STUDY OF VEGETABLE MARKETING IN MALUR: A TRANSACTION COST ANALYSIS

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BY

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CERTIFICATE

This is to certify that the thesis entitled **"Study of Vegetable Marketing in Malur: A Transaction Cost Analysis"** submitted by **Navolina Patnaik** as a part of the degree of Doctor of Philosophy in Economics is original and the work has been carried out in my supervision during the academic session 2008-2014. Thesis has not been submitted for any degree in part or in full to any other university or to this university.

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DECLARATION

I hereby declare that the research work embodied in the present thesis entitled **"Study of Vegetable Marketing in Malur: A Transaction Cost Analysis"** is an original research work carried out by me under the supervision of **Prof. R.V. Ramana Murthy**, School of Economics, University of Hyderabad, and has not been submitted for any degree in part or in full to any other university or to this university.

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TO MY

GRAND MA

AND

HUSBAND

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- *Navolina Patnaik*

Abstract

The Indian agri-food system is undergoing various changes with the advent of organized retailing, food processing, and change of consumer preferences. Transformations in the global food system are also causing changes in food production and marketing in India. The governing and regulatory institutions have also responded to these new requirements by allowing direct procurement from farmers, which has resulted in emergence of new channels in the fresh produce marketing. The farmers are today faced with multiple channels consisting of the *traditional* (spot and terminal markets, traders, cooperatives) and the *new* (retail chains and food processors) channels to sell the produce.

The study location is Malur Taluk in the Kolar District of Karnataka. We focus on the marketing of daily consumable vegetables. The marketing channels faced by the farmers vary in terms of offered price, acceptable quality, quantity demanded, etc. We study the trade characteristics of different channels using *transaction costs*, which are costs associated with an economic exchange. The transaction costs faced by farmers are related to *information search*, *transportation*, *intermediary fees*, *quality*, and *quantity*. We identify, measure, and compare the above transaction costs for the different marketing channels using primary data from the field survey. In general, mobile phones have made the information search (for price and buyer) costs negligible for farmers. The new marketing channels have lower transaction costs in terms of transportation and intermediary fees. The factors that influence the market selection are identified and their relative importance is measured on five point Likert scale. Logistic regression is used to understand the participation in commercial agriculture based on farmer category (size of land holding). There is higher participation from small scale farmers in retail marketing channels, which is explained through the notion of *apportionment* costs which are higher for large scale farmers.

In order to study the strategic emergence of marketing channels like retailers and contract farming by retailers, we use the PWH framework from *strategic management theory*. Using the framework, we analyze the strategic coordination choice of various stake-holders, including farmers, traders, retailers, and enterprise consumers. The thesis concludes by drawing lessons for policy making and strategy formation for retailers and food processors.

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1.1 Background

In the past three decades, there are definite signs that Indian economy is experiencing structural transformation. The share of urban population is fast growing and shares of population dependent on rural sector, in spite of its still large share, is reducing progressively. As a consequence, India's food sector too is undergoing a remarkable change, particularly with the advent of large urban retail markets, food processing units, and changing consumer preferences. Though, the organized retailing in India constitutes only 5-6 percent of the overall retail in the country, but it has registered an annual growth of 30-40 percent since 2000.[1] Food and grocery constitutes 11 percent of retail trade, while food and beverage alone account for 7 percent. The changing demographics, income profiles, and consumer preferences are fueling the growth of organized retailers. Organized retail is becoming more dynamic in India. India's overall retail sector is expected to rise to $1.3 trillion by 2018, at a compound annual growth rate of 10 percent (GRDI, 2008). Though the organized retail business is more focused on urban areas, food retailing is enabled by the flow of materials (like fruits, vegetables, pulses and grains) from the rural areas and thus directly affects the livelihoods of the farmers. The farmers now have access to more marketing channels to sell their fresh produce.

Huge population base of 1.27 billion in 2014, growing at about 1.58 percent (%) p.a., provides a large and growing domestic market for food products. More than 50% of India's current population is below the age of 25 and over 65% below the age of 35. About 72.2% of the population lives in some 638,000 villages and the rest 27.8% in about 5,480 towns and urban agglomerations. The literacy rate of India as per 2011 Population Census is 74.04% and the sex ratio is 940 females per 1,000 males.[2] While food accounts for only 9.7% of the total private consumption expenditure for an average American, 15% for the Japanese and British, for the

[1]NABARD, Organized Agri-Food Retailing in India, National Bank for Agriculture and Rural Development, January 2011.

[2] http://www.indiaonlinepages.com/population/india-current-population.html

Indian it is the principal component of their consumption expenditure, accounting for as much as 53%.[3]

The economy of India is the tenth largest in the world by nominal GDP of $1.824 trillion and the third-largest by purchasing power parity (PPP) of $5.684 trillion as in 2012. The country is one of the G-20 major economies and a member of BRICS. On a per-capita-income basis, India ranked 141st by nominal GDP of $1,491 and 130th by GDP (PPP) of $3,829 in 2012, according to the IMF. India is the 19th-largest exporter and the 10th-largest importer in the world. India's large service industry accounted for 56.9% of the country's GDP in 2012, while the industrial and agricultural sectors contributed 25.8%, and 17.4% respectively.[4] India recorded the highest growth rates in the mid-2000s, and is one of the fastest-growing economies in the world. India has recorded a growth of over 200 times in per capita income in a period from 1947 (249.6) to 2011. India's economic growth rate hit a new decade's low of 5% in the fiscal year 2012-13.

1.2 Fresh Production in Indian Agriculture

India is a land of agriculture diversity with 54% of its population still dependent on agriculture and contributing about 12.4% to the Indian GDP in 2012-13. However, value addition through food products is expected to increase from 8% to 35% by 2025. Fresh fruit & vegetable processing is also expected to increase from the current level of 2% to 25% of total production by 2025.[5] Vast areas of India have tropical and agro-climatic conditions which are well suited for cultivation of horticulture and plantation crops. Besides, providing nutritional and livelihood security, and helping poverty alleviation and employment generation, this sub-sector sustains a large number of agro-industries, which generate huge additional non-farming employment opportunities. The range of horticultural products include: fruits, vegetables, spices, medicinal and aromatic plants, coconut, mushrooms, cashew, cocoa etc. A tremendous boost was given to the development of the horticulture sector during the Eighth and Ninth Plans. The Ninth Plan allocation was raised to Rs. 1,400 Crore from Rs. 1,000 Crore in the Eighth Plan. This sector has had impressive impact in the

[3] http://www.equitymaster.com/detail.09/26/2007Food-Processing---Ready-to-eat

[4] http://en.wikipedia.org/wiki/Economy_of_India

[5] http://gvtindia.org/market_linkage_info

wake of economic liberalization. The high level of land productivity in many parts of the country can be largely attributed to the growth of high value horticulture crops.[6] India accounts for 10% of the world production of fruits and contributes 13.4% of the world's vegetable production. India ranks second in fruits and vegetables production in the world, after China. As per National Horticulture Database - 2012, published by National Horticulture Board, during 2011-12, India produced 76.4 million metric tons of fruits and 156.3 million metric tons of vegetables. The area under cultivation of fruits stood at 6.7 million hectares while vegetables were cultivated at 8.9 million hectares.[7] Cultivation of fruits and vegetable crops is labour intensive and hence, generate lot of employment opportunities for the rural population. Fruits and vegetables are rich source of vitamins, minerals, proteins, carbohydrates etc. and hence, referred as protective foods and contribute to the nutritional security of the people.[8] However, per capita consumption of fruits and vegetables in India is only around 74 gm and 207 gm against a minimum of about 120 gm and 300 gm, respectively recommended by Indian Council of Medical Research, New Delhi and National Institute of Nutrition, Hyderabad. However, there has been a spurt in the demand for fruits and vegetables in the country, which is going ahead of supply, resulting in substantial rise in their prices, contributing to the overall inflation.[9]

Amongst fruits, the country ranks first in production of Bananas (27.8%), Papayas (35.3%), Mangoes (including mangosteens, and guavas) (39%). Among the vegetable production, India is the largest producer of ginger and okra amongst vegetables and ranks second in production of potatoes, onions, cauliflowers, brinjal, Cabbages, etc. The vast production base offers India tremendous opportunities for export. During 2012-13, India exported fruits and vegetables worth Rs.5986.72 crores which comprised of fruits worth Rs. 2503.75 crores and vegetables worth Rs. 3482.97 crores. Mangoes, Walnuts, Grapes, Bananas, Pomegranates account for larger portion of fruits exported from the country while Onions, Okra, Bitter Gourd, Green Chilles, Mushrooms and Potatoes contribute largely to the vegetable export basket. Fruits and vegetables are also used for processing into various products

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[6] Tenth Five Year Plan 2002-07,(Chapter 5.1 Agriculture) (http://planningcommission.nic.in)

[7] http://www.apeda.gov.in/apedawebsite/six_head_product/FFV.htm

[8] http://www.indiaagronet.com/horticulture/horti_3.htm

[9] Economic Survey: 2011-12.

(pickles, preserves, sauces, jam, jelly, squashes, etc.), but substantial quantities are exported in fresh and processed form, bringing much-needed foreign exchange for the country. The major destinations for Indian fruits and vegetables are UAE, Bangladesh, Malaysia, UK, Netherland, Pakistan, Saudi Arabia, Sri Lanka and Nepal. Though India's share in the global market is still nearly 1% only, there is increasing acceptance of horticulture produce from the country.[10]

Fruit production increased 14 times from 5.5 million tons in 1952-53 to 76.4 million tons in 2011-12. The leading fruit growing states in the year 2011-2012 are Maharashtra which accounts for 16% of production followed by Andhra Pradesh (13%), Gujarat (10%), Karnataka (9%), Uttar Pradesh (8%), Tamil Nadu (7%), Bihar (5%), and the rest of India altogether contribute for about 32% of the total fruit production in the country. Banana is the major fruit accounting for 35% of total production followed by mango (21%), citrus (11%), papaya (6%), guava (3.3%), grape (3%), apple (3%), and others 17.7%.[11] The leading vegetable growing states in 2011-2012 are West Bengal which accounts for 15% of production followed by Uttar Pradesh (12%), Bihar (10%), Andhra Pradesh (8%), Gujarat (6.5%), Madhya Pradesh (6.4%), Odisha (6%), Tamil Nadu (6%), Maharashtra (5.5%), Karnataka (5%), Haryana (3.2%), Chhattisgarh (3%), and the rest of India altogether contribute for about 13.4% of the total vegetable production in the country. Potato is the major vegetable accounting for 27% of total production followed by tomato (12%), onion (11%), brinjal (8%), cabbage (5%), cauliflower (4.7%), okra (4%), and others 28.3%.[12] Figure 1.1(a) shows the trend in area under fruit and vegetable crops in India from 2001-11. From the figure, it is clear that, there is an increasing trend over the years for both crops in the long run. Figure 1.1(b) shows the trend in production of fruit and vegetable crops in India from 2001-11. The figure depicts a constant linear increasing trend in fruit production and a long run increasing trend in vegetable production with slight fluctuations in between. Figure 1.1(c) shows the trend in yield of fruit and vegetable crops in India from 2001-11. The figure depicts a long run stagnant trend for fruits whereas a long run increasing trend is depicted for vegetables.

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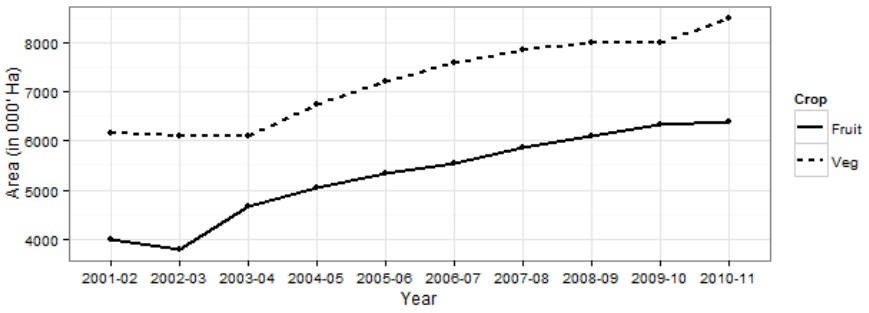
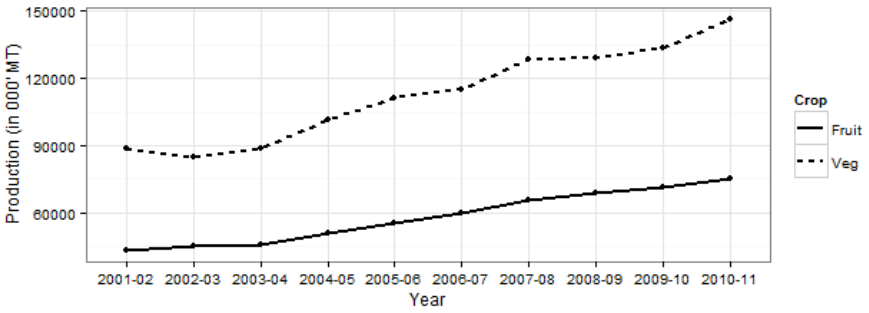
[10] http://www.apeda.gov.in/apedawebsite/six_head_product/FFV.htm

[11] Checklist of Commercial Varieties of Fruits, GoI, 2012.

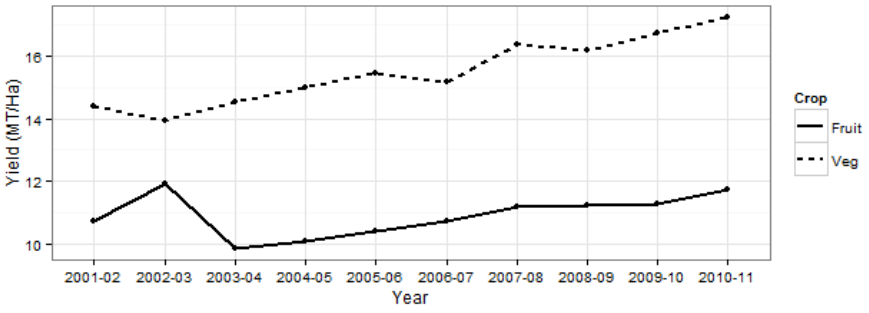
[12] Checklist of Commercial Varieties of Vegetables, GoI, 2012.



(a) Area under Fruit and Vegetable Crops in India (2001-11)



(b) Production of Fruit and Vegetable Crops in India (2001-11)



(c) Yield of Fruit and Vegetable Crops in India (2001-11)

Figure 1.1 Area, Production, and Yield of Fruit and Vegetable Crops in India (2001-11)

Source: Indian Horticulture Database – 2011, National Horticulture Board, 2012.

1.3 Fresh Produce Marketing

Transformations in the global food system are causing changes in food production and marketing in India. There is a growing domestic market for horticultural

produce, in both traditional and exotic vegetables. Production and marketing arrangements are responding to changing demand, driven by urbanization and diet change. Government-sponsored schemes in horticulture have mixed results, generating more jobs than cereal production. Average annual growth of the agriculture and allied sector during the Eleventh Five year Plan (2007-12) was 3.6%. Rate of growth of gross capital formation (GCF) in agriculture (including the allied sector) accelerated to 9.7% in the Eleventh Plan. Development of an agricultural marketing infrastructure is the foremost requirement for the growth of a comprehensive and integrated agricultural marketing system in the country. For the purpose, the Ministry of Agriculture is implementing demand-driven Plan schemes by providing assistance to entrepreneurs in the form of back-ended credit-linked subsidy, viz. the Grameen Bhandaran Yojana and Development/Strengthening of Agricultural Marketing Infrastructure, Grading and Standardization. Another critical issue in agricultural marketing in India is supply chain management. Farmers' access to markets is hampered by poor roads, rudimentary market infrastructure, and excessive regulation. Many agricultural crops are perishable in nature and post-harvest handling issues and marketing problems affect the farm incomes. It is necessary that we evolve mechanisms for linking wholesale processing, logistics and retailing with farm-production activities so as to generate enhanced efficiency, better farm prices, etc. The private sector should be allowed to operate in developing these market linkages for which suitable reforms will help. Recently the government allowed foreign direct investment (FDI) in retail, which has been supported by many farmer organizations as well, and it can pave the way for investment in new technology and marketing of agricultural produce in India.[13]

Food production systems can be characterized as *subsistence*, *semi-commercial*, and *commercial*. Most developing countries have witnessed agriculture moving away from traditional self-sufficiency to an activity where *farm output is more responsive to market trends* (Pingali and Rosegrant 1995). The term *agricultural marketing* was defined as early in 1959 as the action of events that bring farm products to their ultimate end use (Collins, 1959).

[13] Economic Survey: 2012-13.

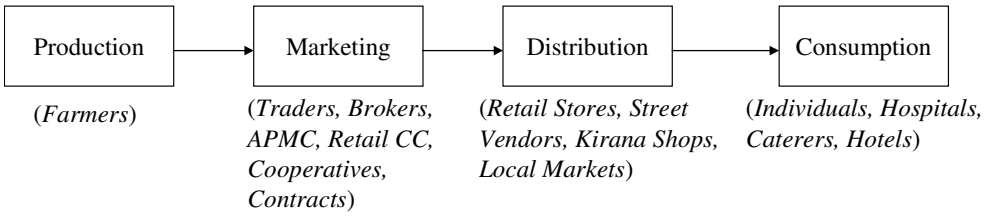


Figure 1.2 Fresh Produce Agri-food Supply Chain

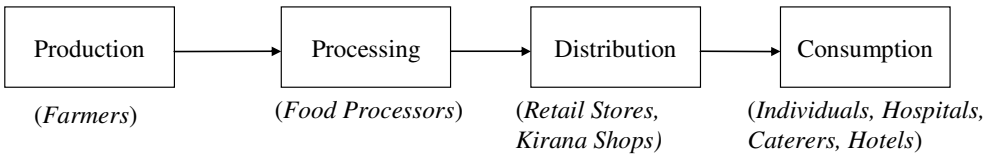


Figure 1.3 Processed Agri-food Supply Chain

Figure 1.2 shows the various stages in the fresh produce agri-food supply chain. The first one is the production stage consisting only of farmers, followed by the marketing stage with various market participants and marketing channels. The third stage is distribution consisting of retailers and small shops that act as venues for consumers to buy the produce. Finally at the consumption stage, the produce is consumed by individual households and enterprise consumers like hotels and caterers. Thus the produce from farmers gets aggregated through the market channels, which then gets distributed through the distribution channels to finally reach the consumers.

It is worth contrasting the fresh produce supply chain with the processed agri-food supply chain, which is shown in Figure 1.3. The only difference is the second stage – *processing* – that converts the fresh produce into processed food and then packaged to be distributed through retailing outlets for final consumption. The processed food manufacturer is the channel master in this supply chain who has much tighter control over the production and distribution. On the other hand, the fresh produce supply chain has no single channel master and is generally fragmented.

The *vertical coordination* mechanisms coordinate the activities between the subsequent stages. The vertical coordination mechanisms between farmers and packaged food producers are widely studied (Szabo and Bardos, 2005; Hobbs and Young, 2001; Frank and Henderson, 1992).

In this work, we focus on vertical coordination mechanisms in marketing channels of fresh produce supply chain. From the schematic shown in Figure 1.1, we focus on the vertical coordination mechanisms between the first two stages: *production* and *marketing*, i.e. between the farmers and the various market participants that directly procure from farmers.

The location selected for our study is Malur. It is located 46 km from Bengaluru, the state capital of Karnataka. Malur is a Taluk in the Kolar District of Karnataka. The agro-climatic and soil conditions are conducive for development of agriculture, horticulture, floriculture, sericulture, plantation crops, aromatic plants and medicinal plants. Malur is an emerging region of fresh produce for the state. For the scope of this thesis, we focus only on marketing of vegetables like: tomato, potato, onion, cabbage, carrot, brinjal, beans, green chillies, sweet potato, khol varieties, ladies finger, radish, beetroot, capsicum, water melon, guord varieties, drum stick, leafy vegetables, etc. The moderate climate enables vegetable cultivation and harvesting throughout the year and caters to various nearby (Bengaluru, Salem, Chennai) and distant markets (Ahmedabad, Kolkata, Bhubaneshwar).

1.4 Vertical Coordination

The coordination of demand and supply of products in the marketing system is necessary for the future viability and growth of the industry as a whole (Kohls and Wiley, 1955). Mighell and Jones (1963) noticed that agriculture was beginning to witness an economic innovation of organizational design that could impact the industry more than future technological innovations. They called the new organizational methods as *vertical coordination* in which the vertical stages of production are controlled and directed.

Vertical Coordination (VC) can be defined as the *alignment of direction and control across segments of a production/marketing system* (King, 1992). The factors that are aligned and controlled in a vertical coordination mechanism are price, quality, quantity, and terms of exchange (Sporleder, 1992). VC in agri-food supply chains is an important and growing phenomenon across the globe (Swinnen, 2005). In the US and Germany, around one-third of agricultural production is produced under contracts. However, vertical coordination differs significantly from rich and poor market economies. In the *dairy and sugar* sectors, extensive contracting arrangements have developed between processors and farms, including the provision

of credit, investment loans, feed, inputs, extension services, bank loan guarantees, etc. In *cotton*, gins typically contract farms to supply seed cotton and provide them with credit, seeds, fertilizer, etc. In *grains*, there is strong vertical integration in Russia and Kazakhstan, where huge agro-holdings produce a large share of the grain crop in some regions. In *fresh fruits and vegetables* modern retail chains, demanding quality and timeliness of delivery, develop supplier contracting with farm assistance programs. Private contractual initiatives have emerged to overcome disruptions of supply and poor public institutions for governing exchange. Traders, agribusinesses and food companies contract with farms and provide inputs and assistance in return for guaranteed and quality supplies.

1.5 Motivation

The structure of Indian agriculture is dominated by small and marginal farmers who constitute 85% of total operational holdings. Most of them are subsistence farmers, who would seek a family food security while producing for the market for cash needs. About 72.3% of the total cultivated area is devoted to food crops and yet the country is just self-sufficient in its food requirements. Indian farmers grow a wide variety of crops both food crops and commercial or cash crops. Yet a very large portion of our crops consist of food grains. Further, the average size of land holdings is very small, with 70% of holdings being less than one hectare in size. The major constraints to agribusiness and commercial agriculture development at the national level are well-documented[14] (Sahni *et al,* 2003). These include: distorted incentive structures, strangle hold of middlemen; inadequate backward and forward linkages; poor infrastructure, especially for storage, marketing; working capital shortage, inadequate outreach of extension services; inadequate institutional credit to farmers; lack of modernization in storage techniques and transportation methods; and lack of processing units of fruits and vegetables. Commercialization of subsistence agriculture implies increased participation of small-scale farmers. The farmers now have access to more marketing channels to sell their fresh produce.

[14] For example, (i) Federation of Indian Chambers of Commerce and Industry. 2002. *Indian Agriculture Unbound: Making Indian Agriculture Globally Competitive*. New Delhi; (ii) Industrial Development Bank of India. 2001. *Value Addition in Indian Agriculture*. Mumbai; and (iii) Export-Import Bank of India. 2001. *Agro and Processed Foods: A Sector Study*. Mumbai.

Commercialization of agriculture can shift the small-scale farmers from self-sufficiency towards profit and income oriented decision making (Pingali, Khwaja, and Meijer, 2005). For a developing country like India, it is generally perceived that small-scale farmers find it difficult to participate in markets because of a range of constraints and barriers reducing the incentives for participation. These barriers and constraints attribute to higher transaction costs associated with commercial agriculture, which deter small-scale farmers from participation.

