TMC. These shares were around 40 and 42% respectively for farmers selling produce through EMC. The remaining share was incurred as the marketing cost and margins of the intermediaries in case of TMC. It is essential to mention that the Reliance Fresh received around 60 and 58% as marketing cost and margins. The calculation of marketing efficiency ratio showed that it was found better under the EMC for both the selected crops.

To sum up, farmers received a higher price (around 6 per cent) by selling tomato and muskmelon to the RF. But, this difference appears to be very low in view of the fact that RF purchased these crops directly from the farmers without involving several functionaries. Also, only quality produce is purchased and bad quality was rejected during sorting and grading. Thus, benefits received by the farmers from sale of produce

to the RF were not found significant. It implies that a larger share of margins accrued after shortening the chain was enjoyed by the RF.

5.3 Policy Implications:

During the course of study, we have observed some shortcomings in the marketing of tomato and muskmelon through the traditional and emerging marketing channels. The following suggestions have been offered to improve the marketing scenario of horticultural crops in general and selected crops in particular in Haryana.

(i) Ensuring barrier free movement of the produce across the country by lifting restrictions.

(ii) Reducing levies and mandi taxes to the minimum level in order to make traditional marketing channel competitive to emerging marketing channels.

(iii) Increasing the number of alternate marketing channels for marketing of perishable crops to increase competition among buyers. The present spread of emerging channels is inadequate to have wider impact on marketing of the produce.

(iv) Given the perishable nature of horticultural crops, farmers may be provided marketing assistance.

(v) Establishing processing centers accessible to producers. This is urgent since growers sell their produce immediately after the harvest. As a result, farmers received low prices in the absence of any other option.

(vi) The differential in the price received by tomato and muskmelon producers selling through TMC and EMC was narrow (6 %). This variation appears to be low in case of EMC which purchased produce directly from farmers without involving functionaries. Results of the study show that marketing margin was found more than 50% in case of EMC. Hence, there is an urgent need to regulate prices and profits of EMC.

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Action Taken on coordinators comments

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