According to the Agriculture Produce Market Committee (APMC) Act, farmers have to sell the produce at the mandi through auctions which is a fair price discovery mechanism. Minimum Support Price (MSP) is provided only for cereals, pulses and oilseed crops but not for horticulture produce consisting of fruit and vegetable crops. APMCs are authorized to collect Intermediary charges which vary across different states in India.[15] The market fee ranges between 0.5 – 2% of the sale value of the produce. Commission charges range between 1 – 2.5% for food grains, and 4 – 8% for fruits and vegetables. All the above charges plus purchase tax plus weighing charges plus hamal charges together account for around 15% of the sale price. Retailers, food processors, and wholesalers cannot directly buy from farmers. Study conducted by ICAR (2010) shows that the post-harvest losses of various commodities range from 3.9 – 6% for cereals, 4.3 – 6.1% for pulses, 5.8 – 18% for fruits, and 6.8 – 12.4% for vegetables. Various states amended APMC acts allowing: direct buying from farmers; setting up of private mandis; private terminal markets; contract farming. This has led to farmers having various marketing channels to sell their produce. Certain basic questions arise such as: what are the trade characteristics of the different marketing channels?; which category of farmers are benefited from the new marketing channels?; what can we learn from the new marketing channels for future policy implications? The study focuses on common domestic daily consumable vegetables rather than one category of high valued export quality vegetable.

The focus of this thesis is on the marketing of fresh produce by farmers. Specifically we focus on vegetables and daily marketing of vegetables by farmers to the various marketing channels. The marketing channels include both the *traditional*

[15] Agriculture Marketing to Promote Reforms, GoI, 2013.

(spot and terminal markets, traders, cooperatives) and the *new* (retail chains and food processors). The study is initiated due to the following reasons.

1. The crops studied in literature are generally high valued export crops. The retail chains and the supermarkets in India cater to the domestic market competing directly with the *kirana* stores and mobile cart shops by providing commonly consumed vegetables. Thus these domestically consumed day-to-day vegetables too have a value chain that has the potential of integrating small farmers in the agribusiness. Hence the study focuses mainly on daily marketing of common valued fresh produce vegetables.
2. Most of the studies so far are focused on *contract farming*, a specific vertical coordination mechanism which is generally applicable for specialized products that are in early stages of technology adoption or market evolution. Majority of successful trading with farmers happens without any enforceable contracts. Hence, it is required to study all the existing vertical coordination mechanisms and their relative performances with respect to cost and price.
3. Government has commissioned thousands of crores for establishing food parks and mega food parks across the country. Innova Agri Bio Park (Food Park) in Malur, Karnataka is the first and currently functioning food park in the country. Though not functional to its fullest capacity, the current operations of the food park needs to be quantitatively analyzed in order to understand the future of proposed food parks elsewhere in the country.

1.6 Problem Statement

Farmers in general face many uncertainties from production to marketing stage. Rainfall instability, pest attacks, quality of seeds, weather, and so are the factors which are not in control of the farmer most often. Further price fluctuations pose risk in marketing and selling. In the literature production risk has perhaps received quite substantial attention. In our view, marketing aspect has received scant attention, particularly in the changing marketing environment in the Liberalization period, where we say emergence of retail chains. Do the retail chains increase the choice for farmers in marketing, how do they make their choice in alternative marketing channels, what are the determinants of their decisions is the problem that this study undertakes. More particularly, principal crops received adequate attention and crops like fruits and vegetables did not receive the attention that they deserve. This study

undertakes the following: *Do the retail chains increase the choice for farmers in marketing*?; *How the farmers make their choice in alternative marketing channels*?; *What are the determinants of their decisions*?; *Which categories of the farmers are benefited by the new marketing channels*?; and *What are the constraints in the traditional channels that gave rise to the new channels*?.

1.7 Objectives

The main focus of the thesis is on vegetable marketing by *farmers*. However, we take a holistic approach by taking into account the other stake holders like retail chains, food processors, and enterprise consumers. The main objectives of the study are:

1. To understand how fresh produce is marketed by the farmers in India. In other words, to study the vertical coordination mechanisms for marketing the fresh produce.
2. To understand the conceptual models of vertical coordination mechanisms in general and for fresh produce marketing in particular.
3. To identify and characterize the drivers for the farmers, which influence the choice of marketing channel and a point-of-sale – in particular for Malur, which is an emerging region for fresh produce.
4. To understand the impact of *Internet and communication technologies* (ICT) technologies on marketing and transaction costs among the farmers.
5. To analyze the interplay between the competing marketing channels for each of the stake holders: *farmers*, *traders*, *retail chains*, and *enterprise consumers*.
6. To understand the strategic choice and evolution of vertical coordination mechanisms.
7. To explore the options for government policies and interventions.

1.8 Hypotheses

We study the following hypotheses:

1. Mobile technology reduces information search cost for farmers.
2. Retail marketing channels have lower transaction costs.
3. Retail marketing has positive size bias.
4. Quality is the main issue for the creation of retail marketing channels.

1.9 Data Sources and Methodology

The analysis is carried out using the primary data and also from the available secondary data. The methodology adopted for primary data collection is explained in detail in the next section. Secondary data was collected from various government sources at the taluk level, district level, state level, and at the country level as a whole. The variables used are crop area sown, production, and yield for fruit crops and vegetable crops. Time series crop wise data on area, production and yield for India as a whole and Karnataka were collected from *Indian Horticulture Database-2011* and *Horticultural Crop Statistics of Karnataka State at a Glance: 2011-12*. Time series crop wise data on area, production, yield and value for Kolar district and Malur taluk were collected from various issues of *Horticultural Crop Statistics of Karnataka State at a Glance: 2002-12*. Data on Demographics, Agricultural Land Holding Particulars, Land Utilization Pattern, Cropping Pattern and Allied Indicators for Malur taluk and Kolar district were collected from *Kolar District at a Glance: 2011-12*. Data from all the above sources were used to calculate percentage rates and visually chart the trend over the years. Data from various other different sources (including various booklets of the Malur Horticulture Department) were used in description and analysis.

Primary data is used to quantify the different costs faced by the farmers. Production costs for five crops are calculated. The transaction costs across all the marketing channels are quantified and compared. The factors that influence the market selection are identified and their relative importance is measured on five point Likert scale type analysis. Logistic regression is used to understand the participation in commercial agriculture based on farmer category (size of land holding). The PWH decision framework (4 step question framework) is used in five case studies to analyze the strategic choice of vertical coordination mechanisms.

1.10 Sample Survey and Data

To answer specific questions pertaining to certain objectives of the study, the methodology we adopted was primary data collection through in-depth interviews with various players in the Malur fresh produce supply chain. Data were collected and analyzed in three phases over the period September 2009 – August 2012. Firstly, exploratory interviews were undertaken with government officials of Horticulture

and Agriculture Departments at Malur. Other key informants in the supply chain were also interviewed to understand fully the existence of a continuum of vertical coordination mechanisms in Malur. Secondly, 50 in-depth interviews were randomly held among purposively sampled groups of small scale farmers (in terms of size of land holding and length of time they had been supplying their produce to various collection centers) and officials of various collection centers at Malur. The intention of the in-depth interviews was to identify the widest range of experiences of the farmers and their initial motivations for the choice of marketing channel(s) to sell their produce. The interviews were conducted using a sample questionnaire. In the third stage, eight questionnaires were designed on the basis of analysis of the in-depth interview data and elicited through personal interviews with a sample of 304 people, including:

- 259 farmers (Random Sampling comprising of: Marginal, Small, Semi-Medium, Medium and Large farmers) from the following 7 gram panchayats (out of 28 gram panchayats): Abbenahalli, Araleri, H. Hosakote, Kudiyanur, Madiwala, Nosagere, and Santhehalli;
- Officials of collection centers of Reliance Fresh, More Store, Heritage Retail, Namdhari Fresh (Contract Farming), HOPCOMS (Cooperative), and Innova Agri Bio Park (Food Park);
- Traders, wholesalers, and transport agents;
- Officers of Malur Horticulture Department, and Malur Agriculture Department;
- Institutional consumers (Hoteliers, Hospitals, and Caterers from Bengaluru).

The questionnaires involved collection of a wide range of information on the characteristics of the surveyed farmers, problems encountered in marketing, transaction costs in terms of waiting, time spent, preferences over alternative mechanisms, knowledge levels of different marketing channels, impact of collection centers, etc., which are described in the core chapters (Chapters 4 – 6) in detail. The interviews were also audio recorded and later transcribed to facilitate analysis.

1.11 Analytical Framework

In this study, we have largely drawn from the *new institutional economics*, in particular, *transaction cost economics* to analyze the vertical coordination

mechanisms. Oliver Williamson coined the phrase the new institutional economics (NIE) (Coase, 2000) that considers the cost of transacting - determined by institutions and institutional arrangements - is the key to economic performance. The most commonly agreed upon definition for institutions is a set of: *formal* (laws, contracts, political systems, organizations, markets, etc.), and *informal* rules of conduct (norms, traditions, customs, value systems, religions, sociological trends, etc.) that facilitate coordination or govern relationships between individuals or groups. Institutions affect the economic growth, which in turn affects the institutional arrangements and hence the institutions. Thus NIE studies both institutions and economic development.

According to NIE, the cost of transacting is the key to economic performance. In developing countries like India, it is so costly for traders to interact and engage in various kinds of economic activities that results in poor performance and inefficient outcomes. For example, a recent study done at IIM Bengaluru reveals that the customers pay Rs. 8.2 for per kg of tomato at a retail store in Bengaluru which was originally sold at the farm for Rs. 2 by the farmer. Since institutions and the institutional framework provide the incentives for efficient production and for people to engage in economic activity, an institutional analysis is required to explain why the cost of transacting is so high (Kherallah and Kirsten, 2001). Thus NIE is an appropriate framework to analyze the vertical coordination mechanisms in the agri-food supply chains.

NIE is a multidisciplinary field and its branches include *new economic history, political choice and political economy, new social economics, theory of collective action, law and economics, transaction cost economics, economics of information,* and *property rights.* Kherallah and Kirsten (2001) give a comprehensive summary of potential contributions of the above to the agricultural policy research in developing countries like India. Our focus is on the *transaction cost economics* (TCE).

The neoclassical analysis of production and distribution assumes that the operation of markets is costless. But economic transactions do not occur in a frictionless vacuum - the buyer and seller incur costs in conducting a transaction. Transaction costs include the costs of gathering and processing the information needed to carry out a transaction, of reaching decisions, of negotiating contracts, and of policing and enforcing those contracts. Thus the focus here is on the costs of doing business.

The transaction costs could arise because of information asymmetry, bounded rationality and opportunism. Transaction costs may arise *ex ante* and *ex post* to a transaction. *Ex ante* transaction costs include costs such as information or sorting costs which arise because of the cost involved in gathering information. Costs may also arise during the transaction called as negotiation costs. These costs include the costs of determining contractual terms. *Ex post* costs include monitoring and enforcement costs.

Institutions are basically designed to be transaction cost *minimizing* arrangements, which may change and evolve with changes in the nature and sources of transaction costs. Central to transaction cost economics is the costliness of information. Thus TCE and economics of information are interrelated. TCE seeks to understand the interplay between institutional factors and market and non-market exchange under positive transaction costs.

The thesis focuses on both *operational* and *strategic* aspects of fresh produce marketing. On the operational front, we are looking at the choice of the marketing channels for daily marketing (selling) of fresh produce. We use TCE for studying operational decisions as the *transaction costs* capture the various cost components related to the trade. Using TCE we test the hypotheses stated earlier.

The *strategic* benefits of continuing with the current choice of coordination mechanism or adopting a new mechanism cannot be sufficiently handled through transaction costs alone. Based on the deep understandings offered by TCE, Peterson, Wyoscki, & Harsh (2001) developed the PWH framework for addressing coordination strategy decisions. We use the PWH framework to analyze the strategic coordination choice of various stake-holders, including farmers, traders, retailers, and enterprise consumers.

1.12 Limitations of the study

Constraints on time and resources of the researcher forced to select only one taluk for the study. Hence, results are largely applicable to those areas only where similar conditions prevail. The personal interview method of data collection requires the respondents to recall from their memories about production and marketing of produce. Hence, the findings may be subjected to errors in memories of respondents.

Transaction costs can be defined generically and are not restricted to the marketing stage. Indeed, transaction costs in agriculture can be classified as

production costs and *marketing* costs. The study however focuses only on the marketing costs, and hence the outcomes have to be analyzed with the awareness that production costs are not factored in the analysis. While the analysis of production costs would be useful, it is also practically difficult for a large variety of vegetables. Production costs of only five varieties of vegetables were analyzed in detail in the present study. As market channels accept different varieties of vegetables, calculation of marketing costs are generally not crop-specific. But production costs are crop specific and the production costs data for all the varieties of produce could not be obtained from the field study.

While studying the marketing channels, the influences of *input* factors (land lease, finance) on marketing were not considered explicitly. The exception is for contract farming, where the retailer (Namdhari Fresh) provides inputs to the farmer as per the contract and the farmer sells the produce to the retailer at the pre-negotiated price. There is a possibility of *input-market* linkage in other vertical coordination mechanisms as well, which were not explicitly explored in the study.

Several studies in analyzing marketing costs (NCAP, 2010; Singh and Singla, 2010) consider the entire marketing supply chain from the producer (farmer) to the consumer in the analysis. In our work, we primarily focus on the vertical coordination mechanisms between the farmer and the immediate buyers from the farmers' perspective. The study does consider other stake holders in the marketing chain like institutional buyers, but the focus of the study is not on marketing supply chains, but on vertical coordination between the farmers and the immediate successive stage in the marketing supply chain. Another constraint of the study is that the marketing costs are not evaluated crop-wise. As the study location Malur caters to around 58 varieties of vegetables all through out the year, the time and resource limitations constrained the study to consider costs common across the crops.

Constraints on secondary data availability limited the analysis of shift in cropping pattern from food grains and emergence of horticulture crops cultivation in Malur taluk and Kolar district in the last 30 years. The trends in area, production, yield, and value of fruit and vegetable crops are only analyzed from 2002-2012 in Malur taluk and Kolar district.

1.13 Contributions and Practical Utility

The study first identifies and maps the vegetable marketing supply chain in Malur. The mapping identifies the marketing channels, all the stake holders and their roles. For each of the marketing channel, the transaction costs faced by the farmers are identified and calculated. Though the concept of transaction costs is well accepted, identifying and quantifying transaction costs are difficult for empirical research (Shelanski and Klein, 1995). All transaction costs are not tangible and all tangible costs are not monetary. Further, a cost would have multiple dimensions. The resulting calculations would help understanding marketing dynamics, and the methodology itself could be useful for related studies.

The study identifies the various factors and their relative importance that influence the choice of the buyer for selling the daily produce by the farmers. Such a ranking would be useful for policy implications and also for retailers to deploy new vertical coordination mechanisms. While studying information search related transaction costs, the analysis showed the role of mobile phone technology in reducing information asymmetry. This provides practical evidence for agri related industries to invest in technology for information sharing and trade with farmers.

Additional cost faced by farmers in selling through multiple channels is explained through the notion of *apportionment cost*. This cost turns out to be a significant factor to enable fair market participation that provides opportunities for marginal and small scale farmers. Current supply and demand dynamics in Malur makes the apportionment cost high for large scale farmers, thus naturally supporting small scale farmer participation in commercial agriculture. The notion of apportionment costs can be of particular interest in other markets to create fair participation.

The study of strategic choice of the vertical coordination mechanisms using PWH framework identifies and maps marketing channels in Malur on the continuum of mechanisms from *open markets* to *vertical integration*. The case studies identify the dominating factors that influence the existence or non-existence of different mechanisms including retail collection centers and contract farming. The results of the case studies can be used by retailers and other stake holders to improve the current trading mechanisms.

1.14 Organization of the Thesis

The thesis is organized in seven chapters. Chapter 2 discusses the literature review on *Vertical Coordination and Agri-Food Retail Chains*. Chapter 3 explores the *Horticultural Scenario of Malur Taluk*. *Fresh Produce Marketing Channels of Malur* are studied in Chapter 4. Chapter 5 is devoted to *Decision Making under Alternate Marketing Channels: Transaction Cost Analysis* that analyzes the marketing channels for daily selling of vegetables based on the transaction costs faced by the farmers. Daily choice of marketing channel for selling by farmers is an *operational* decision. The *Strategic Choice of Vertical Coordination Mechanisms* faced by different stake-holders in Malur vegetable marketing is analyzed using PWH framework in Chapter 6. Finally, the summary is presented, conclusions are drawn and policy recommendations are suggested in Chapter 7. At the end, list of literature referred for the study has been presented. The eight questionnaires used for personal interview method of data collection are attached in the appendix.

2. Vertical Coordination and Agri-Food Retail Chains - A Review of Theory and Evidence

Retail chain in agricultural marketing is an emerging marketing phenomenon in India which is expected to bring substantial changes in the way farmers may sell their output. The genre known as vertical coordination in the literature that seeks to reduce transaction costs and integrate producers and consumers is the focus of this chapter. The chapter reviews the literature related to vertical coordination in agri-food supply chains and marketing. The chapter is organized as follows. Section 2.1 briefly introduces the notion and definition of vertical coordination. Section 2.2 focuses on vertical coordination in agri-food supply chains. Vertical integration, which is a special form of vertical coordination, is reviewed in Section 2.3. The theoretical approaches to studying vertical coordination mechanisms are reviewed in Section 2.4. Transaction cost analysis is predominantly used in this thesis for studying the vertical coordination mechanisms observed in the study location Malur. Section 2.5 reviews transaction cost analysis approach to vertical coordination. The vertical coordination in Indian agri-food marketing scenario is reviewed in Section 2.6. Section 2.7 concludes the chapter.

2.1 Vertical Coordination

Vertical coordination is defined broadly as various methods used to manage vertical stages in a marketing channel. Vertical coordination refers to the means by which products move through the supply chain from production to consumption. It encompasses a continuum of possibilities from open market spot transactions at one extreme, through to full vertical integration at the other, but includes intermediate forms such as strategic alliances, joint ventures, contracting etc. (Mighell and Jones, 1963).

Vertical coordination has been an important topic in the agricultural marketing literature since the beginning of the industrialization of agriculture. Since agricultural markets have become more differentiated, contractual relations are gaining more importance as open market transactions does not always prove to be the most appropriate form for the exchange of goods. Most of the theoretical work in agricultural marketing has focused on the two ends of the continuum, i.e., spot

markets and vertical integration (Peterson and Wysocki, 1997). Many researchers have attempted to explain vertical coordination within agriculture (Sporleder, 1992; Barry, Sonka, and Lajili, 1992), with gaining importance on contractual relations (Szabo and Bardos, 2005).

In late 1950s vertical coordination started to receive the attention of agricultural economists. The factors increasing vertical coordination included the level of risk faced by agricultural producers, changes in technology, and increased needs by farm operations for capital and managerial skills. A high degree of coordination existed between the producers and processors of specialty products due to their limited market and an uncompetitive market structure in 1950s and 60s. Perishable commodities, such as fruits and vegetables for processing, had closely managed supply chains since the beginning of those industries. Efficient use of plant capacity and stringent quality requirements for processing are given as reasons for these close vertical relations. The supply chains of major storable commodities, such as corn, wheat, cotton, rice and peanuts, did not develop closer vertical relations at that time because these commodities were durable and amenable to storage.

2.2 Vertical Coordination in Agri-Food Supply Chains

In 1960s, agriculture was beginning to witness an economic innovation of organizational design that could impact the industry more than future technological innovations. They called the new organizational methods as vertical coordination. The failure of open market prices to guide adjustments in production and distribution asserted that there is no single simple theory for why firms integrate or coordinate via contracts, instead there are many economic and non-economic considerations to aid in explanation. Among them are reducing risk, uncertainty and costs, improving management, improving market position, gaining bargaining power, developing new technology, or obtaining financing (Mighell and Jones, 1963). As the system becomes more responsive, traditional relationships among producers, especially how they communicate consumers demand also change. The emergence of contracting and integration created new communication methods that increased the ability to transmit consumer demands to food producers (Barkema, 1993). As a result, markets started shifting from external coordination toward vertically coordinated contracts and integration. The need for more exacting quality control in specially designed products, flow scheduling and capacity utilization to control costs, reduction of price

risk exposure with input and product sales, and food safety concerns strained the ability of spot markets to coordinate the food chain (Boehlje and Schrader, 1988).

Vertical coordination became a renewed subject of investigation by agricultural economists in the 1990s. Consumer demand for food quality and diversity has been a pivotal factor in increasing vertical coordination in the food industry (Kinsey, 1997). Food markets in developing countries are undergoing profound changes fuelled by economic development, increases in per capita incomes, changing technology, and urbanization. Higher incomes and increasing numbers of women in the labour force mean greater demand for high-value commodities, processed products, and pre-prepared foods. Consumers are willing to pay more for food safety standards to minimize risk. With increase in income consumer preferences for quality and process attributes change that makes it critical for the firm to have a stable and assured supply of ready-to-cook convenience foods. Provision of adequate information to consumers about the inherent quality of the product is achieved in a variety of ways, including branding, product and firm reputation, and labelling. Consumer concerns over food safety, coupled with the need to meet quality regulations and the rise of process characteristics as a more important consumer concern, give firms a strong incentive to enhance their knowledge of and control over the supply chain. Trade in agricultural products has also been an important factor in increased vertical coordination in agricultural supply chains. Urbanization increases the scope for economies of scale in food marketing and distribution, while reductions in transaction costs increase the size of the market for distributors and retailers (Pingali et al, 2005). While economic growth and diet diversification have been the driving forces of agricultural commercialization, the move toward integration into the agri-food system is induced by globalization trends. Globalization has resulted in the rapid growth of world trade, internationalization of production by multinational corporations, and declining informational and communications costs associated with information technology. The potential trade benefits for agriculture arise from two aspects. The first stems from the possibility of direct increased exposure of agriculture to international competition. The ability to access global markets and specialize in areas of comparative advantage could yield high gains for this sector. The second stems from the indirect effects of increased international trade on the growth of non agricultural sectors, changing the domestic demand for agricultural goods both quantitatively and qualitatively (Pingali and Khwaja, 2004).

Members of many agri-food supply chains have moved towards *closer* vertical coordination for five reasons (Hobbs and Young, 2001):

- To produce and deliver in a timely fashion the quality attributes demanded by the consumer;
- To communicate these attributes, many of which are invisible, to the consumer;
- To ensure that members of the supply chain are compensated for the costs involved;
- To meet regulatory requirements, both health and environmental; and
- To meet associated concerns about liability.

Vertical coordination in agri-food supply chains is an important and growing phenomenon across the globe. In the US and Germany, around 1/3 of agricultural production is produced under contracts. However, vertical coordination differs significantly from rich and poor market economies. In the *dairy and sugar* sectors, extensive contracting arrangements have developed between processors and farms, including the provision of credit, investment loans, feed, inputs, extension services, bank loan guarantees, etc. In *cotton*, gins typically contract farms to supply seed cotton and provide them with credit, seeds, fertilizer, etc. In *fresh fruits and vegetables* modern retail chains, demanding quality and timeliness of delivery, develop supplier contracting with farm assistance programs. In *grains*, there is strong vertical integration in Russia and Kazakhstan, where huge agro-holdings produce a large share of the grain crop in some regions. Private contractual initiatives have emerged to overcome disruptions of supply and poor public institutions for governing exchange.

Traders, agribusinesses and food companies contract with farms and provide inputs and assistance in return for guaranteed and quality supplies. Successful vertical contracting typically includes conditions for product delivery, prompt payments, and farm assistance programs for suppliers. Farm assistance can include input supply programs, investment assistance, trade credit, bank loan guarantees, extension and management advisory services, etc. The search for quality is a key engine of vertical coordination. The shortage of quality supply, which is typical of

transition countries, induces vertical coordination and spillover effects through farm support packages.

Successful vertical contracting has important positive effects, both direct and indirect. The direct impact is on *increased output and productivity* of the processing company that initiates vertical contracting. Indirectly, contract support measures have positive effects on *farm productivity and product quality*. Measures with the greatest impact on yields were specialist storage (cooling equipment in dairy), veterinary support and physical inputs. Prompt payments, guaranteed prices, and market access also had large positive effects. *Quality* of output improved strongly in response to specific programs. Direct loans and loan guarantee programs stimulated farm *investments*. Programs which assist farms in accessing inputs (mainly feed) enhance investment indirectly by lowering input costs, or reducing transaction costs in accessing inputs, improving profitability (Swinnen, 2005).

There are three basic types of vertical co-ordination in US Agri-food systems: *open marketing*, *contract production and marketing*. *Integration* through investments in food and agribusiness firm's stock or new generation co-operatives and purchases of a delivery right are observed. The food industry has traditionally operated in an open marketing system. In this system a firm purchases a commodity from a producer at a market price determined at the time of purchase. A firm commits to purchase a commodity from a producer at a price established in advance of the purchase by using contract production (Boland, 2002).

Vertical relations are structured to give firms control over production processes and inputs along the supply chain. Control is important for firms who need an input to meet their obligation to the next stage of production. Issues of liability for supply chain members and the motivation to meet health, safety, quality and environmental standards also figure prominently in the need for control. Closer vertical relations between firms facilitate the flow of information to the producer on four issues*: the traits that consumers desire, production processes and new technologies*, *the amounts to be produced*, and *the scheduling of production*. These relations also provide information to consumers over the health, safety and process attributes of the good. Closer vertical coordination can help to assure firms that a market will compensate them for the production of a highly differentiated good. Contracts are one way to assure farm operators that their specialized product will be sold to a customer that values its characteristics rather than through the bulk market (Hobbs

and Young, 2001). In the next section, we review the literature related to vertical integration, which is one form of vertical coordination.

2.3 Vertical Integration in the Agri-Food Sector

The agricultural economics literature of the 1950s and 1960s often used the terms *vertical integration* and *vertical coordination* interchangeably (Hobbs and Young, 2001). Vertical integration is a method of vertical coordination representing the greatest degree of control that a firm can gain over the output from another stage of production. Coordination of two or more stages occurs under common ownership and management. The incentives for integration may arise either from producers or from buyers further down the marketing chain who realize an opportunity to enhance potential returns or reduce risk. For example, a producer (or group of producers) may vertically integrate downstream (forward in the marketing channel) to ensure a market for commodities and to have an opportunity for a greater return on equity. By doing so, producers may enhance returns by lowering transaction costs and by using management and other resources more efficiently.

Risk may also be reduced by guaranteeing a market outlet and by avoiding the uncertainties of selling and purchasing immediate commodities in imperfect markets. Conversely a producer may vertically integrate upstream (backwards in the marketing channel) to exercise greater control over the quality and timing of deliveries and the quality of inputs used in the production process. Again, reduced risk and/or greater returns may result. Thus the ability to secure dominant share in these input or output markets is critical for the success of integration.

The two leading theories of vertical integration are the *Transaction Cost Economics* (TCE) approach of Williamson (1975, 1985) and the *Property Right Theory* (PRT) approach of Grossman and Hart (1986) and Hart and Moore (1990). Both approaches emphasize the importance of incomplete contracts and ex post opportunistic behaviour (hold up) on ex ante relationship-specific investments. The TCE approach views vertical integration as a way of circumventing the potential hold-up problems, and thus predicts that vertical integration should be more common when there is greater specificity and hold up is more costly. The PRT approach, on the other hand, focuses on the role of ownership of assets as a way of allocating residual rights of control, and emphasizes both the costs and the benefits of vertical integration in terms of ex ante investment incentives (Acemoglu, et.al., 2005).

Vertical integration is a unified structure, where the transaction is removed from the market and organized within the firm. Vertical integration is the result of market failure (Williamson, 1971, 1979). Williamson has classified certain other issues which are related to why a company may become integrated, which he shows as being incentives for integration. These all come under *market failure* considerations and areas follows:

- monopolistic supply in static markets;
- contractual incompleteness caused by product changes;
- contractual incompleteness problems caused by both *ex site* and *ex post* incompleteness;
- anti-competitive consequence of vertical integration – price discrimination and entry barriers;
- information processing effects – information impactedness, observational information economics and consequence of expectations (co-ordination resources);
- institutional adaptation – simple economic and extra-economic (risk aversion).

Williamson's theory applies to the production stage of the value chain[16]. The principal difficulty in application of this approach is the accurate estimation of transaction costs, since costs will be different in the long term than the short term, and the full cost consequences of integration decisions are extremely difficult to forecast. Hence the transaction cost approach is inherently limited. Incomplete contracts per se do not necessarily lead to market inefficiencies. It is the interaction between contractual incompleteness and certain attributes of transactions that can lead the parties to a trading relationship to become *locked-in* to the relationship once the relationship is consummated. This in turn can lead to adaptation problems that can adversely affect ex ante investment incentives and the ex post efficiency of the trading relationship.

The relationship between vertical integration and risk is twofold (Bernhardt, 1977):

[16] The value chain is the processes carried out by a company in order for it to achieve its objectives.

- Uncertainty in the market that the company operates within;
- Uncertainty within the market from which the company receives its factors of production.

When a great deal of risk or uncertainty surrounds the supply of factors of production to a company, there exists an incentive for the company to backward integrate in an attempt to eliminate such risks (Green, 1974; Carlton, 1979). On the other hand, when there is uncertainty in the market that the company operates in, it is suggested that the company should not vertically integrate. This ensures reduced risk to the investment in the company (Harrigan, 1983).

2.4 Theoretical Approaches to Vertical Coordination

The factors that determine vertical coordination come from a variety of theoretical approaches. TCE literature provided by Coase (1937) and Williamson (1979) is central to the theoretical framework of the thesis. The *Transaction Cost Economics Theory* is complemented by literature in the areas of *Agency Theory, Competency Theory, Strategic Management Theory,* and *Convention Theory*. These theoretical approaches are summarized below for a better understanding of vertical coordination in agri-food sectors.

2.4.1 Transaction Cost Economics

Transaction cost economics (TCE) recognizes that transactions do not occur in a frictionless economic vacuum. The genesis of TCE was provided by Coase (1937) in his paper "The Nature of the Firm." When we relax the neoclassical assumption of perfect information, costs arise from using the market mechanism. Costs may arise *ex ante* and *ex post* to a transaction. *Ex ante* costs include costs such as information or sorting costs which arise because of the cost involved in gathering information. Costs may also arise during the transaction called as negotiation costs. These costs include the costs of determining contractual terms. *Ex post* costs include monitoring and enforcement costs.

Four key concepts distinguish transaction cost economics from the traditional neoclassical theory of the firm: *information asymmetry, bounded rationality, opportunism and asset specificity. T*he assumption of perfect information is relaxed, allowing for information asymmetry between transacting partners. Transaction costs

are incurred in reducing the risks the parties face, as a result of moral hazard and adverse selection. TCE recognizes that individuals exhibit bounded rationality. *Bounded rationality* means that parties in a transaction will agree to a contract or a trading mechanism that is in their best interests, without having perfect information regarding the other party. Bounded rationality can increase transaction costs in situations of complexity and uncertainty. Because of information asymmetry and bounded rationality, individuals are not able to determine with certainty whether a transaction partner will act opportunistically. *Asset specificity* also creates transaction costs. These costs arise when one party to a transaction makes an investment in an asset specific to the requirements of another party, with little or no value in alternative uses. Asset specificity includes *site specificity, physical asset specificity, human asset specificity, dedicated assets and brand name capital* (Williamson, 1986).

Williamson (1979) further developed Coase's concept and created modern TCE theory. He also pointed that firms choose the governance structure that minimizes cost. His work described the basic behavioural assumptions of TCE and the fundamental properties of transactions. The first main assumption of TCE is that *parties in a transaction exhibit bounded rationality*. He has identified three dimensions for transactions: *Uncertainty,* the *frequency* with which transactions recur, and the degree to which *transaction-specific investments* in capital (both human and physical) are incurred. He related the above dimensions of a transaction to the governance structures one might expect to see emerge, from "classical contracting" (spot markets) at one end of the spectrum, to unified governance (vertical integration) at the other. He has further described three types of governance structures of transaction: *market governance*, *trilateral governance*, and *transaction-specific* (bilateral and unified) governance. In bilateral governance structures the autonomy of the parties are maintained.

In case of unified governance structures transactions are removed from the market and are organized within the firm. Partnerships and alliances are examples of bilateral structures, whereas unified structures involve complete vertical integration. Furthermore he classified frequency of transactions into three categories: one-time, occasional and recurrent. Transaction specific investments are divided into three classes: non-specific, mixed (semi-specific) and idiosyncratic investments. Transactions that do not require specific investments in capital are termed as non-

specific transactions. Whereas transactions that require an extremely high level of specific investments are termed as idiosyncratic transactions.

A low level of uncertainty lends itself to spot market transactions. But, when aspects of the transaction are uncertain, spot markets may result in higher information and monitoring costs, consequently closer forms of vertical coordination (such as long-term contracts, strategic alliances or full vertical integration) are predicted. In the absence of asset specificity, hold-up problems are not important and spot market transactions may suffice. With the increase in asset specificity, however, we move to more formal vertical coordination alternatives. We will explore this further in the fresh produce marketing studied in this thesis.

2.4.2 Agency Theory

Agency Theory is defined as the economic analysis of cooperation in situations where externalities, uncertainty, limited observability, or asymmetric information exclude the pure market organization[17] (Bamberg and Spremann, 1987). Agency theory basically focuses on the contractual relationship between two parties, in which the agent performs tasks for the principal. The optimal contractual relationship depends on the information, negotiation, monitoring, and enforcement costs involved in creating an incentive structure which sends the right signals to the agent.

The problem of information asymmetry occurs when the agent knows more about its own activities than the principal. Agency theory can be broadly separated into two branches: *positivist theory* and *principal agent theory* (Sauvée, 1998). Positivist theory (Jensen and Meckling, 1986) which is descriptive is mainly concerned with the governance mechanisms of contracts, while principal-agent theory (Grossman and Hart, 1986) develops quantitative models for the contractual optimum. The principal can face the risk of adverse selection due to ex ante opportunism which arises from hidden information. Also there is a risk of moral hazard for the principal due to ex post opportunism arising from the hidden actions of agents.

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[17] The "pure market organization" can be defined as the spot market where the price system works smoothly (Mahoney, 1992) and no vertical coordination exists.

The study of the contracting problem using agency theory is often termed as a study of incentives. The theory assesses the optimal contractual relationship between principal and agent, given information asymmetry and relative degrees of risk aversion. It also enhances our understanding of how and why different contractual relationships evolve. But the theory has less to say about the *bigger picture* of how different vertical coordination systems evolve and why strategic alliances and closely managed supply chains (or *value chains*) are evolving in some sectors.

Agency theory complements the transaction cost approach to the theoretical framework. It provides explanations for inefficiencies stemming from incentive problems when using more coordinated contracting and vertical integration. Contracting efficiencies exist for *producer-oriented firms* (POFs) compared to *investor-owned firms* (IOFs) because the principal-agent relationship entails less incentive to withhold information and more trust when producers contract with a firm that they own and control (Sykuta and Cook, 2001).

2.4.3 Competency Theory

Competency theory also complements the transaction cost approach. It explains vertical coordination inefficiencies that exhibit themselves through production costs. Competence theory, as described by Hodgson (1998), is that on the margins of a firm's increasing scope, firms may not be as competent, and therefore, may not be as cost efficient as a firm that specializes in that given task. He explains the situation as follows: the contractual approach (including transaction cost economics and agency theory) is centred on information asymmetries in a world of uncertainty and bounded rationality. Different firms have different *skill sets*.

Core competencies of a firm influence its activities and provide motivations for different types of vertical relations. Knowledge central to the competency approach: *codifiable knowledge, tacit knowledge and distributed knowledge* (Sachwald, 1998). *Codifiable knowledge* is information which can be specified in formulas and designs, can be patented and can be transferred between firms by exchanging ownership rights. *Tacit knowledge* cannot be described and specified in well codified forms (e.g., much knowledge about production is tacit because it is acquired gradually over time in a process of learning-by doing). Some of the production knowledge is *distributed knowledge* i.e., it is valuable only if used in conjunction with the knowledge of others (Langlois and Foss, 1997).

Transferring tacit knowledge between firms is complex, subject to uncertainty and creates high transaction costs. Therefore it provides a motivation for closer vertical relations, cooperative agreements, joint ventures or a within-firm transfer of knowledge in a vertically integrated firm (Sachwald, 1998). The competency theorists argue that when transactions are organized as a series of market exchanges between independent self-producers, the transmission of information and knowledge between these individuals is impeded.

Firms emerge in circumstances in which they are able to coordinate the collective learning process more efficiently than is possible through open market transactions. Competency theory suggests that the technological capabilities of the firm determine its boundaries. TCE theorists take a static equilibrium approach, while competency theorists view the evolution of an industry as a dynamic, disequilibrium process.

2.4.4 Strategic Management Theory

The strategic management theory considers questions of vertical coordination within the context of firm strategies to attain or improve competitive advantage. The focus is on internal firm strategies and internal organizational issues rather than the inter-firm, industrial structure focus of the organizational economics literature (transaction cost economics, agency theory, etc.) (Hobbs and Young, 2001). Mahoney (1992) reviews the reasons for and against vertical integration, as well as provides a framework for predicting organizational form. He classifies the motives for closer vertical relations between firms (focussing mostly on full vertical integration) into four groups: *transaction cost considerations, strategic considerations, output and/or input price advantages,* and *uncertainties*. *Transaction cost considerations* include *information asymmetry, bounded rationality, opportunism* and *asset specificity*. Whereas the *strategic considerations* include: *creating barriers to entry*, *increasing the rivals' costs* (by restricting the number of suppliers and by increasing the capital requirements of market entry), and *mitigating the impacts of regulatory price control* (through the use of transfer pricing in a vertically integrated firm). The output and/or input price advantages suggest that firms vertically integrate to "jointly" profit maximize over successive production stages, avoiding monopoly prices charged by upstream firms.

Mahoney (1992) also reconciles two apparently conflicting empirical findings regarding the impact of increasing uncertainty on vertical integration. According to Williamson (1979), an increase in uncertainty leads to more vertical integration, when assuming the level of asset specificity remains constant. This view is essentially a *comparative statics* argument. Whereas, Harrigan (1983) found that increasing uncertainty led to less vertical integration. Over time the presence of uncertainty may lead a firm to utilize less firm-specific assets, such that less vertical integration is observed in the long-run.

While much attention has been paid to the advantages of vertical integration, less attention has been given to the disadvantages of vertical integration. The disadvantages are classified by Mahoney (1992) into three categories: *bureaucratic costs, strategic costs,* and *production costs*. *Bureaucratic costs* include a range of managerial diseconomies related to the increased costs of coordination, control and communication within the firm. *Strategic costs* include the loss of access to information and tacit knowledge previously gained through relationships with experienced suppliers, a decrease in strategic flexibility and high exit barriers. *Production costs* include economies of scale considerations in the use of inputs, i.e., failure to use sufficient quantities of vertically integrated input results in production of that input at less than minimum efficient scale (Hobbs and Young, 2001).

One of the implicit assumptions in the transaction cost framework is that the costs are the primary drivers of transaction cost decisions, while benefits, particularly strategic benefits, are not considered. Based on the deep understandings offered by transaction cost economics, Peterson, Wyoscki, and Harsh (2001) developed an approach known as the *PWH* framework for addressing coordination strategy decisions. The main objective of the PWH theoretical framework is to identify the critical factors in the decision making process that lead to selection of coordination strategies. The framework is based on a continuum of coordination strategies that range from low to high levels of intensity of control. At both the end of the continuum are the familiar coordination mechanisms of *spot markets* and *vertical integration*. The intensity of control is least at the spot market transactions and is extremely high for vertical integration at the other end. In between the two extremes are *specifications contracts*, *relation-based alliances*, and *equity-based alliances*, with increasing intensity of control. PWH hypothesize that managers are motivated

to adopt a new coordination strategy when an existing strategy results in unacceptably costly coordination errors.

2.4.5 Convention Theory

Convention theory incorporates a political economy approach to the study of vertical coordination. However, the theory provides insights into the *middle ground* between open market transactions and hierarchies. (Sauvée, 1998) considers conventions as *"a set of mechanisms and rules that involve private agents as well as public institutions"*. The focus of convention theory has been on the solutions for quality uncertainty. In markets with perfect information, quality can be assessed easily and prices reflect all relevant quality characteristics.

When uncertainty about quality is introduced in the market, then, quality conventions are necessary to help coordinate that transaction. There are *four types of coordination* to provide appropriate quality: *domestic coordination* which relies on trust and long-term relations built on reputation, *industrial coordination* in which an independent third party defines a set of norms or standards, *market coordination* which will suffice in the absence of uncertainty over quality, and *civic coordination* in which there is a collective commitment to avoid conflicts in the absence of uncertainty.

When high uncertainty exists, then, domestic coordination will prevail (where quality can be defined internally to the relationship through brand reputation or trust). But in cases where the quality is best determined by externally established standards or specifications, industrial coordination will prevail. With the increase in demand for differentiated agricultural products and the level of competition, the need for new quality standards and more flexible price discovery mechanisms gives way to industrial/market coordination. An important lesson from convention theory is that the wider institutional environment can influence contract terms—e.g., whether there are independent third party standards on which to base a contract—and should therefore be included in any analysis of vertical coordination (Sauvée (1998); Hobbs and Young, 2001).

The preceding discussion is a summary of some of the pertinent theoretical approaches to the analysis of vertical coordination in agriculture. Indeed, it is probably the case that a comprehensive analysis of the changing nature of vertical coordination needs to draw on all of these theoretical approaches. As we will be

using transaction cost approach predominantly in this thesis, we review next the transaction cost analysis of vertical coordination in agri-food marketing.

2.5 Transaction Cost Analysis of Vertical Coordination in Agri-Food Marketing

The issue of transaction costs has always figured in agricultural markets. In many instances they explain missing markets—for example, in credit markets (Besley 1994), labor markets (Bardhan, 1980), and land (Carter and Mesbah, 1993) as well as the product markets (Stiglitz, 1998; Holden and Binswanger, 1998). Such failures can result in alternative institutional arrangements (Binswanger and Rosenzweig, 1986; Timmer, 1997) such as sharecropping and interlinked markets (Bardhan, 1980; Braverman and Stiglitz, 1982; Binswanger, Khandkar, and Rosenzweig, 1993). Williamson (1979, 1993, 1996) defines transaction costs as a trade-off between the costs of coordination within an organization and the costs of transacting and forming contracts in the market. That trade-off will depend on the magnitude of the transaction costs. According to the seminal work of Coase (1937), it is precisely because of the presence of transaction costs associated with information, negotiation, monitoring, coordination, and enforcement of contracts that intermediary firms emerge to economize on such costs. A substantive volume of literature has been built on this work and applied to agricultural markets.

Building on Coase's work, Hobbs (1997) classified transaction costs into information, negotiation, and monitoring or enforcement costs. Information costs, for example, arise ex ante of an exchange. Negotiation costs are the costs of physically carrying out the transaction, while monitoring costs occur ex post of a transaction and include the costs of ensuring that the terms of the transaction (quality standards and payment arrangements) are adhered to by the other parties involved in the transaction. Others have distinguished transaction costs between tangible (transportation costs, communication costs, legal costs, etc.) and intangible (uncertainty, moral hazard, etc.) costs (Cuevas and Graham, 1986; Holloway et al, 2000; Birthal, Joshi, and Gulati 2005). In addition to the above, with the rise of modern food systems, a new set of transaction costs has arisen because of the standards required in terms of quality, size, and delivery. Private companies, in order to capture markets and differentiate their products, put ever more stringent conditions on suppliers. Customers are increasingly willing to pay for product attributes that

include convenience, taste, variety, high quality, and low caloric intake (Napier, 2001).

Transaction costs are faced by all in the food system. We focus in particular on agri-food companies and retailers trying to contract small farmers and small farmers trying to integrate into the modern food supply chain. The tendency is to move away from the spot market to other forms of vertical coordination. That is because there is a continuous need for information sharing on consumers' changing preferences, on quality requirements through grades and standards, and on high postproduction and service value addition, which requires specific investments. Open access markets can no longer meet consumer needs for accurate information on quality and safety attributes (Van der Vorst, 2005). For farmers, transaction costs are those associated with participation in the—increasingly vertically coordinated—markets. Furthermore, motivations for increased vertical integration in agriculture include perishability, capital intensity, and discontent among farmers over prices. Seven factors that determine vertical integration are concentration, capital intensity, flow economies, number of inputs and outputs per firm, economies of scope, firm size and future demand (Kilmer, 1986).

Transaction costs can be household specific, such as access to assets, or they can be the same for all farmers in a particular location, such as land quality, or producing a specific product, such as perishable fruit and vegetables. It is the bundle of transaction costs that farmers face that determines market participation. Interactions between the unique features of food system participation and other household- and location-specific characteristics can further exacerbate transaction costs. Farmers will not enter markets when the value of participating is outweighed by the costs of undertaking the transaction (Sadoulet and de Janvry, 1995). Specific transaction costs can arise in both the input and output markets and affect market participation. Evidence from Bangladesh (Ahmed, 1989) found that transaction costs resulting from loans from formal lenders are higher than those of loans from informal lenders because the borrower is usually known. By contrast, transaction costs per unit of loan decrease with loan size, and this was much faster for formal than for informal loans.

Transaction cost economics helps us to understand many of the recent changes in vertical coordination in the agri-food sectors of developed countries. Fundamentally, the approach indicates that, in the presence of information

asymmetry, a transaction-cost-economizing form of vertical coordination will emerge (Hobbs and Young, 2001). Most farm producers in developing countries confront incomplete or imperfect markets for their inputs and outputs. Sometimes market exists but works defectively due to lack of information (Stiglitz, 1998). Peasants have limited access to timely and reliable market information. On the other hand, traders especially inter regional and large traders generally have a good access to the information since they have better facilities and sell commodities to the market everyday. The asymmetry of marketing information generally argued to be the main reason for the existence of excessive profit margin in traditional marketing channel. In this case, peasants are becoming a victim of opportunist's traders who take advantage of an information asymmetry situation for the trader's personal profit gain (Natawidjaja, 2000). However, with the wide spread use of information and communication technologies like mobile phones, the information sharing has become inexpensive. We will explore this in detail in Chapter 5.

Agriculture has seen a move away from open market production and has become increasingly vertically coordinated with agribusiness in order to produce a greater range of high-quality differentiated products (Sporleder, 1992; Peterson & Wysocki, 1997). As a result, processors and marketers have avoided traditional spot markets and have engaged in more direct market channels such as market and production contracts, full ownership or vertical integration.

Contract farming is seen as one of the alternative forms of vertical coordination in which firms can engage, which can also be spot markets, full vertical integration and different forms of vertical alliances. Contracting is an intermediate mode of coordination, whereby the conditions of exchange are specifically set among transaction partners by some form of legally enforceable, binding agreement. Authors such as Key and Runsten (1999), Kirsten and Sartorious (2002), have focused their discussion of the theoretical basis for contract farming on the examination of such failures. They discussed asymmetries in production and marketing information, as well as the imperfection in markets for credit, inputs and agricultural support services and indicated that these failures account for increases in transaction costs and thus provide incentives to increased coordination in the transactions, leading to contracting or to full vertical integration. Transaction cost theory is the conceptual framework of choice in recent analyses of contracting farming issues. Agri-food systems internationally are creating a renewed interest in

contract farming as a supply chain governance strategy. We also saw that the theoretical framework of transaction cost economics helps to explain the growing role of contracts in vertical coordination in food and agriculture.

Contract farming, as an institution in agriculture, has a long history. In the period 1930–50, contracting was used increasingly in many food and fibre sectors. The fruit and vegetable canning sectors expanded in the United States and Europe (Little & Watts, 1994). In the period 1960–80 there was a significant increase in contracting for vegetables, fruits, nuts and seed crops (Kilmer, 1986). Contract farming is now a common organisational structure in many developed countries. Usually, this institution takes the form of a central processing or exporting unit purchasing harvests of independent farmers, but also includes multipartite, nucleus estate and informal models (Eaton & Shepherd, 2000). The terms of the purchase are arranged through contracts that vary from case to case but are usually signed at planting time. Often the agribusiness provides credit, inputs, farm machinery and technical advice to the farmers in exchange for the commodity they produce (Glover, 1987; Grosh, 1994; Eaton & Shepherd, 2000). A study based on a survey of small scale producers in Zimbabwe, focused on the ex ante motivations to grow non traditional vegetables under contract for export. Four factors were identified as motivating contracting, namely, market uncertainty, indirect benefits (e.g., knowledge acquisition), income benefits, and intangible benefits. How these motivations vary across individual producers and the resulting policy implications for the role of globalized agribusiness in rural development and poverty alleviation was explored in the paper (Masakure and Henson, 2005).

Contract farming in India has not benefited the farmers. Appropriate institutional arrangements, legal provisions and government intervention are needed to protect the interests of farmers. Various studies have shown that there is adverse fallout of the contract system. For example, agribusiness firms have been found to overprice their services, pass on the risk to the producers, offer low prices for produce, and delay payments. Some firms look at contracts only as a management tool and a strategy to overcome procurement and related business problems. Contract farming in the country is currently being led by multinationals such as Unilever (tomato, chicory, tea, milk), Pepsi (potato, chillies, groundnut), Cadbury (cocoa), ITC Ltd (tobacco, wood trees, oilseeds), Cargill (seeds), domestic corporates like Ballarpur Industries Ltd, JK Paper and Wimco (eucalyptus and poplar trees), and

many more. A study entitled 'Contract Farming for Agricultural Development' was commissioned by the Centre for Trade & Development (Centad), an initiative of Oxfam GB in India and conducted by Ahmedabad-based Indian Institute of Management (IIM-A) noted a general monopsony of corporates and contracts being loaded against the interests of farmers.[18] Though the amended Agricultural Produce Marketing Committees (APMC) Act contains some provisions to regulate contract farming, legal protection for contract growers as a group is essential. This would include setting out clearly what the parties must do and what they cannot do in the areas of delivery, payment, returning goods, price-fixing, etc.[19] The UPA government's Approach Paper to the Eleventh Plan gave priority to the development of contract farming. What cultivators in rural India need most of all today is the following combination: a basic price support mechanism that ensures that costs are covered; efficient extension services that provide information about possible crops, new inputs and their implications and new agricultural practices relevant for the particular area; and the availability of reliable and assured credit at reasonable rates of interest.[20]

In the next section, we specifically focus on the vertical coordination in agri-food marketing in India.

2.6 Vertical Coordination in Agri-Food Marketing in India

In India food is the largest segment of retail industry. There are around 3.7 million food retail outlets with an estimated turnover of 7400 billion (Chengappa, 2006). Food retailing in India is by and large unorganised, highly fragmented and predominantly small, family owned business. About 78 per cent of these function with only family labour. Nearly 96 per cent of the food outlets are small with less than 500 sq.ft area. Unorganised food retail segment consists of kirana shops, selling dry food products, fruits and vegetable shops and hawkers (pushcartwalas) selling wet food products. As the unorganised retail outlets are under-capitalised, they are

[18]http://www.financialexpress.com/news/Contract-farming-did-no-good-to-farmers,-says-IIM-A study/174312/

[19]http://www.centad.org/resources/working-papers/706-contract-farming-for-agricultural development.html

[20] http://www.frontline.in/static/html/fl2408/stories/20070504001904600.htm

not able to cater to the consumer demand for value added services (Singh, 2007). Small holders though make a sizeable contribution to high value food production (fruits and vegetables), their access to market is constrained by scale. Their marketable surplus is small while local markets for high value commodities are thin and sale in distant urban markets rises transportation and marketing costs. Existing supply chains are long and are dominated by a number of intermediaries like assemblers, wholesalers, sub-wholesalers, commission agents and retailers. In case of fruits and vegetables, farmers receive one- third to one half of the final price (Gandhi & Namboodiri, 2002). Food processing industries have a crucial role to play in value addition to the agriculture, increase the shelf life and also in the reduction of post-harvest losses. The most important point in the food industry is that a substantial portion being rural based it has a very high employment potential with significantly lower investment. The fruits and vegetables farming for processing is not only employment intensive, but also enhances the gross as well as net returns of the farmers (Rao, 1994; Acharya, 1997; Dileep et al, 2002). Agro-industry also generates new demand on the farm sector for more and different agricultural output, which are more suitable for processing (Srivastava, 1989). On the other hand, the development of these industries would relax wage goods constraint to economic growth by enhancing the supply of their products (Desai and Namboodiri, 1992). With liberalization of trade in the post - WTO regime, India has the opportunity to export agricultural and food products to the world. Over the last decade food processing has grown at a rate of 7.1% per annum.[21] The sector has great potential for employment generation, both direct and indirect, across the supply chain in production of raw materials, storage of produce and finished products and distribution of food products to consumers, besides enhancing the shelf life of agricultural products and reducing wastages. The chain of intermediaries in the marketing of fruits and vegetables is very long and this leads to very small fraction of every rupee of profit to the farmer (World Bank, 2003; Pingali and Khwaja, 2004).

A typical marketing channel of horticultural crop thus involves a number of intermediaries like the pre harvest contractor, commission agent, wholesaler, retailer

[21] Position Paper on Indian Food Processing Industry, The Associated Chambers of Commerce and Industry.

operating between the producer and the final consumer. Each of these market intermediaries performs a specific market function of assembling or distribution that involves a cost to then, there by claiming a share in the market margin. Though, it is said that an efficient market provides for the distribution of market margins in proportion to the task performed by each market intermediary it is seldom so. The price spread along the marketing channel is directly proportional to the number of market intermediaries involved along the channel (Gupta and Rathore, 1998). In a market function, the physical movement of the produce is along the chain, while the monetary and information flow is in the reverse direction. It is the access to information that empowers a market intermediary to bargain or take away a larger share in the marketing margin (Crawford, 1997).

Most of the fruits being bulky and highly seasonal are sold through the Pre-Harvest Contractor (PHC) at the field much before they come to harvest. Very often, the PHC takes most of the production risks due to pests and diseases and also the cost of maintenance, while he makes his margin through bulking (Sudha and Froukje, 2006). Vegetables, barring cabbage and cauliflower, are mainly sold through the commission agents at the market, who intern transports the produce to the distant markets and makes his margin, traditional flowers are self marketed at the wholesale auction centres (Subrahmanyam, 1989). Efforts have constantly been on to link farmers to the markets so that the marketing channels and the role played by different market intermediaries are minimized. These efforts include creation of alternate marketing channels which provide better pricing policies and reduce the margins, contract farming for assured buy back and hence assured price and supply chains for creating and sustaining value addition for some commodities (Dileep, et al, 2002).

Shifting Indian farming from a rural lifestyle to an agribusiness sector and linking farmers to super markets is a key drier for industrialization of agriculture (Dastagiri and Immanuelraj, 2012). A Study was done on traditional areas / conventional crops (Sudha and Gajanana, 2001). A few studies (Raju and Rao, 1993; Ganesh, et al, 2004) mainly focused on traditional marketing channels. Limited scientific studies on the emerging/newer institutional marketing models are available (Chengappa, 2001). However, several studies on fresh fruit and vegetable retail chains in India have confirmed relative advantages for farmers connected with organised retail. For example, retail chain-contracted farmers receive comparatively higher prices (Dhananjaya and Rao, 2009; Alam and Verma, 2007), higher net profits

(Joseph, et al, 2008; Mangala and Chengappa, 2008; Birthal et al, 2005) and also had lower transaction costs (Singh and Singla, 2010; Joseph, et al, 2008; Alam and Verma, 2007). Retail chains have raised quality consciousness among farmers, introduced grading (in primary processing) and have helped in cost-cutting through extension and training on input use for better yield (Singh and Singla, 2010).

The CMA publication on "*Fresh Food Retail Chains in India: Organisation and Impacts*" (Singh and Singla, 2010) discusses the impact of fresh food retail chains on farmers for the states of Gujarat, Karnataka, and Punjab. The study extensively analyzes the organization and operations of fresh food retail chains and their interaction with both the farmers and the customers. The impact of retail chains on traditional retailers is also discussed. Though the study is focused on retail chains, the techniques used to study the impact of retail chains on farmers uses transaction costs.

The study on "*Estimation of Marketing Efficiency of Horticultural Commodities under Different Supply Chains in India*" was conducted by National Centre for Agricultural Economics and Policy Research (NCAP, 2010). The study focused on certain some aspects of horticulture marketing in the states of Andhra Pradesh, Karnataka, Tamil Nadu, West Bengal, Manipur, Rajasthan, and Punjab. The main objective of the study is to estimate the marketing cost, market margin, price spread, and producer share in consumer price. The remainder of this section reviews the results from the NCAP (2010) report for the seven states.

In Andhra Pradesh, the study was conducted in Ranga Reddy, Medak, and Hyderabad districts. The crops included in the study were potato, tomato, baby corn, rose, and grapes. The marketing supply chains with different sets of intermediaries consisting of middlemen, wholesaler, and retailer, were studied for the different crops. The need for the different intermediaries varied with crops. Farmers preferred intermediaries in marketing potato as it required bulk handling and storage. But the study focused mainly on traditional channels and did not cover direct selling to organized retailers.

The study in Karnataka specifically evaluated three modern marketing systems viz., SAFAL, Namdharis, and HOPCOMS Cooperative in comparison to the traditional marketing networks for banana and tomato crops in the state. The study concluded that the HOPCOMS cooperative provided the highest benefit to the farmers, and performance of SAFAL was not as expected, as per the study.

In Tamil Nadu, the study was conducted for four selected vegetables: brinjal, potato, tapioca and gherkin. The study concludes that marketing issues were larger than mere reduction in the number of middlemen or promoting adhoc measures. Tapioca and gherkin farmers face decrease in income due to declining tapioca processing plants and falling demand for gherkins in US and Europe. On the other hand, brinjal, potato, and similar commonly consumed vegetable farmers have been reaping greater benefits in recent years due to escalating vegetable prices. The marketing cost was estimated as 15% and marketing margins of the intermediaries as 10% of the consumer price. Farmers are reported to get about 75% of the consumer rupee. The study suggests that the main problem faced by the farmers is the wider price fluctuations. While production and marketing costs for the farmers remain fixed, abnormal down trends in prices inflicts heavy damages in terms of income loss.

In West Bengal, the costal districts of South 24 Parganas, North 24 Parganas, and East Midnapore were studied for marketing of brinjal, bhindi (ladies finger), tomato, marigold, and guava. The study reported that marketing channels for tomato frequently change depending on season and local supply. Guava and marigold have shorter marketing channels as the produce has to reach the customers at the earliest before they loose the freshness.

The study taken up in Manipur consisted of Bishnupur, Imphal-West, Ukhrul, Thoubal, Churachandpur and Senapati districts for Tomato, Cabbage, Passion fruit and Anthurium. Transportation cost has the highest share in the marketing cost. The marketing cost and marketing margin vary considerably from channel to channel and increased with the length of the channel. Similar observations were made for Rajasthan, where the study was conducted in Jaipur and Sriganganagar districts for kinnow, carrot, aonla, and tomato.

In Punjab, Jalandhar district was selected for potato, brinjal, and okra, Kapurthala district for tomato, and Hoshiarpur district for green peas. The study focussed on three types of marketing supply chains. The first type has wholesaler and retailer as intermediaries, second one has retailer, and third one has no intermediaries between farmer and consumer. The farmers got 46%, 48%, and 93% of the consumer's price from the above three supply chains, respectively. The chief constraints reported were malpractices in auction, faulty weighing, inadequate storage facilities, and high market fees.

The FAO (2005) study on food retailing in Asia indicates that rather than the type of store, factors such as methods of procurement, the use of logistics and quality standards applied have implications for farmers' incomes. The same study also indicates that farmers face many problems in supplying to supermarkets, including: delisting of suppliers and rejection of produce by retailers for not conforming to volume, quality and delivery; and price competitions between chains that keep prices low, thus making it difficult for farmers to earn enough of a profit to pay for on-farm investments. The Indian Government, however, considers organised retail to be beneficial as it can set up supply chains, give better prices to farmers and facilitate agro-processing (GoI, 2007).

2.7 Conclusions

The literature related to vertical coordination mechanisms in agri-food marketing was reviewed in this chapter. Majority of the literature focused on the need for the firms to move from open markets to *closer* vertical coordination mechanisms. The demand on food processing industry to meet the quality and hygiene encouraged the firms to have closer vertical coordination mechanisms. There is also vast literature on *vertical integration*, which is the extreme form of managed coordination. Again, the focus was mainly on why firms want to vertically integrate the upstream producers like farmers. The literature helped in understanding the difference in coordination mechanisms in terms of control and interactions between firms and farmers.

The theoretical approaches to vertical coordination mechanisms, comprising of *transaction cost economics*, *agency theory*, *competency theory*, *strategic management theory*, and *convention theory* were studied. The transaction cost economics recognizes that transactions do not occur in a frictionless economic vacuum. Though originally proposed for firms to choose between open markets and vertical integration, notion of transaction costs has been generalized as costs of participating in a market. Agency theory basically focuses on the contractual relationship between two parties, in which the agent performs tasks for the principal. It has been widely applied to study asymmetry in contract farming, a specific vertical coordination mechanism. Competency theory takes on a dynamic approach and is based on differing skill sets of the firms. The strategic management theory considers questions of vertical coordination within the context of firm strategies to attain or improve competitive advantage. Literature in strategic management theory focuses

on reasons for and against a particular coordination mechanism and also in predicting which mechanism is relevant to a given set of conditions. Convention theory incorporates a political economy approach to the study of vertical coordination. Interestingly, all the theories are based on the notion of transaction costs, but complement transaction cost economics in different ways.

In order to understand the Indian context, we reviewed the works related to vegetable marketing in India. Majority of the work adopted the transaction cost approach by identifying and measuring different costs associated with vegetable marketing. Impact of retail chains by Singh and Singla (2010) and estimation of market efficiency by NCAP (2010) are significantly relevant to our work. The work on retail chains focussed on the organization and impact of retail chains on farmers, consumers, and traditional retailers. The work also discussed the benefits for the farmers in terms of engaging with modern marketing channels through retailers in terms of transaction costs. However, it did not focus much on the other traditional channels. The estimation of market efficiency study (NCAP, 2010) focused on estimating the marketing cost, market margin, price spread, and producer share in consumer price. It covered the end-to-end marketing supply chain from farmers till consumers. While the retail chain work (Singh and Singla, 2010) had the central focus on retail chains, the NCAP report (NCAP, 2010) focussed on all supply chain intermediaries. Our focus is on vertical coordination between farmers and immediate buyers. The immediate buyer could be APMC market or a retailer or a cooperative or a food processor. Our interest is in studying the decision making of farmer in choosing a buyer. Given the choice of different marketing channels, why a farmer chooses a particular channel and in particular, what transaction costs influence the choice of the buyer.

The focussed analysis on vertical coordination between farmers and the immediate buyers in Indian context is missing in the literature and we address this issue for vegetable marketing at two perspectives: *operational* and *strategic*. The operational perspective (Chapter 5) focuses on the daily selling of vegetables. The transaction cost economics is the appropriate approach for studying daily transactions. The strategic perspective (Chapter 6) is concerned with the strategic benefits of continuing with a vertical coordination decision or the decision to search for alternate mechanism. We analyze this problem using the PWH framework from the strategic management theory.

3. Horticultural Scenario of Malur Taluk

Karnataka is the first state in the country to set-up a separate department for the development of horticulture. The state with its ten different agro-climatic zones and other bounteous natural advantages offers immense opportunities for high growth in horticulture crops. The Chapter is organized as follows. Section 3.1 discusses the geographical description and socio-economic profile of Karnataka. The development of horticulture in Karnataka is discussed in Section 3.2. The geographical description and socio-economic profile of Kolar district is discussed in Section 3.3 and Section 3.4 discusses development of horticulture in Kolar district. The geographical description and socio-economic profile of Malur taluk is discussed in Section 3.5 and Section 3.6 discusses the development of horticulture in Malur taluk in particular. Section 3.7 concludes the chapter.

3.1 Geographical Description and Socio-Economic Profile of Karnataka

Karnataka State is situated between 11°31' and 18°48' North Latitudes and 74°12' and 78°40' East Longitudes, and lies in the West-Central part of the Peninsular India. Its length from North to South is 700 km and from East to West is 400 km. Karnataka State covers an area of 1,91,791 sq km, occupying 7.75 percent of the total geographical area of the Country.[22] It is the eighth largest Indian state by area, the ninth largest by population. It comprises of 30 districts and 176 taluks. As per the 2011 Census, the population of the State is 61,130,704 (5 percent of India's population). The density of the population is 319 per sq km and the sex ratio is 968. The literacy rate of the state is 75.60 percent. Kannada is the most widely spoken and official language of the state. About 60 per cent of the population in the State is in the working-age group (15 to 59 years), while only about 45 per cent is actually working. Of the total workers, 55 per cent are involved in agriculture alone, either as cultivators or agricultural labourers (NSDC, 2013).

Karnataka is a state in South West India. It was created on 1st November 1956, with the passing of the States Reorganization Act, by joining five erstwhile different parts, namely, State of Mysore, Coorg, five districts from State of Bombay,

[22] Horticultural Crop Statistics of Karnataka State at a Glance: 2011-12, Department of Horticulture, Government of Karnataka.

two districts from State of Madras, and three distrcts from State of Hyderabad, it was renamed as Karnataka in 1973. Karnataka is situated in the Deccan Plateau;is bordered by the Arabian Sea to the west, Goa to the northwest, Maharashtra to the north, Andhra Pradesh to the east, Tamil Nadu to the east and southeast, and Kerala to the southwest.[23] The two main river systems of the state are Krishna and its tributaries in the north, and the Cauvery and its tributaries in the south. Both these rivers flow eastward and fall into the Bay of Bengal. Some of the important rivers in Karnataka are Kaveri, Tungabhadra, Krishna, Malaprabha and the Sharavathi.[24] The state has three principal geographical zones: the coastal region of Karavali; the hilly Malenadu region comprising the Western Ghats; and the Bayaluseeme region comprising the plains of the Deccan plateau. The bulk of the state is in the Bayaluseeme region, the northern part of which is the second largest arid region in India.[25] As for climate, Karnataka experiences four seasons. The winter in January and February is followed by summer between March and May, the monsoon season between June and September and the post-monsoon season from October till December. Meteorologically, Karnataka is divided into three zones — coastal, north interior and south interior. Of these, the coastal zone receives the heaviest rainfall with an average rainfall of about 3,638.5 mm (143 in) per annum, far in excess of the state average of 1,139 mm (45 in). The southwest monsoon accounts for almost 80% of the rainfall that the state receives. The average annual rainfall in Karnataka is 1248 mm. Coastal Karnataka with an average annual rainfall of 3456 mm is one of the most rainy regions in the country. Contrasting this, the region of South Interior Karnataka and North Interior Karnataka receive only 1286 and 731 mm of average annual rainfall.[26]

Eleven groups of soil orders are found in Karnataka. Depending on the agricultural capability of the soil, the soil types are divided into six types, viz. red, lateritic, black, alluvio-colluvial, forest and coastal soils. The cropping pattern of Karnataka is influenced owing to the availability of different kinds of soil in different regions. About 38,724 sq km of Karnataka (i.e. 20% of the state's geographic area) is

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[23] http://en.wikipedia.org/wiki/Geography_of_Karnataka

[24] http://www.cityindia.org/karnataka/karnataka-tourism.html

[25] http://en.wikipedia.org/wiki/Karnataka

[26] http://en.wikipedia.org/wiki/Rainfall_in_Karnataka

covered by forests. The forests are classified as reserved, protected, unclosed, village and private forests. The percentage of forested area is slightly less than the all-India average of about 23%.[27]

In the recent past, Karnataka has been credited by the Planning Commission for presenting separate agriculture budget. As of 2011-12, Karnataka's Gross State Domestic Product (GSDP) at constant prices stood at Rs. 298 thousand crore, the state ranks 10th in the country in GDP terms. The GSDP at current prices was Rs. 466 thousand crore – 5.62 % of India's Gross Domestic Product (GDP). Karnataka's state income has increased at a CAGR of 8.6% between 2004-05 and 2011-12. Its per capita income at Rs. 69,493 – was higher than the India's overall per capita income at Rs. 60,972. Even though agriculture and allied sectors have only a 17 per cent share in State's GSDP, they continue to provide employment to about 55 per cent of the total workforce. Allied activities such as horticulture, fishery, sericulture, animal husbandry, poultry and dairy are important sources of income for the people. Horticultural crops are grown in an area of 16,300 km² which is 15 per cent of the total cropped area and the annual production is about 9.58 million ton. The income generated from horticulture constitutes over 40% of income generated from agriculture.[28] As of 2009-10, total cropped area in the State was 128.73 lakh ha, which is 66% of the total geographical area of the State (NSDC, 2013). Only 26.5% of sown area (30,900 km²) is subjected to irrigation. The state has three agricultural seasons – Kharif (April to September), Rabi (October to December) and Summer (January to March).[29] The main crops grown here are rice, ragi, jowar, maize, and pulses (Tur and gram) besides oilseeds and number of cash crops. Cashews, coconut, arecanut, cardamom, chillies, cotton, sugarcane and tobacco are among the other crops produced in the state. Karnataka is the largest producer of coarse cereals, coffee and raw silk among the states in India. Silk industry is concentrated mainly in the North Bengaluru regions of Muddenahalli, Kanivenarayanapura, and Doddaballapura. It is also the largest producer of spices, aromatic and medicinal plants in the country. In floriculture, Karnataka occupies the second position in India in terms of production. Gold, iron ore, quartz, limestone, manganese, kyanite and

[27] http://www.travellerspoint.com/guide/Karnataka/

[28] http://en.wikipedia.org/wiki/Economy_of_Karnataka

[29] http://advanceagripractice.in/location/karnataka/

bauxite are some of the minerals that are found in Karnataka. Major mines of manganese and iron ore are located at Sandur in Bellary district. Karnataka leads the nation in information technology and biotechnology. Bengaluru is the home of the largest bio cluster in India with total revenues of over Rs. 14 billion and having 158 of the 320 companies working on biotechnology in India.[30]

3.2 Development of Horticulture in Karnataka

Karnataka has been the First State in the Country to set-up a separate department for the development of horticulture, in the year 1965 (vide dated 3rd November). It is gratifying to note that, 'The All-India Horticultural Development Conference', held at Simla in September 1966, passed a resolution, to follow the pattern of the Department of Horticulture of the then Mysore State, throughout India.[31] The state with its ten different agro-climatic zones and other bounteous natural advantages offers immense opportunities for high growth in agriculture and allied sectors.[32] The geographical area of Karnataka is 190.50 lakh hectare (ha), of which, an area of 125.65 lakh ha, comes under cultivable area, constituting 65.96% of the geographical area for the year 2011-12. Horticultural area in the state increased from 13% of the total cultivable area in 2002-2003 to 15.01% of the total cultivable area in 2011-12. In 2002-03, out of 15.81 lakh ha of the total horticultural cropped area, 7.02 lakh ha (44.38%) was under Plantation Crops; 3.67 lakh ha (23.21%) under Vegetables; 2.55 lakh ha (16.14%) under Fruits; 2.38 lakh ha (15.03%) under Spices and 0.2 lakh ha (1.25%) under Commercial Flowers (including the area under the Medicinal & Aromatic plants).[33] In recent years, due to introduction of the high yielding varieties through the improved technology and also commercialization, the productivity of horticultural crops has improved. But, due to urbanization, failure of rains during Rabi & Summer seasons and change of cropping pattern, there was a decrease in the total area under horticultural crops in 2011-12 compared to that of 2010-11. Recently, efforts are being made by the Government of Karnataka to boost up the

[30] http://www.cii.in/States

[31] Horticultural Crop Statistics of Karnataka State at a Glance: 2008-09, Department of Horticulture, Government of Karnataka.

[32] Department of Agriculture, Government of Karnataka, 2011.

[33] Horticultural Crop Statistics of Karnataka State at a Glance: 2002-03, Department of Horticulture, Government of Karnataka.

agricultural exports, mainly of Horticultural produces like fruits, vegetables and flowers, through an effective Agricultural Policy. In 2011-12, out of 18.86 lakh ha of the total horticultural cropped area, 8.35 lakh ha (44.3%) was under Plantation Crops; 4.2 lakh ha (22.28%) under Vegetables; 3.69 lakh ha (19.58%) under Fruits; 2.29 lakh ha (12.15%) under Spices and 0.32 lakh ha (1.7%) under Commercial Flowers (including the area under the Medicinal & Aromatic plants). Accordingly, the total horticultural production in the state during the year figures at 155.01 lakh metric ton (MT). The production figure stands at 63.18 lakh MT (40.76%) with respect to (w.r.t.) Fruit Crops; 75.49 lakh MT (48.7%) w.r.t. Vegetable Crops; 8.95 lakh MT (5.77%) w.r.t. Spice Crops; 5.04 lakh MT (3.25%) w.r.t. Plantation Crops and 2.35 lakh MT (1.52%) w.r.t. crops coming under Commercial Flowers (including Medicinal and Aromatic Plants).[34]

According to 'Horticulture Database – 2012' published by National Horticulture Board, the total Area and Production of Horticultural crops in India is 232.42 lakh ha is 2572.77 lakh MT respectively. Karnataka state has occupied 3rd place in respect of total area with 20.04 lakh ha contributing to 8.6% area, and 7th place in respect of total production with 190.58 lakh metric ton contributing 7.4% production in the country. The state has occupied 4th place in Fruit Crops with an area of 3.72 lakh ha & production of 64.28 lakh ton, and 9th place in Vegetable Crops with 4.55 lakh ha of area & 76.63 lakh ton of production. With regard to Commercial Flowers the state has stood in 3rd place with 0.29 lakh ha of area & 2.12 lakh ton of production, and 2nd place in Plantation Crops with 8.8 lakh ha of area & 42.33 lakh ton of production. This shows a clear indication that Karnataka is in the fore-front in the field of Horticulture. The number of Agricultural Operational Holdings in the state is 78.32 lakhs and the area operated is 121.62 lakh ha according to Agricultural Census 2010-11. The Gross State Domestic Product (GSDP) of the state during 2011-12 at factor cost at current prices is Rs.4,63,243 crores and in Agriculture sector it is estimated at Rs.62,057 crores, the share of Agriculture towards GSDP being 13.4%.

[34] Horticultural Crop Statistics of Karnataka State at a Glance: 2011-12, Department of Horticulture, Government of Karnataka.

Table 3.1 Major Fruits Producing Belts in Karnataka

Name of Fruit	Production Belt in the State
Aonla	Bangaluru (Urban), Shimoga, Bidar, Koppal, Chamarajnagar, Mandya, Mysore
Banana	Hassan, Shimoga, Bengaluru, Chickmagalore, Dakshina Kannada, Tumkur
Ber	Tumkur, Kolar, Bellary, Raichur, Belgaum
Fig	Dharwad, Belgaum, Davangeri, Hubli, Bellary, Raichur
Grape	Bijapur, Bengaluru (Rural), Kolar, Belgaum, Bengaluru (Urban), Gulbarga, Koppal, Bidar, Belgaum
Guava	Kolar, Bengaluru (Rural), Bengaluru (Urban), Dharwad, Shimoga
Jackfruit	Mysore, Bangaluru (Rural), Uttara Kannada, Tumkur, Kolar, Chikkaballapur, Mandya
Lime	Bijapur, Gulbarga, Raichur
Mango	Kolar, Bengaluru, Tumkur, Mysore, Belgaum, Hassan, Dharwad
Mandarin orange	Chickmagalore, Hassan, Bijapur, Kodagu (Coorg), Raichur, Shimoga
Papaya	Bengaluru (Rural)
Passion fruit	Kodagu (Coorg)
Pineapple	Bijapur, Bellary, Koppal, Bagalkot, Belgaum
Pomegranate	Bijapur, Bellary, Koppal, Bagalkot, Belgaum
Sapota	Kolar, Bengaluru, Belgaum, Gulbarga, Chickmagalore, Bellary
Sweet orange	Bengaluru (Rural), Bijapur, Shimoga

*Source***:** Checklist of Commercial Varieties of Fruits, GoI, 2012.

Table 3.2 Major Vegetables Producing Belts in Karnataka

Name of Vegetable	Production Belt in the State
Ash Gourd	Haveri, Hassan, Bijapur, Mandya, Koppal, Tumkur
Beans	Kolar, Belgaum, Haveri, Hassan, Chamarajanagar, Mandya, Bengaluru Rural
Beet Root	Dharwad, Haveri, Chamarajanagar, Kolar, Belgaum, Hassan, Chikmagalur, Mandya, Raichur, Ramanagara, Davanagere, Mysore, Bidar, Bengaluru Rural, Chikkaballapur
Bitter Gourd	Haveri, Koppal, Bijapur, Mandya, Tumkur, Hassan
Bottle Gourd	Hassan, Haveri, Mandya, Koppal, Tumkur, Bijapur
Brinjal	Kolar, Belgaum, Dharwar, Bijapur, Hassan, Mysore, Tumkur
Cabbage	Haveri, Hassan, Bellary, Dakshin Kannada, Chamarajanagar, Chikmagalur, Mandya, Raichur, Bengaluru Rural, Chikkaballapur, Ramanagara, Davanagere, Mysore, Bidar, Kolar, Belgaum, Dharwad
Capsicum	Kolar, Belgaum, Haveri
Carrot	Kolar, Belgaum, Dharwad, Haveri, Hassan, Chamarajanagar, Chikmagalur, Mandya, Raichur, Bengaluru Rural, Chikkaballapur, Mysore, Ramanagara, Davanagere, Bidar
Cauliflower	Chikkaballapur, Ramanagara, Kolar, Belgaum, Dharwad, Haveri, Hassan, Chamarajanagar, Chikmagalur, Mandya, Raichur, Bengaluru Rural, Davanagere, Mysore, Bidar
Chillies	Kolar, Belgaum, Gadag, Haveri, Bagalkot, Chitradurga, Chamarajanagar, Raichur, Bellary, Mysore, Tumkur
Drum Stick	Chamarajanagar, Haveri, Bijapur, Mandya, Raichur, Bellary, Koppal
Leafy Vegetables	Kolar, Belgaum, Bijapur
Okra	Haveri, Dharwad, Gulburga, Dakshin Kannada, Belguam, Shimoga
Onion	Belgam, Dharwad, Gadag, Haveri, Bagalkot, Chitradurga, Bijapur, Chamarajanagar, Chikmaglur, Raichur, Bellary, Gulburga, Chikkaballapur, Davanagere, Koppal
Peas	Kolar, Bengaluru, Mysore, Tumkur, Hassan, Chikkaballapur
Potato	Kolar, Belgaum, Dharwad, Hassan, Chikmagalur, Chikkaballapur, Bengaluru Rural
Pointed Gourd	Koppal, Haveri, Hassan, Bijapur, Mandya, Tumkur
Radish	Chamarajanagar, Mysore, Bidar, Haveri, Hassan, Kolar, Belgaum, Dharwad, Chikmagalur, Mandya, Raichur, Bengaluru Rural, Chikkaballapur, Ramanagara, Davanagere
Ridge Gourd	Haveri, Mandya, Koppal, Tumkur, Hassan, Bijapur
Round Gourd	Bijapur, Mandya, Haveri, Hassan, Koppal, Tumkur
Snake Gourd	Haveri, Hassan, Koppal, Bijapur, Mandya, Tumkur
Sponge Gourd	Mandya, Koppal, Tumkur, Haveri, Hassan, Bijapur
Tomato	Kolar, Belgaum, Bagalkot, Chitradurga, Bijapur, Chamarajanagar, Chikmaglur, Mandya, Bellary, Koppal, Gulburga, Bengaluru Rural, Chikkaballapur, Ramanagara, Davanagere, Mysore, Tumkur
Turnip	Bengaluru Rural, Belgaum, Mysore, Bidar, Dharwad, Haveri, Hassan, Kolar, Chamarajanagar, Chikmagalur, Mandya, Raichur, Chikkaballapur, Ramanagara, Davanagere
Water Melon	Haveri, Mandya, Tumkur, Kolar

Source: Checklist of Commercial Varieties of Vegetables, GoI, 2012.

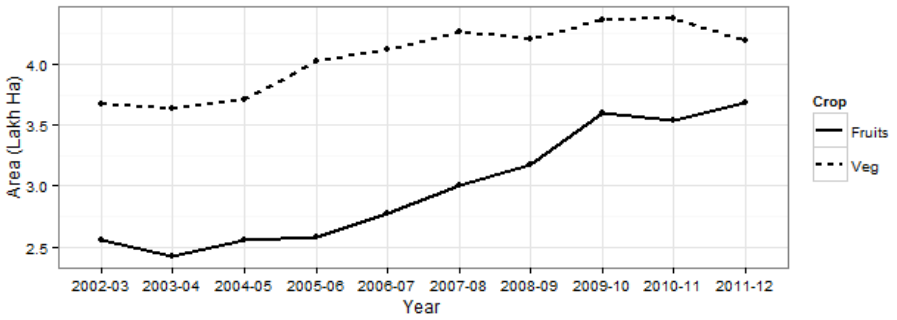
The major horticultural crops that are grown in the State[35] are:

- **Fruit crops**: mango, banana, guava, sapota, grapes, jack fruit, papaya, citrus fruits, pineapple, fig, annonaceous fruits, avocado, ber, rose apple.
- **Vegetable crops**: potato, tomato, brinjal, cole crops, peas, beans, okra, radish, beetroot, carrot, tapioca, sweet potato, leafy vegetables, capsicum, gourds and cucurbits.
- **Plantation and Spice crops**: coffee, arecanut, coconut, cashewnut, beetlevine, cocoa, pepper, cardamom, ginger, turmeric etc. Vanilla is also being grown in the transitional belt.
- **Flower crops**: traditional flower crops such as chrysanthemum, jasmine, crossandra, rose, tuberose, aster, marigold, champaka, roses, gerbera, carnation, heliconia etc.
- **Medicinal and Aromatic Plant crops**: medicinal plants like sarpagandha, ashwagandha, ghritakumari, ayapana, anantamul, antamul, chirata and aromatic plants like lemon grass and Citronella.

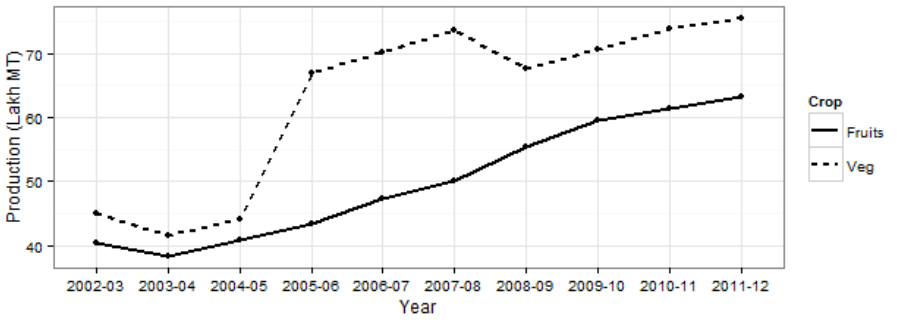
The Major Fruits and Vegetables Producing Belts in Karnataka are depicted in detail in Table 3.1 and Table 3.2 respectively. In 2010-11, 5.67 lakh MT of fruits have been traded in organized markets with average price of Rs. 17.47/kg and 19.34 lakh MT of vegetables have been traded in organized markets with average price of Rs. 10.12/kg (NHM, 2012).

- The state is the **second largest onion producing state** and accounts for 17% of the total production of onion in the country.
- It is also the **second largest tomato producing state** after Andhra Pradesh and accounts for 10% of the total production of tomato in the country.
- It is the **leading sapota producing state** and contributes to about 26.5% in the total production of sapota in the country.
- It is the **second largest producer of grapes** after Maharashtra and accounts for 26.8% of the total production of grapes in the country.

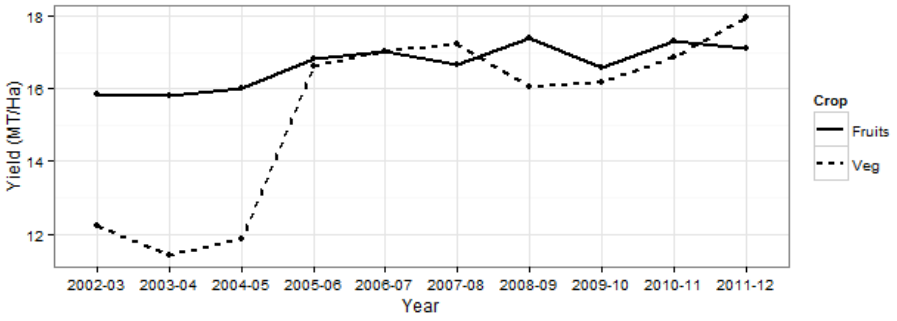
[35] National Horticulture Mission - Revised Action Plan for Karnataka, 2005.



(a) Area under Fruit and Vegetable Crops in Karnataka (2002-12)



(b) Production of Fruit and Vegetable Crops in Karnataka (2002-12)



(c) Yield of Fruit and Vegetable Crops in Karnataka (2002-12)

Figure 3.1 Area, Production, and Yield of Fruits and Vegetable Crops in Karnataka (2002-12)

Source: Horticultural Crop Statistics of Karnataka State at a Glance: 2011-12

- It is the **second largest pomegranate producing state** accounting for 19.2% of the total production of pomegranate in the country.
- The **state ranks third in the production of mango, papaya, pineapple & mosambi** and accounts for 11.7% of mango production, 10.5 % of papaya

production, 13.1% of pineapple production, & 5% of mosambi production in the country.

- It is the **leading arecanut producing state** and accounts for 46.9 % of the total production of arecanut in the country. It is the **second largest producer of cocoa** and accounts for 23.6% of the total production of cocoa in the country. It is the **third leading coconut producing state** and accounts for 13.8% of the total production of coconut in the country.
- It is the **fourth largest producer of spices** and produces about 8.6% of total production of spices in the country.

The trends in Area, Production, and Yield of Fruit and Vegetable Crops in Karnataka from 2002-12 are shown in Figure 3.1(a), 3.1(b), and 3.1(c) respectively. From Figure 3.1(a), it is clear that over the years, the area under fruit crops show a constant linear increasing trend and the area under vegetable crops has been constantly increasing, with only a slight decline observed in last few years. Figure 3.1(b), shows a constant linear increase in fruit production. Long run increasing trend is observed in vegetable production with fluctuations in between. In Figure 3.1(c), an almost constant trend is observed in yield of fruit crops. Yield of vegetable crops depict a long run increasing trend with fluctuations in between.

The **Centrally Sponsored Scheme of National Horticulture Mission** (NHM) is being implemented in Karnataka on a Mission mode approach to address all the issues related to development of Horticulture in the State since 2005-06. The program is being implemented by the State Horticulture Development Society through District Mission Committees involving farmers, Societies, NGOs, Grower Associations, SHGs, State institutions etc. The focus crops identified under the program includes: mango, banana, grape, pomegranate, pineapple, cashew, cocoa, ginger, pepper, flowers and aromatic plants. NHM also undertakes production and distribution of planting material, vegetable seed production, area expansion, rejuvenation of old and senile orchards, creation of community water resources, protected cultivation, IPM/INM, organic farming, mushroom cultivation, development of post harvest management & marketing infrastructure and human resource development etc. (NHM, 2013).

a) Physical Progress (during 2005-06 to 2011-12)

- Additional area of 1.89 lakh ha of identified horticulture crops are covered.
- 441 nurseries have been established for production of quality planting materials.
- Area of 21444 ha has been covered under rejuvenation of old and senile orchards.
- Organic farming has been adopted in an area of 18669 ha for promotion of organic cultivation of horticultural crops.
- IPM practices have been adopted in an area of 488041 ha.
- 67 IPM/INM infrastructure facilities such as Leaf tissue analysis labs, disease forecasting units have been created.
- Area of 3089 ha has been covered under protected cultivation.
- 5118 community water structures have been created.
- Harvest under the component of Post Management, 1765 units including pack houses, cold storage units, refrigerated vans, primary/mobile processing units, ripening chambers, pre-cooling units attached to cold storages and mobile pre-cooling units have been established.
- 98 market infrastructures have been set up.

b) Financial Progress

During 2005-06 to 2011-12, an amount of Rs. 613.34 crore was released to Karnataka. The state has reported an expenditure of Rs. 624.57 crore including State share till March 2012. An allocation of Rs. 140 crore has been approved including GoI share of Rs.119 crore for Annual Action Plan 2012-13. Funds to the tune of Rs. 57.71 crore have been released during the financial year, out of which an expenditure of Rs. 14.16 crore has been reported.

3.3 Geographical Description and Socio-Economic Profile of Kolar District

Kolar is the easternmost district of Karnataka. District headquarter of Kolar is in the Kolar town which is about 80 kilometres from Bengaluru, the state capital. Kolar district is located in the southern region of the State. The district is bounded by the Bengaluru Rural district in the west, Chikballapur district in the north, Chittoor District of Andhra Pradesh in the east and on the south by Krishnagiri and Vellore

district of Tamil Nadu. On 10 September 2007, Kolar district was bifurcated to form the new district of Chikballapur. Figure 3.2 shows the Map of Districts in Karnataka. Due to the modern discovery of the Kolar Gold Fields (KGF), Kolar has become popularly known as the "Golden Land" of India.[36] KGF was closed down in the year 2003 after being in operation from the 1850s due to the rising costs of mining the gold. Kolar District has 5 Taluks – Bangarapet, Kolar, Malur, Mulbagal, and Srinivaspur. The district is spanned across an area of 3,969 sq km. It lies between East Longitude 77° 21' to 78° 35' and North latitude 12° 46' to 13° 58' .Kolar District belongs to semi-arid drought-prone region. The district lies almost in the central part of peninsular India, which has immense bearing on its geoclimatic conditions. It experiences tropical climate throughout the year having temperature of 37 ˚ C (Max.) and 15 ˚ C (Min.). This favours the production of horticultural crops in general and fruit & vegetable crops in particular. In 2011-12, the percentage of cultivable area to geographical area was 62.24%, the percentage of area under horticultural crops to geographical area was 28.84%, and the percentage of area under horticultural crops to net area sown was 59.02% in the district.[37] Average Rain fall in the district is around 744 mm. Palar, Uttara Pinakini and Dakshina Pinakini are the rivers flowing in the district. It is also famous as the land of Silk and Milk.[38] Figure 3.3 shows the Map of Kolar District. According to the 2011 census, Kolar district has a population of 1,540,231. The district has a population density of 348 inhabitants per sq km. Kolar has a sex ratio of 974 females for every 1000 males, and a literacy rate of 66.5%. The primary language spoken here is Kannada. Other widely spoken language is Urdu. There are also Tamil and Telugu speakers. It ranks 16th on Gender Development Index (GDI), with a value of 0.613. The district has a total workforce of about 704,000 persons. Of this, 33% are cultivators, 25% are agricultural labourers, 4% are workers in household industry and 38% are other workers. As of 2008-09, Kolar district had the Gross District Domestic Product (GDDP) at Rs. 6,090.65 crore (1.98% of the Gross State Domestic Product). In terms

[36] http://en.wikipedia.org/wiki/Kolar_district

[37] Horticultural Crop Statistics of Karnataka State at a Glance: 2011-12, Department of Horticulture, Government of Karnataka.

[38] Brief Industrial Profile of Kolar District by Ministry of Micro, Small and, Medium Enterprises (MSME),Government of India, Bengaluru, 2012.

of per capita GDDP, it ranked 12th amongst 30 districts at Rs 40,062. This was lower than the State average of Rs 53,101.The district is pre-dominantly a service economy, with service sector's share in GDDP at 41% followed by primary sector at 30% and secondary sector at 29% in 2008-09. Out of the total area of 374,966 hectares in the district, about 48% is the net sown area (cultivated land). Agriculture is mainly dominated by cultivation of ragi and paddy under food crops. Agri-based processing represents the biggest potential with Srinivasapura taluk mangoes having a distinct taste. Kolar town and the taluks of Bangarpet and Malur reap benefits because of the proximity to Bengaluru and Chennai. As of March 2012, Kolar had four medium scale industries employing 362 people and two large scale industries employing about 13,000 people. The large scale employment is dominated by Bharat Earth Movers Limited (BEML). In addition to these, the district also has 8,039 Small Scale Industries (SSIs), which employ about 49,903 persons. Textiles employ the maximum number of people – 10,562. This is followed by chemical and engineering units that are scattered across the Malur and Bangarpet taluks. The maximum number of small units is dedicated to brick making.

Figure 3.2 Map of Districts in Karnataka

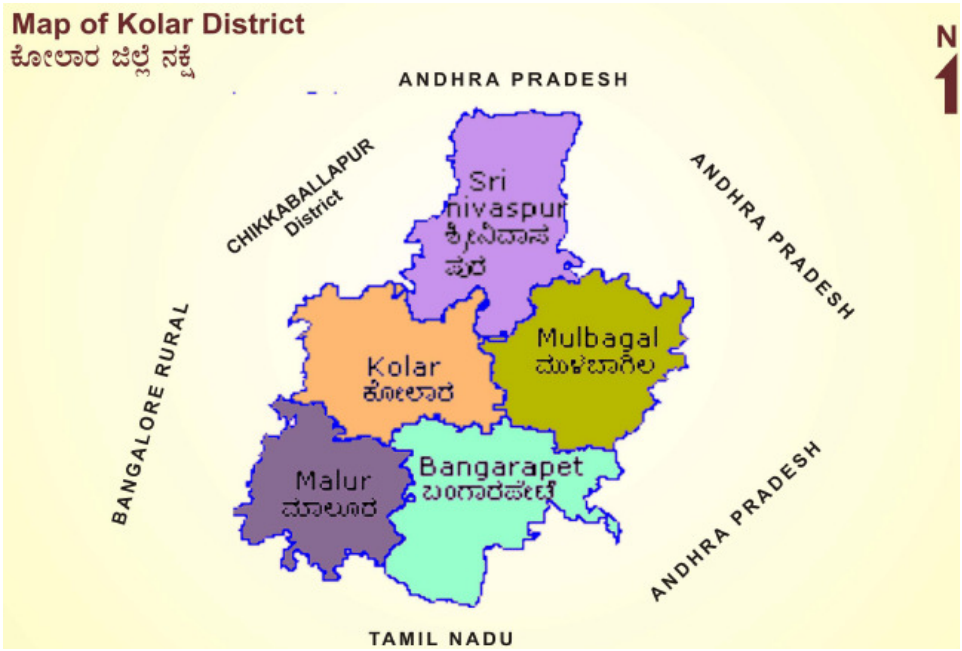


Figure 3.3 Map of Kolar District

The Government of India and the State Government have launched many financial schemes for industrial development in the district. The major schemes for development of industries are Credit Guarantee Fund Trust, Credit Linked Capital Subsidy schemes, Prime Minister Rozgar Yojana, several plan schemes for the development of Food Processing Industries, Swarozgar Credit Card Scheme, etc. The services sector includes construction, wholesale and retail trade, hotels and restaurants, transport, storage and communication, banking and insurance, real estate, public administration and other services. The chief contributors are trade and transport with about 17% and 9.4% respectively. In terms of education infrastructure, as of 2009-10, Kolar had 2,532 schools, 9 general colleges, one medical, one dental, 12 polytechnics and two engineering colleges. For vocational training, Kolar district had a total of 31 Industrial Training Institutes (ITIs) / Industrial Training Centres (ITCs) as of March 2012. The Government Departments also offer courses in trades such as sericulture, handloom, animal husbandry etc. (NSDC, 2013).

One of Kolar's biggest constraints to development is the acute water scarcity the district faces. The area irrigated by wells constitutes 99% of the total irrigated area. Dug well irrigation practice is largely replaced by bore-well irrigation.

Irrigation is being practiced both in the valley as well as in upland areas. Kolar district falls in the Eastern dry agro climatic Zone. It experiences a semi-arid climate, characterized by typical monsoon tropical weather with hot summers and mild winters. The year is normally divided into four seasons. They are; a) dry season during Jan-Feb, b) Premonsoon season during Mar-May, c) Southwest Monsoon season during Jun-Sep and d) Post or Northeast monsoon season during Oct-Dec. The southwest monsoon contributes around 55 percent of the annual rainfall. The other monsoon (NE) yields around 30 percent. The balance of around 15 percent results from the premonsoon. September and October are the wettest months with over 100mm monthly rainfall. Thunderstorms are common during the month of May. The post monsoon season often gets copious rains due to passing depressions. Normally April and May are hottest months with temperatures as high as 40° C. They are generally lowest during December being as low as 10°C. The topography of the district is undulating to plain. The soils of Kolar district occur on different landforms such as hills, ridges, pediments, plains and valleys. The types of soils distributed range from red loamy soil to red sandy soil and lateritic soil. Soil distribution map is given in figure below. Of the total area, about 73% is suitable for agriculture and horticulture; about 3% for forestry, pasture and the remaining area is suitable for quarrying, mining and as habitat for wildlife. Mode of ground water extraction is through borewells. Among the abstraction structures, borewells are predominant. The yield of borewells in hard rock varies generally from 15 to 200 m3/day. The depth of irrigation borewells range in depth from 100to 300 mbgl and the yield of borewells ranges from 0.5 to 20 m3/hour.In general, the ground water is of acceptable quality for irrigation and domestic use. The pH value of ground water ranges from 7 to 8.67 indicating that the water is alkaline in nature. Hence, ground water has a special significance for the all-round development of this water-starved district and plays a vital role in the development of this drought-prone area.[39]

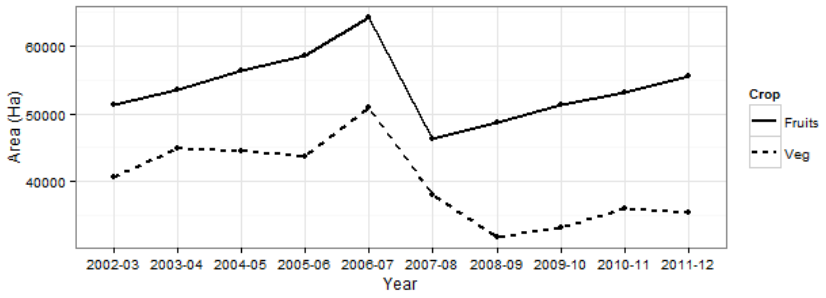
3.4 Development of Horticulture in Kolar District

Government of India has announced various programs in the State under National Horticulture Mission (NHM) to increase the production of horticulture crops. The

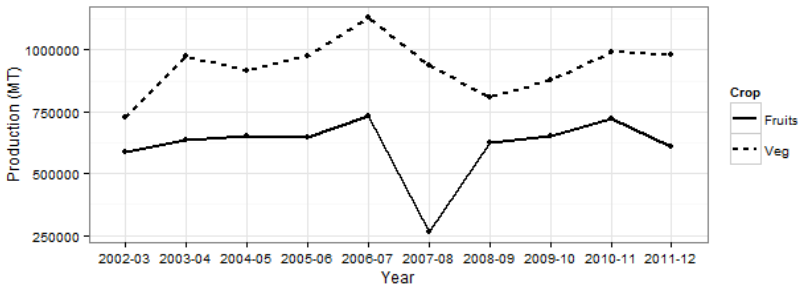
[39] "Ground Water Information Booklet, Kolar District, Karnataka", Central Ground Water Board, Ministry of Water Resources, Govt. of India, South Western Region, Bengaluru, November 2009.

Horticulture Department at Kolar utilized the funds available under National Horticulture Mission (NHM) to boost the production of horticultural crops. NHM is being implemented in all the Districts of Karnataka State to promote holistic growth of the horticulture sector covering fruits, vegetables, root and rubber crops, mushroom, spices, flowers, aromatic plants, cashew and cocoa. The main objectives of the Mission are: **i)** To provide holistic growth of the horticulture sector through an area based regionally differentiated strategies which include research, technology promotion, extension, post-harvest management, processing and marketing, in consonance with comparative advantage of each State / region and its diverse agro-climatic feature. **ii)** To enhance horticulture production, improve nutritional security and income support to farm households. **iii)** To establish convergence and synergy among multiple on-going and planned programs for horticulture development. **iv)**To promote, develop and disseminate technologies, through a seamless blend of traditional wisdom and modern scientific knowledge. **v)** To create opportunities for employment generation for skilled and unskilled persons, especially unemployed youth.

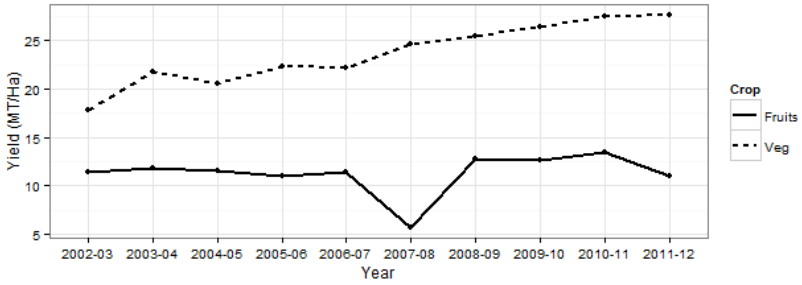
Prior to 2007, Kolar district comprised of 11 taluks. In 2007, Kolar district was bifurcated to form the new district of Chikballapur. Hence, 2007 onwards Kolar district comprises of 5 taluks. The trends in Area, Production, Yield and Value of Fruit and Vegetable Crops in Kolar district from 2002-12 are shown in Figure 3.4(a), 3.4(b), 3.4(c), and 3.4(d) respectively. From Figure 3.4(a), it is clear that over the years, the area under fruit crops show a constant linear increasing trend for both the time periods i.e., 2002-07 (before bifurcation) and 2007-12 (after bifurcation). The area under vegetable crops shows a fluctuating trend in both the time periods mentioned above. Figure 3.4(b), shows a constant trend in fruit production for both the time periods with slight decline in the last year. In case of vegetable production a fluctuating trend is observed. In Figure 3.4(c), a constant trend is observed in yield of fruit crops in both the time periods with a slight decline in the last year. Yield of vegetable crops depict a long run increasing trend in both the time periods. In Figure 3.4(d), a constant linear trend is observed in value of fruit crops till 2007. After 2007, a dramatic increase in value is observed for fruit crops in the district. The Value of vegetable crops depict a long run increasing trend with slight fluctuations in between.



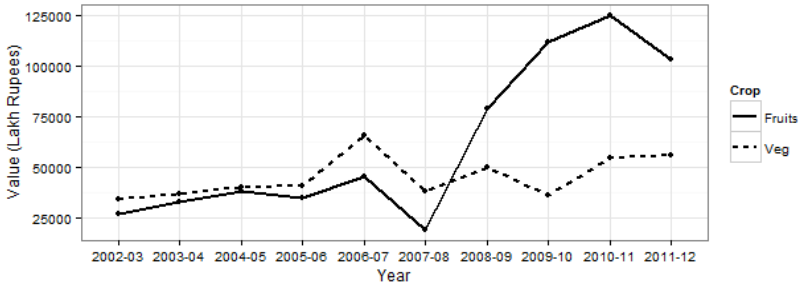
(a) Area under Fruit and Vegetable Crops in Kolar (2002-12)



(b) Production of Fruit and Vegetable Crops in Kolar (2002-12)



(c) Yield of Fruit and Vegetable Crops in Kolar (2002-12)



(d) Value of Fruit and Vegetable Crops in Kolar (2002-12)

Figure 3.4 Area, Production, Yield, and Value of Fruits and Vegetable Crops in Kolar(2002-12)

Source: Horticultural Crop Statistics of Karnataka State at a Glance: 2002-12.

Table 3.3 Demographics of Malur and Kolar as per 2011 Census

	Malur	**Kolar**
Geographical Area (Sq. Kms)	645	3969
Male	121238	779401
Female	115709	760830
Total Population	236947	1540231
Density Per Sq Km.	321	348
Sex Ratio Per 1000 Males	954	974
Literacy Rate	63.3	66.5
Hoblies	4	27
Gram Panchayats	28	156
Towns	1	6
Villages	363	1798

Source: Kolar District at a Glance 2011-12

Table 3.4 Agricultural Land Holding Particulars for Malur and Kolar as per 2010-11 Census

Category	**Location**	**Number**	**Number (%)**	**Area (Ha)**	**Area (%)**
Marginal	Malur	33725	69.65	13828.99	30.32
	Kolar	159140	67.19	67349.79	28.79
Small	Malur	9252	19.11	12693.68	27.83
	Kolar	49321	20.82	67975.38	29.06
Semi-Medium	Malur	4131	8.53	10945.00	24.00
	Kolar	21712	9.17	57598.40	24.62
Medium	Malur	1205	2.49	6646.18	14.57
	Kolar	6162	2.60	33843.90	14.47
Large	Malur	107	0.22	1493.89	3.28
	Kolar	520	0.22	7155.69	3.06
Total	Malur	48420	100	45607.75	100
	Kolar	236855	100	233923.09	100

Source: Kolar District at a Glance: 2011-12.

Table 3.5 Land Utilization Pattern of Malur and Kolar in 2011-12 (Area in Hectares and Percentages)

	Malur	**Kolar**
Forest	1560 (2.47%)	20620 (5.5%)
Land not available for cultivation	10165 (16.09%)	74547 (19.88%)
Other Uncultivated Land	13883 (21.98%)	52824 (14.09%)
Fallow Land	9236 (14.62%)	43761 (11.67%)
Net Area Sown	28322 (44.84%)	183214 (48.86%)
Geographical area	63166 (100%)	374966 (100%)

Source: Kolar District at a Glance: 2011-12.

Table 3.6 Cropping Pattern and Allied Indicators of Malur and Kolar (2011-12)

	Malur	**Kolar**
Total Cropped Area (in Ha)	30839	194233
Net Area Sown (in Ha)	28322	183214
% of Total Cropped Area to Net Area Sown	108.88	106.25
Area under Total Food Grains(in Ha)	14628	86727
% of Area under Total Food Grains to Total Cropped Area	47.46	44.65
Area under Fruit and Vegetable Crops(F&V) (in Ha)	6007	61453
% of Area under F&V to Total Cropped Area	19.48	31.64
Area under Horticultural Crops (in Ha)	15045	108139
% of Area under Horticultural Crops to Total Cropped Area	48.78	55.67
Area under Oil Seeds (in Ha)	688	11495
% of Area under Oil Seeds to Total Cropped Area	2.23	5.92
Area under Commercial Crops (in Ha)	51	208
% of Area under Commercial Crops to Total Cropped Area	0.16	0.11
Net Area Irrigated (in Ha)	4161	25351
% of Net Area Irrigated to Net Area Sown	14.69	13.83
Fertilizer (NPK) consumption in Kg	8504	42906
Fertilizer (NPK) consumption in Kg/Ha	27.57	22.73
Number of Tractors per 000' Ha	37	30
No. of Livestock Units	90945	799645
Per Capita Bank Credit to Agriculture (in 000'Rupees)	0.22	0.24

Source: Kolar District at a Glance: 2011-12, and Horticultural Crop Statistics of Karnataka State at a Glance: 2011-12.

3.5 Geographical Description and Socio-Economic Profile of Malur Taluk

Malur is a taluk and one of the towns in Kolar district of Karnataka. The geographical area of the taluk is 645 sq km. It is at a distance of 46 km from Bengaluru City and is located the Bengaluru - Chennai trunk railway line. As of 2011 India census, Malur had a population of 2,36,947. Males constitute 51.17% of the population and females 48.83%. Malur has an average literacy rate of 63.3%. In Malur, the density of the population is 321 per sq km and the sex ratio is 954. Table 3.3 shows the Demographics of Malur and Kolar as per 2011 Census. The languages spoken in Malur are Kannada, Telugu and Tamil. The economy of Malur is primarily dependent on agriculture, famous for clay tile-and-brick industry and some small scale industries. It is also famous for large number of Eucalyptus plantations. It has an average elevation of 910 metres (2985 ft).[40]

Malur is one among the 5 taluks of Kolar district and a part of Malur Loksabha Constituency. The taluk headquarter is at a distance of 32 km from the district headquarter. The taluk geographically lies between 78^{o} 8' 3'' & 77^{o} 50' 24'' longitude and 12^{o} 48' 24'' & 13^{o} 6' 57'' latitude. Malur taluk comes under Malur sub-division. This taluk is further divided into 4 hoblies, viz. Malur, Lakkur, Masthi and Tekal. There are 28 gram panchayats and 363 villages with one town. Malur town is the taluk headquarter. All the taluk level departments are located in Malur town. The taluk administration lies with the taluk panchayat for the implementation of developmental schemes and their progress. The taluk is endowed with excellent agro climatic conditions which are conducive, particularly for development of horticulture, floriculture, sericulture, agriculture, plantation crops, aromatic plants, medicinal plants, the sectors have immense export potential. The taluk has red loam soil which is suitable for cultivation purposes and responds to good manure and other treatments. The water-table in this type of soil is between 40 to 50 feet deep.

Table 3.4 shows the Agricultural Land Holding Particulars for Malur and Kolar as per 2010-11 Census. Majority of the farmers in Malur taluk are marginal farmers constituting around 69.65% of the total number of farmers, but holding only 30.32% of the total area. Small farmers constitute 19.11%, with land holdings of 27.83%. The semi-medium farmers represent 8.53% and have 24% of the area. The

[40] http://en.wikipedia.org/wiki/Malur

medium & large farmers constitute 2.49% & 0.22% respectively. Land holdings of medium & large farmers comprise of 14.57% and 3.28%, respectively. The average land holdings in Malur taluk by farmer category are: 0.41 Ha (marginal), 1.37 Ha (small), 2.65 Ha (semi-medium), 5.51 Ha (medium), and 13.96 Ha (large). The number and area of land holdings in Kolar district are similar to that of in Malur (see Table 3.4). Table 3.5 shows the Land Utilization Pattern of Malur and Kolar in 2011-12 (Area in Hectares and Percentages). According to the table forest constitutes 2.47%, land not available for cultivation constitute 16.09%, other uncultivated land constitute 21.98%, fallow land constitute 14.62%, net area sown constitute 44.84% of the total geographical area of the taluk. Similar numbers are observed in Kolar district (see Table 3.5).

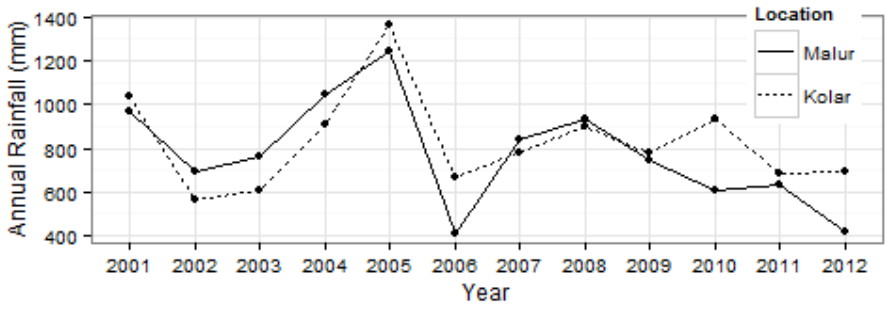


Figure 3.5 Annual Rainfall Pattern of Malur and Kolar (2001-12)
Source: **Kolar District at a Glance: 2011-12.**

Malur lies in the rain shadow and dry region, with no perennial rivers. The main source of water is ground water using tube wells. Farmers at Malur taluk and Kolar district are heavily dependent on tube wells for irrigation and entire irrigation is done through tube wells. In 2011-12, Malur had 15119 tubewells and Kolar had 81837 tube wells.[41] The gross sown area is about 108 percent in the taluk, which is all cultivated under borewells. There could be two reasons for this, the groundwater recharge still seems to be reasonably good. Second, extensive horticulture, which is usually short duration (usually 2 months for all vegetables), may involve repeated sowing in an agricultural season, could account for high share of gross sown area. Climate is dry and hot during summer in Malur taluk. Actual rainfall received in the taluk is 420.9 mm for the year 2012,which is below the district's average rainfall of

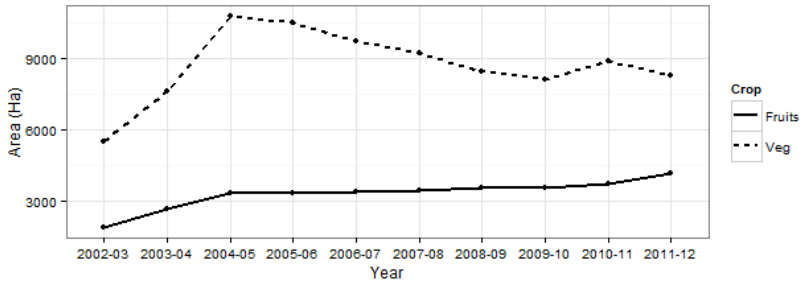
[41]Kolar District at a Glance: 2011-12., Government of Karnataka.

694 mm. Figure 3.5 shows the trend in Annual Rainfall Pattern of Malur taluk and Kolar district from 2001 to 2012 (in mms). Over the years, the rainfall pattern in the taluk as well as district shows a very fluctuating and decreasing trend in the long run.

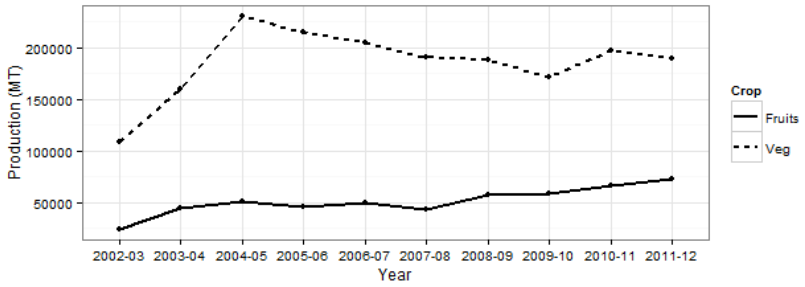
Being a dry land, the taluk produces minor millets and pulses like ragi, avare, and horse gram; some paddy, tur, cow pea, and maize is also grown under tube wells. Food grains draw 47.46% of total area under cultivation, while 48.78% of land is under horticultural crops which are extensively grown in the taluk. Kolar district has emerged as a fruit and vegetable growing region in the state with 31.64% of land cultivated under it. Fruits and Vegetables draw 19.48% of area under total cropped area in the taluk. In 2011-12, Malur ranked 1st among all the taluks in the district in yield of fruit crops. The Cropping Pattern and Allied Indicators of Malur and Kolar (2011-12) are shown in Table 3.6. From the table it is evident that the percentage of net area irrigated to net area sown in the taluk is 14.69%. Fertilizer (NPK) consumption in kg/ha is 27.57 and the no. of tractors per 000' ha is 37 which is higher than the Kolar district average of 30. The per capita bank credit to agriculture in the taluk is 0.22 in Rs. (000'). Similar numbers are observed in Kolar district (see Table 3.6).

The major fruit crops grown in the taluk are mango, jackfruit, banana, pineapple, citrus varieties such as pomegranate, grapes, guava, sapota, papaya. Major vegetable crops grown in the taluk are tomato, potato, onion, cabbage, carrot, brinjal, beans, green chillies, sweet potato, khol varieties, okra, radish, beetroot, capsicum, water melon, gourd varieties, drum stick, leafy vegetables, etc. The main spices grown in the taluk are tamarind, dry chilly, ginger, coriander, etc. Main floriculture activities undertaken in the taluk are marigold, crosandra, jasmine, chrysanthamum, tube rose, aster, etc. The major plantation crops grown in the taluk are cashew, coconut, aromatic plants. The soil in the taluk is excellent in promoting medicinal plant cultivation, which in turn provides raw materials for ayurvedic medicine, which has domestic as well as export market. Sericulture is a labour intensive sector and provides direct and indirect employment to rural people.[42]

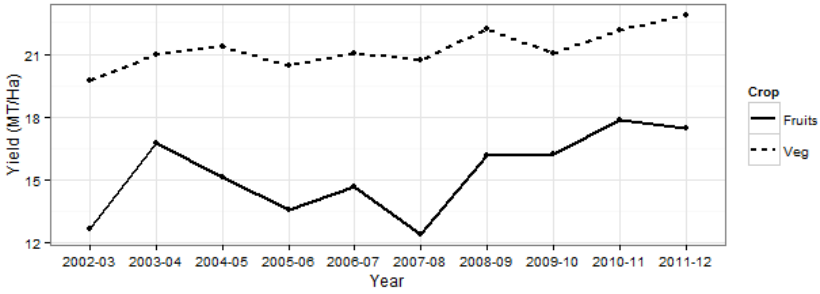
[42] Brief Report on Industrial Development Plan of Malur Taluk, Kolar District, 2006-11, Small Industries Service Institute, Government of India, Ministry of Small Scale Industries,Bengaluru.



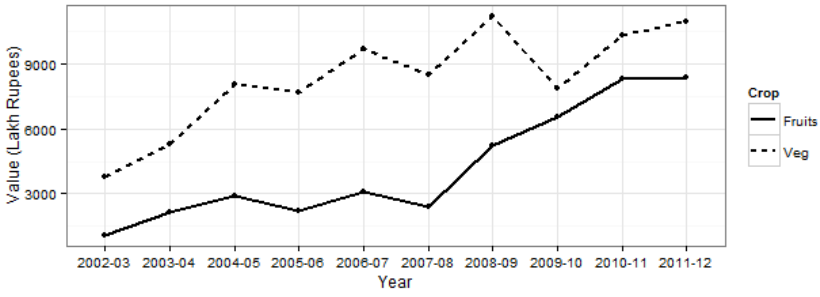
(a) Area under Fruit and Vegetable Crops in Malur (2002-12)



(b) Production of Fruit and Vegetable Crops in Malur (2002-12)



(c) Yield of Fruit and Vegetable Crops in Malur (2002-12)



(d) Value of Fruit and Vegetable Crops in Malur (2002-12)

Figure 3.6 Area, Production, Yield, and Value of Fruits and Vegetable Crops in Karnataka (2002-12)

Source: Horticultural Crop Statistics of Karnataka State at a Glance: 2002-12.

3.6 Development of Horticulture in Malur Taluk

The agro climatic and soil conditions in the Malur taluk are conducive for development of horticulture. The moderate climate enables vegetable cultivation and harvesting throughout the year and caters to various nearby and distant markets. From Figures 3.6 (a) and (b), it is clear that over the years, the area and production of fruit crops show a constant linear increasing trend. The area and production of vegetable crops depict a fluctuating trend. In Figure 3.6 (c), a fluctuating trend is observed in yield with substantial increment in the long run for fruit crops and slight increment in the long run for vegetable crops. Figure 3.6 (d), depicts a very fluctuating trend in value of both the fruit and vegetable crops with substantial increment in the long run.

The Government of India and the State Government have launched many financial schemes for the development of horticulture in the taluk. The major centrally sponsored and state level programs which are being implemented by the Horticulture Department of Malur Jilla Panchayat are listed below in detail.

A. Centrally Sponsored Programs:

1) National Horticulture Mission Program

National Horticulture Mission aims at accomplishing overall progress through different ways at the regional level. The main objectives of the program are to increase the productivity, food security and financial empowerment of the farmers.

2) Introduction of New Fruits and Area Expansion

a. For expansion of land for the cultivation of Mango and Sapota a sum of Rs.22500/- will be given per hectare. In the first year subsidy of Rs.11250/-, second year Rs.4,500/- and third year Rs.6,750/- will be given.

b. For expansion of land for the cultivation of Banana and Papaya an amount of Rs.15000/- will be given along with a subsidy of Rs. 7500/- in the first year and Rs.7500/- in the second year respectively.

3) Mango Cultivation (in old land) and Redevelopment of Unproductive land

For growing mango in a farm land which is older than 20 years or above a sum of Rs.15000/- will be given as subsidy.

4) Community Agricultural Pond

For the construction of community agricultural pond the sanction of subsidy would vary from Rs. 1 Lakh to 10 Lakhs. The construction should involve at least three farmers as beneficiaries.

5) Vegetables

Farmers who possess vegetable nursery and cultivate by using modern technologies will be given 25% subsidy and Rs. 7 per square meter to the maximum of 1 hectare.

6) Floriculture

Farmers are given various amounts of subsidy depending on their size of land. Also the growth of the crop should not exceed 1 month. Details are given below in Table 3.7.

Table 3.7 Schemes for Development of Floriculture

S.No	Name of the Crop	Quantity of Land	Subsidy
1.	Rose		
	Medium and Large Farmers	Per Acre	Rs. 9240/-
	Small and Marginal Farmers	Per Acre	RS. 14000/-
2.	Jasmine, Aster, Sevanthi and Kakda		
	Medium and Large Farmers	Per Acre	Rs. 3168/-
	Small and Marginal Farmers	Per Acre	Rs. 4800/-

Source: Malur Horticulture Department.

7) Vermiculture based Horticulture

For farmers changing into vermiculture a sum of Rs. 10000/- per hectare will be given as subsidy.

8) Bio Digester Unit

Any bio digester unit built in the measurement of 20x10x6 feet would be given 50% subsidy with a sum of Rs.30000/-.

9) Vermi Compost Unit

Any vermi compost unit would be given Rs.10,000/- and a subsidy of Rs.30000/-.

10) Save Plantation Program

To generate bio pesticides and neem oil medicines a maximum subsidy of 50% and a sum of Rs. 1,000/- worth medicine per hectare will be given.

11) Expansion of Cultivation Area for Medicinal and Fragrance Oriented Crops

For the expansion of cultivation area for medicinal and fragrance oriented crops a sum of Rs.11250/- will be given per hectare.

12) Safe Cultivation

a. For the construction of **High Cost Green House**, 33% subsidy for medium and large farmers per 1000 square meter will be given. For the small farmers Rs.215000/- per 1000 square meters and for the marginal farmers Rs.325000/- for 1000 Square meters will be given as subsidy.

b. For the construction of **Green House**, 33% subsidy for medium and large farmers per 1000 square meter will be given. For the small farmers Rs.83000/- and for the marginal farmers Rs.125000/- per 1000 square meter will be given as subsidy.

13) Malting

Those farmers who have used malting for horticulture will be given Rs.7000/- per hectare. Subsidy for a maximum of 2 hectares can be given.

14) Pack House

Under the Maximum Subsidy (Back Ended) Program, 25% subsidy and an amount of Rs.62500/- will be given.

15) Centrally Sponsored Drip Irrigation Project

For the drip irrigation program, 100% will be given for maximum of 2 acres. On the other hand 50% subsidy will be given for sprinkler irrigation. In the total sanction released list the beneficiaries are chosen on merit.

B. State Level Programs:

1) Control of Horticulture related Diseases and Pest Control Program

Farmers will be given a subsidy of 50% and Rs.1000/- per hectare.

2) Mechanization in Horticulture

Farmers will be given a subsidy of 50% a maximum amount of Rs.25000/- for the purchase of sprayers.

3) Introduction of New Varieties of Seed

Introduction and distribution of new varieties of seeds to farmers will be done by the State.

4) Development of Coconut Cultivation Program

For the induction of coconut exposure units in cluster villages an amount of Rs.17500/- per unit will be given as subsidy.

5) District and Taluk Level Programs

a. Under the 'Help Farmers Program', 50% discount and a maximum amount of Rs.200/- will be given to beneficiaries for the purpose of buying pesticides.

b. Training programs will be conducted for the male and female farmers to make them aware of cultivation methods.

6) Special Unit Program and Tribal Sub Program

For the farmers belonging to Schedule Caste and Schedule Tribe a maximum of Rs.2000/- will be sanctioned and distributed through Taluk Panchayat to buy high quality vegetable seeds.

7) National Rural Employment Guarantee Scheme (NREGS)

Under NREGS, there is a provision for the farmers to cultivate their field by using the services of the daily wage earners through the Gram Panchayat. This scheme can be availed by the farmers to a maximum extent of 5 acres.

8) Special Instruction

Under the National Horticulture Mission and Drip Irrigation Program, farmers have to pay full amount of the instrument and claim the subsidy later.

3.7 Conclusions

In this Chapter, we have discussed in detail the development of horticulture in Karnataka in general and Malur taluk of Kolar district in particular. Karnataka with its ten different agro-climatic zones and other bounteous natural advantages offers immense opportunities for high growth in agriculture and allied sectors. It has been the first state in the country to set-up a separate department for the development of horticulture. It is observed that the thrust given by the Government of India for the development of horticulture during the eighth plan period has started yielding results in the state. In recent years, due to introduction of the high yielding varieties through the improved technology and also commercialization, the productivity of horticultural crops has improved. The state contributes 9% of total fruit production and 5% of total vegetable production in the country. The centrally sponsored scheme of National Horticulture Mission, which is being implemented to address all the issues related to development of horticulture in the state has started yielding results. The trends in area, production & yield of fruit and vegetable crops from 2002-12 were analyzed in detail at the state, district and taluk level. In 2011-12, the state has occupied 4th place in area & production of fruit crops and 9th place in area &

production of vegetable crops in the country. This shows a clear indication that Karnataka is in the fore-front occupying 1st position in sapota; 2nd position in grapes & pomegranate; and third position in mango, papaya, pineapple, & mosambi production in the country. It also occupies 2nd position in onion and tomato production in the country.

Kolar district lies almost in the central part of peninsular India, which has immense bearing on its geoclimatic conditions. Hence the district experiences tropical climate throughout the year which favours the production of horticultural crops in general and fruit & vegetable crops in particular. In 2011-12, the percentage of cultivable area to geographical area was 62.24%, the percentage of area under horticultural crops to geographical area was 28.84%, and the percentage of area under horticultural crops to net area sown was 59.02% in the district. One of Kolar's biggest constraints to development is the acute water scarcity and the area irrigated by tube wells constitutes 99% of the total irrigated area. The Horticulture Department at Kolar utilized the funds available under National Horticulture Mission (NHM) to boost the production of horticultural crops. The main aim being to provide holistic growth of the horticulture sector through an area based regionally differentiated strategies which include research, technology promotion, extension, post-harvest management, processing and marketing. Kolar district has emerged as a fruit and vegetable growing region in the state with 31.64% of land cultivated under it.

Malur is a taluk and one of the towns in Kolar district of Karnataka. Majority of the farmers in the taluk are marginal farmers constituting around 69.65% of the total number of farmers, but holding only 30.32% of the total area. The taluk lies in the rain shadow and dry region, with no perennial rivers. The main source of water is ground water using tube wells and entire irrigation is done through tube wells. Being a dry land, the taluk produces minor millets and pulses like ragi, avare, and horse gram; some paddy, tur, cow pea, and maize is also grown under tube wells. Food grains draw 47.46% of total area under cultivation, while 48.78% of land is under horticultural crops which are extensively grown in the taluk. . Fruits and Vegetables draw 19.48% of area under total cropped area in the taluk. In 2011-12, Malur ranked 1st among all the taluks in the district in yield of fruit crops. The agro climatic and soil conditions in the taluk are conducive for development of horticulture. The moderate climate enables vegetable cultivation and harvesting throughout the year and caters to various nearby and distant markets. The Government of India and the

State Government have launched many financial schemes for the development of horticulture in the taluk. The major centrally sponsored and state level programs which are being implemented by the Horticulture Department of Malur Jilla Panchayat were analyzed in detail in the chapter. This shows the growth of the horticulture sector in the taluk.

With this background, we proceed to the next chapter to study the different marketing channels at Malur taluk for farmers to sell fresh produce particularly daily consumable vegetables.

4. Fresh Produce Marketing Channels of Malur

4.1 Introduction

Unlike processed and manufactured goods, fresh produce move quickly through the marketing system due to its perishable nature. Cold chain infrastructure helps in moving the fresh produce across countries and continents, and the produce can be in the system for a relatively longer period of time. Apart from large investment pumped in by the private sector, public sector has also taken initiatives and with APEDA's assistance several Centers for Perishable Cargoes and integrated post harvest handling facilities have been set up in the country. Capacity building initiatives at the farmers, processors and exporters' levels has also contributed towards this effort.[43] However, in developing countries, where the majority of the produce is domestically consumed, the marketing channels tend to move the produce quickly from the farmers to the consumers. For the scope of this thesis, we confine our discussion to vegetables and fruits as the fresh produce.

Development of the vegetable industry is constrained by poor marketing arrangements; there is a large gap between farmers and retail prices. There has been concern in recent years regarding the efficiency of marketing of fruits and vegetables, leading to high and fluctuating consumer price and only a small share of consumer rupee reaching to the farmer. The traditional retailing of vegetables is not very much organized, amounts to 97% of the total market, is extremely localized and highly fragmented with large number of intermediaries.[44] Marketing of fresh produce is complex because of perishability, seasonality and bulkiness. Low efficiency in the marketing channels and inadequate marketing infrastructure are believed to be the cause for fluctuating prices. Indian farmers depend heavily on middlemen in fruits and vegetable marketing. Fresh produce supply chain is highly *fragmented* with large number of farmers (producers) and a larger (several magnitudes of order) number of consumers. By fragmented we mean that there are no major *channel masters* who

[43] www.apeda.gov.in/apedawebsite/six_head_product/FFV.htm

[44] http://gvtindia.org/market_linkage_info

control the flow of goods from the producers to the consumers. In this chapter, we study the fresh produce marketing channels of Malur.

The rest of the Chapter is organized as follows. Section 4.2 discusses the marketing infrastructure for agricultural produce in India. The post-reform phase of the marketing framework is discussed in Section 4.3. The unique characteristics of fresh produce and the associated marketing and distribution channels are presented in Section 4.4. Section 4.5 briefly discusses the changing landscape of fresh produce marketing in India. The vegetable marketing channels of Malur are presented in Section 4.6. The sample of farmers studied in the survey is discussed in Section 4.7. Sections 4.8 to 4.15 present the organization and trade profile of different marketing channels of Malur. Section 4.16 concludes the chapter.

4.2 Marketing Infrastructure for Agricultural Produce in India

Marketing channels connecting urban with the rural are important institutions in capitalist development. For a late entrant like India, marketing and transport have started developing in a substantial way only after the arrival of railway lines during 1859-1930. The Royal Commission on Agriculture in 1928 recognized the importance of an efficient marketing system as a vital link between the farmer and the consumer in India. Some of the measures which were taken up before Independence to improve the marketing situation are: the establishment of the Directorate of Marketing and Inspection in 1935, the enactment of the Act for grading and standardization of agricultural commodities in 1937. Post-Independence period marked the establishment of regulated markets in the States under the Agricultural Produce Marketing Regulations Acts, conducting of commodity market surveys, etc. (Acharya, 2004). The Warehousing Corporations Act in 1962, and the National Grid of Rural Godowns Scheme of 1979, enabled the Central and State Warehousing Corporations to construct warehouses for storage of agricultural produce. However, these were confined to largely foodgrains. Finally, the Cold Storage Order in 1980, helped in expanding cold storage facility for preserving perishable agricultural commodities and fruits and vegetables found some help, while even the cold storages were largely used for storing pulses. As for the several other legislative acts concerned with reference to agricultural commodities such as: Forward Contracts (Regulation) Act, 1952; Prevention of Food Adulteration Act, 1954; Essential Commodities Act, 1955; Export (Quality Control & Inspection) Act,

1963; Standards of Weights and Measurers Act, 1976; Consumer Protection Act, 1986; and Bureau of Indian Standards Act, 1986 were enacted that have important ramification for fresh produce (Hegde and Madhuri, 2013).

Apex institutions and organizations were set up for facilitating various marketing functions. The **State Trading Corporation** of India Ltd. (STC) set up in 1956 is a premier International trading company of the Government of India engaged primarily in exports, and imports operations. Today STC undertakes exports/imports of a diverse range of items to/from countries all over the world. Its export basket includes wheat, rice, tea, coffee, cashew, extractions, castor oil/seed, sugar, spices, and processed foods.[45] **Central Warehousing Corporation** (CWC) is a premier Warehousing Agency in India, established during 1957, provides logistics support to the agricultural sector. CWC is operating 464 Warehouses across the country with a storage capacity of 10.54 million tons providing warehousing services for a wide range of products ranging from agricultural produce to sophisticated industrial products. Apart from storage and handling, CWC also offers services in the area of clearing & forwarding, handling & transportation, procurement & distribution, disinfestation services, fumigation services and other ancillary activities.[46] The **National Agricultural Cooperative Marketing Federation** (NAFED) is the apex cooperative marketing organization established on 2nd October 1958. It is registered under the Multi State Co-operative Societies Act. It was founded to promote the trade of agricultural produce and forest resources across the nation. It is now one of the largest procurement as well as marketing agency for agricultural products in India. It was setup with the objective to promote Co-operative marketing of Agricultural Produce to benefit the farmers, though in practice it is the traders who utilize them most. Indeed, it is supposed to be a national level farmers' cooperative marketing organization which provides remunerative prices to the farmers for their produce and ensures timely payment; promotes cooperative marketing of agricultural produce; bridges the price gap between the producer and the consumer; and stabilizes prices of essential commodities.[47] The **National Cooperative Development Corporation** (NCDC) was established by an Act of Parliament in 1963 as a statutory Corporation

[45] http://www.stc.gov.in/overview/history/objectives.aspx

[46]http://cewacor.nic.in/index.php

[47] http://www.nafed-india.com/home.asp

under the Ministry of Agriculture. Its functions are: Planning, promoting and financing programs for production, processing, marketing, storage, export and import of agricultural produce, food stuffs, certain other notified commodities e.g. fertilizers, insecticides, agricultural machinery, lac, soap, kerosene oil, textile, rubber etc.; Supply of consumer goods and collection, processing, marketing, storage and export of minor forest produce through cooperatives; Income generating stream of activities such as poultry, dairy, fishery, sericulture, handloom etc.[48] The **Food Corporation of India** (FCI) was setup under the Food Corporation's Act 1964, in order to fulfill following objectives of the Food Policy: Effective price support operations for safeguarding the interests of the farmers; Distribution of food grains throughout the country for public distribution system; and Maintaining satisfactory level of operational and buffer stocks of food grains to ensure National Food Security.[49] The **Agricultural Prices Commission** was set up in January, 1965 to advise the Government on price policy of major agricultural commodities with a view to evolve a balanced and integrated price structure in the perspective of the overall needs of the economy and with due regard to the interests of the producer and the consumer. Since March 1985, the Commission has been known as **Commission for Agricultural Costs and Prices** (CACP).[50] The Commission's jurisdiction largely confines only to food grains.

National Horticulture Board (NHB) was set up by the Government of India in 1984 as an autonomous society under the Societies Registration Act 1860. Its major aims and objectives are: Development of hi-tech commercial horticulture in identified belts; Promotion and market development of fresh horticulture produce; Development of integrated, energy efficient cold chain infrastructure for fresh horticulture produce; Development of modern post-harvest management infrastructure; Popularization of identified new technologies / tools / techniques for commercialization / adoption, after carrying out technology need assessment; promotion of field trials of newly developed/ imported planting materials and other farm inputs, production technology, PHM (Post Harvest Management) protocols, INM (Integrated Nutrient Management) and IPM (Integrated Pest Management)

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[48] http://www.ncdc.in/index_files/GenesisAndFunctions.htm

[49] http://fciweb.nic.in/

[50] http://cacp.dacnet.nic.in/

protocols, and applied R&D programs for commercialization of proven technology.[51] The **Agricultural and Processed Food Products Export Development Authority** (APEDA) was established by an Act of Parliament in December, 1985. APEDA is mandated with the responsibility of export promotion and development of the following scheduled products: Fruits, Vegetables and their Products; Meat and Meat Products; Poultry and Poultry Products; Dairy Products; Confectionery, Biscuits and Bakery Products; Honey, Jaggery and Sugar Products; Cocoa and its products, chocolates of all kinds; Alcoholic and Non-Alcoholic Beverages; Cereal and Cereal Products; Groundnuts, Peanuts and Walnuts; Pickles, Papads and Chutneys; Guar Gum; Floriculture and Floriculture Products; Herbal and Medicinal Plants. In addition to this, APEDA has been entrusted with the responsibility to monitor import of sugar.[52] **Spices Board** was constituted on 26th February, with the merger of the erstwhile Cardamom Board (1968) and Spices Export Promotion Council (1960). Spices Board is one of the five Commodity Boards functioning under the Ministry of Commerce & Industry. It is an autonomous body responsible for the export promotion of the scheduled spices and production development of some of them such as Cardamom. India produces a wide range of spices. At present, production is around 3.2 million tons of different spices valued at approximately 4 billion US Dollars, and holds a prominent position in world spice production. Under the act of Parliament, a total of 52 spices are brought under the purview of Spices Board. However 109 spices are notified in the ISO list.[53] **National Institute of Agricultural Marketing** (NIAM) is a premier National level Institute set up by the Government of India on 8th August 1988 at Jaipur (Rajasthan), to offer specialized Training, Research, Consultancy and Education in Agricultural Marketing.[54] Agricultural Marketing Research is one of the important areas which needs substantial documentation strength to develop strategic policies in order to achieve a paradigm shift in agriculture towards commercialization. Working together as partners,

[51] http://nhb.gov.in/about.html

[52] http://www.apeda.gov.in/apedawebsite/about_apeda/About_apeda.htm

[53] http://www.indianspices.com/

[54] http://www.ccsniam.gov.in/orgainisation.html

disseminating information and sharing knowledge at the national and global levels are the fundamental ethos of the Institute.[55]

4.3 Marketing Framework for Agricultural Produce: The Post-Reform Phase

In India the agricultural marketing system consists of: Regulated Markets, Agricultural Cooperative Marketing Societies, Public Sector Trading and Futures Trading. Private trading also takes place out of these segments. The **Regulated Markets** have been organized in most of the States to facilitate trading in an orderly manner in specified commodities at specified places at the least margin. Comprehensive rules have been framed and market committees have been set up to enforce discipline among the participants under the respective State Agricultural Produce Marketing Regulations Act. The number of regulated (secondary) agricultural markets stood at 7,157 as of March 2010 as compared to just 286 in 1950. There are also about 22,221 rural periodical markets, about 15 per cent of which function under the ambit of regulation (GoI, 2011). **Agricultural Cooperative Marketing Societies** generally undertake marketing of agricultural produce on behalf of the members and also supply agricultural inputs to them. Recently cooperatives have diversified their activities into other areas such as constructing warehouses, providing credit facilities, processing of agro-products, etc. Some of the **Public Sector Trading** agencies of India are **State Trading Corporation** (STC) and **Metals and Minerals Trading Corporation** (MMTC). Established in 1963, MMTC is widely recognized as India's largest international trading company with a turnover of around 10 billion US Dollars. It is a global player in the Agro trade, with its comprehensive infrastructural expertise to handle agro products. It provides full logistic support from procurement, quality control to guaranteed timely deliveries of agro products from different parts of India through a wide network of regional and port offices in India. The company's bulk exports include commodities such as rice, wheat, wheat flour, soya meal, pulses, sugar, processed foods and plantation products like tea, coffee, jute etc. It also undertakes extensive operations in oilseed extraction, from the procurement of seeds to the production of de-oiled cakes for export, as well

[55] http://en.wikipedia.org/wiki/National_Institute_of_Agricultural_Marketing

as the production of edible oil for domestic consumption.[56] There are two important developments with reference to agricultural marketing that have taken place. First, the APMC Act is amended to enable private corporate entities to purchase agricultural produce outside the regulated markets, directly at the farm gates from farmers and at their own warehouses. Second, **Futures Trading** is allowed to protect the market participants from the risk arising out of adverse price fluctuations. The hedging and price discovery functions of future markets promote more efficient production, storage, marketing and agro-processing operations and help in improvement in overall agricultural marketing performance.[57] Commodity futures markets in the country are regulated through Forward Contracts (Regulation) Act, 1952. National Agricultural Policy 2000, supported commodity futures. The Guru committee (2001) on "Strengthening and Developing Agricultural Marketing" emphasized the need for and role of futures trading in price risk management and in marketing of agricultural produce. At present, 25 commodity exchanges are in operation in India carrying out futures trading in as many as 81 commodity items. Most of these exchanges are regional and commodity specific exchanges. National Multi Commodity Exchange (NMCE) was the first exchange to be granted permanent recognition by the government, where futures trading started from 26th November, 2002 in 24 commodities (includes cash crops, food grains, plantations, spices, oilseeds). Subsequently, Multi Commodity Exchange of India (MCX), National Commodity and Derivatives Exchange Limited (NCDEX), Indian Commodity Exchange (ICEX) and Ace Commodity Exchange (ACE) commenced their operations, respectively, from November 2003, December 2003, November 2009 and October 2010. Apart from these, there are about 16 recognized futures exchanges in India with more than 3000 registered members. Trading platforms can be accessed through 20000 terminals spread across 800 towns/cities across the country. Forward Markets Commission (FMC) under the Ministry of Consumer Affairs is the chief regulator of futures trading in India (Sendhil *et al*, 2013).

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[56] http://mmtclimited.gov.in/

[57] http://www.agritech.tnau.ac.in/banking/PDF/Farm%20Sector%20Schemes_Agricultural%20Commodity%20Futures%20Markets.pdf

4.4 Characteristics of Fresh Produce and its Marketing

In this section, we briefly describe the characteristics of the fresh produce and its marketing and distribution channels.

4.4.1 Characteristics of Fresh Produce

The nature of the marketing channels depends on the characteristics of the produce. For the fresh produce like vegetables and fruits, the marketing channels should take into account the perishability of the produce. Mallen (1967), HSRC (1991), Seitz, Nelson and Halcrow (1994), and NAMC (2000) identify the following characteristics of fresh produce:

a) A large proportion of fresh produce is produced at a considerable distance from consuming markets.
b) The weather, pests and diseases have an important effect on production.
c) The time cycle of production is relatively rigid.
d) Fresh produce is perishable.
e) The quality of produce varies.
f) Fresh produce varies according to weight-value relationships. In general, *bulky* produce (e.g. potatoes and cabbages) has lower relative prices/kg, while lighter, *fancy* fruits and vegetables obtain higher prices/kg.
g) There is an important institutional demand (from restaurants, hotels, hospitals, etc.) in addition to the ultimate consumer demand for fresh produce.
h) Fresh produce is convenience produce. This implies that consumers have a comprehensive knowledge about fresh produce and are not prepared to put a great deal of effort into comparing price and quality. The potential advantages or savings to be derived from comparisons normally do not warrant the additional time taken up by shopping.

4.4.2 Characteristics of Fresh Produce Distribution

Due to the nature of the fresh produce discussed in the previous section, the distribution and marketing of the fresh produce has the following characteristics (Mallen 1967; HSRC 1991):

a) Transportation and storage as well as grading and packing of fresh produce are of greater significance than for most manufacturing industries.

b) Agricultural producers should be provided with a variety of alternatives for transfer of ownership.
c) Middlemen mostly specialize in the price-determining and risk-bearing aspects of the channel.
d) Different channels apply for institutional demand and ultimate consumer demand.
e) Products should be within easy reach of consumers, which requires a developed retail network and intensive distribution.
f) Convenience products lend themselves ideally to self-service marketing. This shifts the burden of the marketing communication process to the retailer and the producer.
g) Self-service requires effective packaging, shelf space and advertising at the point of sale.

4.5 Changing Landscape of Fresh Produce Marketing in India

In the section we discuss the changing landscape of fresh produce marketing in India with the advent of retailers and policy amendments.

4.5.1 APMC Markets

In India, the primary terminal markets are regulated by Agricultural Produce Marketing Committee (APMC). APMC is a marketing board established by respective state governments in India that facilitates a fair marketing channel for farmers to sell agricultural produce. As per the Constitution of India, Agricultural Marketing is state governed and hence regulated under State APMC acts. The basic objective and contribution of regulated markets has been:

a) to ensure reasonable gain to the farmers by creating environment in markets for fair play of supply and demand forces;
b) to regulate market practices and attain transparency in transactions;
c) providing proper method of sale, correct weighing, prompt payment and various marketing related services.

However, the major constraints in agricultural marketing are:

d) Predominantly marginal or small farmers – Hence small marketable surpluses & limited bargaining power;
e) Poor availability of markets & monopolistic tendencies of APMCs;

f) Inadequate infrastructure in wholesale markets/ rural primary markets;
g) Lack of fair price discovery mechanism;
h) Multiple and exploitative intermediaries – low returns;
i) Fragmented supply chain, poor cold chain & high post-harvest losses;
j) Lack of cleaning, grading, packaging & quality certification facilities; and
k) Limited access to market information and marketing opportunities available.

Amendments in APMC Act were suggested by Expert Committee on Market Reforms. The Committee was constituted by the Ministry of Agriculture in June, 2001. Expert Committee recommendations were discussed in the National Conference of State Agriculture Marketing Ministers on Sept. 27, 2002. Committee headed by Additional Secretary (AM), GoI, including State Representatives set up to draft a Model Law for Agri-Marketing. Model APMC Act was finalized on Sept. 9, 2003 by the Committee and circulated to States by Central Government. A panel of State ministers asked the State Governments to amend the APMC Act at the earliest to create *barrier-free national market* for the farming community and encourage private investment.

The model APMC Act was circulated to the State Governments for implementation in 2007. Since then, 16 States have already made amendments in the Act. The Act suggested choice of multiple and competitive market channel to farmers, independent regulatory authority to encourage private investors and smooth license and registration of traders in mandis. That apart, the committee also stressed on measures on dissemination of market information and promotion of grading, standardization, packaging and quality certification of agricultural produce. It has also suggested states to waive off market fee on fruit and vegetables with the Union Government compensating the loss to APMC and single-window unified single registration for traders or market functionaries across the states.

Among other points, the committee has also advocated that APMCs are authorized to collect Intermediary charges which vary across different states in India. The market fee ranges between 0.5 – 2% of the sale value of the produce. Commission charges range between 1 – 2.5% for food grains, and 4 – 8% for fruits

and vegetables.[58] The other major recommendations of the committee are need for viability gap funding to attract private sector investment and agricultural markets may be treated as infrastructure project so as to invite economic source of funding of foreign direct investment (FDI) or external commercial borrowings (ECB).[59]

Major govt. initiatives based on reforms: a) Reform-linked central assistance to encourage public/ private investment for development of marketing infrastructure, common facilities for aggregation & value addition of produce and grading/ packaging/ quality certification facilities; b) Scheme to set up modern terminal markets under National Horticulture Mission (NHM) for perishable agricultural produce with suitable backward & forward linkages; c) Development of post-harvest/ cold chain infrastructure, CA storage facilities, refrigerated transportation by road/ rail, perishable cargo centres at air & sea ports under NHM; and d) Action Plan for development of Food Processing Industries including setting up of Mega Food Parks.

4.5.2 Direct Marketing by Farmers

Direct marketing by farmers eliminates middlemen and the highly perishable fresh produce like vegetables, fruits, and flowers reach the consumers directly with less wastage. If farmers directly sell their produce to the consumers, it not only saves losses but also increases farmers' share in the price paid by the consumer. Given the above advantages some state governments arranged facilities for the farmers to sell their produce directly to the consumers at reasonable prices, fixed on a daily basis, which did not unfortunately yield very encouraging results, farmers have substantial transaction costs and opportunity costs in indulging in marketing. We discuss here briefly this innovative marketing channel that benefits both the farmers and the consumers (NABARD, 2001).

4.5.2.1 Apni Mandi (Punjab and Haryana)

The Punjab State Agricultural Marketing Board started Apni Mandi in Feb, 1987. After this successful experiment now the Board is holding Apni Mandis in 27 towns

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[58] Final Report of Committee of State Ministers, In-charge of Agriculture Marketing to Promote Reforms, Ministry of Agriculture, Department of Agriculture and Co-operation, Government of India, January,2013.

[59] *Panel urges States to amend APMC Act to remove 'barriers'*, cited in 'Business Line', New Delhi, Sept. 8, 2012.

in the State including Chandigarh. These *Apni Mandis* are similar to the Saturday markets of United Kingdom and United States of America. Farmer producers bring the produce for sale directly to the buyers or consumers. The APMC of the area where Apni Mandi is located provides all necessary facilities like space, water, shed, counters and weighing balances. Farm level extension services of the relevant departments are also pooled in, securing the benefit of on-going Government scheme to Apni Mandi farmers. The benefits include input subsides, better quality seeds and loans at reasonable rates of interest from the Bank. An evaluation study has shown that Apni Mandi has really proved a blessing for the farmers particularly the small farmers and boon to the consumers.[60]

4.5.2.2 Rythu Bazars (Andhra Pradesh)

The Government of Andhra Pradesh initiated the *Rythu Bazars* on January 26, 1999. There are around 100 Rythu Bazars covering nearly 40,000 farmers of 2,800 villages in all the district head-quarters and important cities in Andhra Pradesh. Rythu Bazars are located on government lands identified by the District Collectors and the maintenance expenditure is handled by APMC. The locations are decided in such a way that they are convenient to both for the farmers and consumers. The criteria for opening of new Rythu Bazar are the availability of at least one acre of land in strategic location, and identification of 250 vegetable growing farmers including 10 farmer groups. The price fixation in Rythu Bazars is through a committee of farmers and the Estate Officer. The prices in Rythu Bazars are generally 25 per cent above the wholesale rates and 25 per cent less than the local retail price, so that there is enough incentive for the farmers to sell directly and also incentive for the consumers to buy directly. However, there is no foolproof way to check the identity of farmer, in practice, middlemen continued to mediate as the farmers have high opportunity costs to focus on marketing, and the margins do not give the incentive (GoI, 2007).

4.5.2.3 Uzhavar Santhai (Tamil Nadu)

Uzhavar Santhai was introduced as a direct marketing channel in 1999 in Tamil Nadu. The markets are located in an urban consumer area, where adequate number of consumers can approach to the market easily. The prices are daily fixed at the

[60] http://mandiboard.nic.in/ach-apni-mandi.htm

average of 20% higher than the wholesale prices and 15% less than retail prices by the Committee consisting of the representatives of farmers and officials. The prices are publicly displayed in front of each shop as well as exhibited in big signboards of the market and it is ensured by the Department staff that they are sold at the fixed rates.

Horticultural Department officials identify vegetable growing farmers in the villages and photo identification cards are issued to those farmers. Shops are allotted at free of cost to the farmers who bring their produce on first come first served basis. There is no permanent allotment of shops to farmers. The farmers are permitted to bring their produce without any fair for their luggage in special trips from the villages to the markets. Hill vegetables are sold in Uzhavar Santhais through women self help groups and Cooperative Societies. Weighing scales are provided at free of cost for the use of farmers and they are retrieved when the market closes. Uzhavar Santhai also functions as a Technical Information Centre and Training Centre to the farmers. Seeds and other Inputs are also provided in some of the markets.

Uzhavar Santhai are maintained by Agricultural Marketing Department and manned by the staff of the Department of Agricultural Marketing, Agriculture, and Horticulture. The District Collector is the coordinator for the respective districts whereas in the state as a whole, the scheme is implemented by the Director of Agricultural Marketing and Agribusiness.[61]

4.5.2.4 Raithara Santhe (Karnataka)

Karnataka Agricultural Marketing Board established Raithara Santhe as direct markets in July, 2002. The board has created the entire infrastructure for marketing fruits and vegetables directly from the growers to the consumers without any middlemen or commission agent. Apart from basic amenities the registered farmers are provided with electronic scale.[62]

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[61] http://www.agritech.tnau.ac.in/agricultural_marketing/agrimark_Farmers%20market.html

[62]http://articles.timesofindia.indiatimes.com/2002-07-05/Bengaluru/27302763_1_farmers-santhe-wholesale-prices

4.5.2.5 Krushak Bazar (Odisha)

Under 12 point initiative programme of Odisha State Agricultural Marketing Board, the Krushak Bazars have been set up in the state of Odisha in 2000-01, to help farmers sell their agricultural produces directly to the consumers. There are 43 krushak bazars in 24 districts. The purpose is to empower farmer-producer to compete effectively in the open market to get a remunerative price and ensure products at affordable prices to the consumer. It is a direct market model with forward linkages linking farmers to markets.[63]

4.5.2.6 Shetkari Bazar (Maharashtra)

Goverment of Maharashtra in July 2002 decided to set up Shetkari Bazars in the State and the Maharashtra State Agricultural Marketing Board (MSAMB) is the nodal agency for implementing this scheme. Shetkari Bazar is a concept of direct marketing, by producer (farmer) to consumers. By circumventing the intermediateries, the produce reaches in good shape with minimum handling. This results in better price realisation for farmer producer with enhanced share in consumer rupee and good quality produce to consumer at reasonably lower prices. This helps small farmers with small quantity of perishable, fruits and vegetables get fair price and escape commercial exploitation in the market place.[64]

4.5.2.7 Hardaspar Vegetable Market (Pune)

Hadaspar vegetable market is a model market for direct marketing of vegetables in Pune. This is one of the ideal markets in the country for marketing of vegetables. In this market, there are no commission agents/middlemen. The market has modern weighing machines for weighing the products. The produce is weighed in the presence of licensed weighmen of the Market Committee and sale bill is prepared. The purchasers make payment of the value of produce directly to the farmer.[65]

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[63] http://www.osamboard.org/krushak_bazar.aspx

[64] http://www.msamb.com/schemes/default.htm

[65] http://agropedialabs.iitk.ac.in/agrilore/sites/default/files/7.TOMATO%20ppt_0.ppt#293,8,Slide 8

4.5.3 Terminal Markets

Terminal markets which have become an important feature in developed countries, are expected to gain ground in India. They are expected to be located nearer to big cities and terminal points providing the final link in the market structure. The terminal market concept promoted in India is expected to link the farmers to these markets directly through collection centers. Government of India has announced to set up eight terminal market complexes for perishables at Nagpur, Nashik, Bhopal, Kolkatta, Patna, Rai, Chandigarh and Mumbai during 2006-07. The proposed terminal market complex will be in *hub and spoke* format, with terminal market as *hub* and collection centers near to the production areas as *spoke*. The terminal markets provide multiple options to farmers for disposal of produce. Such markets are expected to reduce post harvest losses and increase farmers' realization.

SAFAL, the Fruit & Vegetable business initiative of Mother Dairy Fruit & Vegetable Pvt. Ltd has its origin in the Fruit & Vegetable Project established by National Dairy Development Board (NDDB) in 1986 for undertaking integrated marketing of horticultural produce under the brand name SAFAL.[66] The SAFAL market in Bengaluru is an establishment of an auction market through clock auction, backward linkage through farmer associations and a forward linkage in form of cash and carry semi-wholesale and retail stores. SAFAL market comprises of a terminal market capable of handling approximately 1,600 tons per day of fresh fruits and vegetables at full capacity. The market infrastructure also has the facility of cold storage, grading, sorting and distribution.

The market is supported by 250 Horticultural Farmers' Associations organized throughout India with more than 20,000 members. The farmers' associations are linked to 40 collection centers that are equipped to meet the specific or special requirements of buyers in terms of quality, packing and weighing. Farmers or the wholesale purchasers have to register themselves with SAFAL Market on a very nominal charge and become its member, in order to involve themselves with the daily transactions. This is necessary to enable the SAFAL authorities to have consistent suppliers and takers and plan their future demand.

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[66] http://www.motherdairy.com/MotherDairyPages/branddetailpage.aspx?HLID=7

Farmers cost to market their produce through collection centers of SAFAL has almost reduced by half. A traditional commission agent was charging them 8-10 per cent while the handling charges at SAFAL Markets are only 4.25 per cent (Chengappa and Nagaraj, 2005). Farmers are being provided with payment for their produce on weekly basis in form of account payee cheque. Farmers selling their produce to SAFAL realize 10 to 15 per cent higher profit as compared with traditional channel. They gain through proper weighing of produce, low transaction cost, less input cost, efficient transportation, less wastage, right price and extension services.

4.5.4 Contract Farming

Contracts basically involve four things—pre-agreed price, quality, quantity or acreage (minimum/maximum) and time. The contracts could be of three types: (a) procurement contracts under which only sale and purchase conditions are specified; (b) partial contracts wherein only some of the inputs are supplied by the contracting firm and produce is bought at pre-agreed prices; and (c) total contracts under which the contracting firm supplies and manages all the inputs on the farm and the farmer becomes just a supplier of land and labor (Singh, 2002).

Contract Farming entails an agreement between farmers and sponsors (Government Bodies/ Corporate/Processors/Individual Entrepreneurs) to co-ordinate and promotes production and marketing of agricultural produce. The farmers produce quantity and quality as per sponsor's requirements and the Sponsor/s provide support in terms of agri-inputs, credit, improved farm practices, markets and fixed price procurement and marketing of produce. Contract Farming is essentially demand/market driven unlike traditional farming that first produces a commodity and then looks for its market. For a single crop/or commodity, a simple Centralized Model with a single sponsor could suffice, whereas for Multicrop Multiyear Contract Farming, like the one adopted by the Punjab agriculture industries corporation, a Multipartite Model involving a variety of organizations, frequently including statutory bodies, is followed.[67]

Contract farming is one of the most significant and powerful means by which farmers are integrated into national and international commodity markets and agro-

[67]Punjab Agro Industries Corporation Limited**,** (http://www.punjabagro.com)

industrial markets. The nature and structure of contract farming systems vary widely from country to country, but a fundamental element is the vertical concentration of producers in which the states attempt to supervise and condition the production patterns of farmers (Little and Watts, 1994). Many researchers view this institutional form as an integral element in the new international division of labor in agriculture and the new internationalization of agriculture. Contract production is very prominent in the horticultural and tree crops, floriculture and industrial animal husbandry sectors.

The Government of India (GoI) initiated contract farming to facilitate *third-party* investment so that benefits of the market-driven economy reach the farmers. States need to amend the Agricultural Produce Market Committee (APMC) Act for allowing contract farming. The Government of India's National Agriculture Policy envisages that *private sector participation will be promoted through contract farming and land leasing arrangements to allow accelerated technology transfer, capital inflow and assured market for crop production, especially for oilseeds, cotton and horticultural crops*. Contract farming has been there in India since the 1960s in seed production, in both private and public sectors. Also, since the Land Ceiling Act does not permit non-farmers to own land, there is no other way to get specified produce than through contract farming. So as market demand changed in the 1980s and 1990s, contract farming became more common, starting with Pepsi in Punjab in tomatoes and potatoes in the mid-1990s as a first case of perishable-produce contract farming, other than a few other cases in some other crops elsewhere in India.[68] Kuppam project initiated in 1997 by an Indian Corporation (M/S BHC Agro) with support from the Govt. of Andhra Pradesh is a form of contract farming. Export crops such as *potatoes*, *gerkhins,* and *chilies* are grown using expensive imported Israeli technologies for dry land farming. The land is leased from small and medium farmers, who are offered work as labourers on the consolidated holding managed by the company (Chowdry et.al 2000).

4.5.5 Agri Export Zones

The concept of *agri-export zone* (AEZ) attempts to take a comprehensive look at a particular produce located in a contiguous area for the purpose of developing and

[68] http://www.frontline.in/cover-story/it-excludes-farmers/article4888083.ece#test

sourcing for raw materials, their processing and packaging, and finally their export (Viswanadham, 2005). Agri-export zones (AEZs) have been approved by the Govt. of India (GOI) with a total envisaged investment of Rs 1,325 crore. A total number of 48 AEZs have been approved in 19 States of India. Since the AEZ was flagged off in the 2001 Export-Import (Exim) Policy, the actual investment flows from both the State governments as also private sector was only Rs 145 crore in 2002. The concept of AEZ's which aims to give fillip to agriculture exports, comprises the following a) Identifying a potential zone based on agro-climatic requirements for a particular crop b) Integrating various assistance programs of Central and State Government agencies and providing fiscal incentives to exporters. c) Implementing the same through involvement of private and public partnership and d)Integrating all the activities till the produce reaches the market. There are several success stories of AEZs. For the first time, 170 tonne processed litchi was exported from Bihar in 2003, over Rs 58 crore worth of gherkins had been exported from Karnataka and Export of three tonnes of flowers occurred from a model farm in Tamil Nadu. For the first time, vegetables such as snow peas, snap-peas and okra were shipped in Punjab. The total exports from AEZ were of the order of Rs 460 crore in 2002.[69]

4.5.6 Food Processing

Food Parks, promoted by the Union Government on the lines of industrial parks, are meant to bring together food processing and related industries in one area. The parks were planned to be located in growing areas to help bring down post harvest losses by processing agricultural produce immediately.[70] The Ministry funded over 40 food parks and 30 mega food parks during the 10th Plan (2002-2007) and 11th Plan (2007-12) to bring together farmers, processors and retailers and link agricultural production to the market throughout the country. Such food parks are eligible for a subsidy of Rs 4 crore and the units there can also be supported through subsidies. Food Processing Ministry has planned to grant SEZ status to mega food parks. The Food Processing Ministry has also proposed a separate policy for food parks allowing them to sell at least 50% in the domestic market but would be treated at par

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[69] *Agri-export zones potential yet to be fully tapped,* cited in 'Business Line' by G. Srinivasan, New Delhi, Nov. 30, 2003.

[70] http://www.thehindubusinessline.in/2002/07/09/stories/2002070900881100.htm

with the special economic zones. The Mega Food Park Scheme will provide backward and forward linkages as well as reliable and sustainable supply chain. The Cluster based demand driven approach will provide linkages from farm to market with linkages from local to regional level through Primary Processing Centers, Collection Centers, Strategic Distribution Centre-cum-Cold Chain at critical locations – having Controlled Atmosphere storage and distribution centers where large quantities can be stored and supplied to distribution centers for fresh sale and to processing industries for processing.[71] The food parks are part of the ministry's ambitious program called "Vision Document 2015" that seeks to raise India's food processing of perishable items from 6% in 2007 to 20% by 2015.[72]

4.5.7 Participation of Private Sector

Over the years the share of private sector in gross capital formation in India has been increasing. The share of Private sector in capital formation in Indian agriculture is many times more than the Public sector. Modern food retail has been estimated to have grown 49 percent annually from 2001 to 2010 (Reardon, Timmer, and Minten 2010; Reardon and Minten 2011). While per capita incomes grew only slightly from the 1960s through the 1980s, there has been strong per capita growth since the liberalization of the economy in the 1990s. This liberalization has increased the food expenditure pie and driven diversification from foodgrains into non-staples. As the well-known relation of Bennett's law predicts that the share of cereals in total food expenditure declines with income and share of non-cereals such as meat, eggs, edible oil, fruits and vegetables will increase with income levels. Therefore, the current rise in demand for fruits and vegetables is therefore totally expectable outcome of rise in per capita income in India. There are efforts on behalf of the government to improve the production of the same. A series of reforms of the agricultural and food economy are in the direction of encouraging modern private-sector players (for example, retailers, processors, logistics firms, modern wholesalers) to emerge and, in some cases, to procure directly from farmers.

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[71] http://pib.nic.in/newsite/erelease.aspx?relid=31083

[72]http://www.livemint.com/Politics/ofpBXmlKHWANu7l8H6HokN/India-to-kickstart-the-process-for-food-parks.html

An emerging and potentially important factor in the medium to long run in transforming rural–urban food supply chains in India is the rise of modern food retail (Reardon, Timmer, and Minten 2010). Reardon and Minten (2011) in their study on the recent supermarket revolution of India noted that modern retail in India has developed in three waves. The first wave was of government retail chains, started in the 1960s and 1970s. The second wave was cooperative retail chains in the 1970s and 1980s. The third has been the rise of private retail chains in the 1990s and 2000s. This third wave occurred in two phases. The first phase, from roughly the mid-1990s to the early 2000s, was southern-India focused, middle-class centered, and domestic–foreign joint ventured. It also was very small compared with the second phase. The second phase, which started in the mid-2000s till present has occurred throughout India and is mainly in the middle class, though in some formats and places it has moved into the lower-middle and upper working class, as well as into smaller cities and even rural towns. The second phase has been mainly driven by domestic capital. The rise of modern private retail in India in the recent years has been among the fastest in the world, growing at 49 percent per year (in U.S. dollar terms) on average over that period and bouncing back to growth after a dip from the recent recession. By 2010, the sales of the leading 20 private chains that sold food were roughly US$5 billion, of which about US$2.5 billion was for food. This is roughly 5–6 percent of urban food retail (figured roughly with a denominator of US$45–50 billion of total urban food expenditures, as noted previously). Therefore, it is still a small share of the market. However, this share was much below 1 percent even 6 years earlier, so the change was rapid but early. The private investment in agricultural sector is on the rise and several companies are trying to reach farmers via different models. A few such models are discussed below.

4.5.7.1 e-Choupal

In June 2000, ITC launched the concept of e-choupals. This model came into picture because of the challenges faced by Indian agriculture. These challenges are fragmented farms, weak infrastructure and the involvement of numerous intermediaries and marketing of the produce in a reasonable price. ITC tried making these agents as the important element in its value chain called as Sanchalaks who now supervise and coordinate the activities in e-Choupals. Thus ITC deleted Pakka (large) and Kacca (small) traders from the traditional value chain. It aims at

transforming the Indian farmer into a progressive knowledge seeking netigen. 'e-Choupal' services today reach out to over 4 million farmers growing a range of crops - soyabean, coffee, wheat, rice, pulses, shrimp - in over 40,000 villages through 6500 kiosks across ten states (Madhya Pradesh, Haryana, Uttarakhand, Karnataka, Andhra Pradesh, Uttar Pradesh, Rajasthan, Maharashtra, Kerela and Tamil Nadu). This enthusiastic response from farmers has encouraged ITC to plan for the extension of the 'e-Choupal' initiative to altogether 15 states across India over the next few years. On the anvil are plans to channelise other services related to micro-credit, health and education through the same 'e-Choupal' infrastructure. It basically utilizes the information and communication technologies to deliver the farmers needs related to cropping information, commodities pricing. The e-choupal initiative creates a direct marketing channel, eliminating wasteful intermediation and multiple handling, thus reducing transaction costs and making logistics efficient. The system provides direct access to the farmer to information about conditions on the ground, improving planning and building relationships that increase its security of supply. The increased efficiencies and potential for improving crop quality contribute to making Indian agriculture more competitive[73] There is no direct advantage which ITC provides in terms of price, while it claims that proper weighment, which is denied by the traditional merchants to farmers, on the spot payment are being offered as USP of the model. In practice, most of the computers of Sanchalaks are said to lie unutilised. In other words, ITC is trying to stabilise its supply chain given wide marketing network of ITC over Asia, Africa, US and Europe, it can take any quality and still manage to sell. The model however offers no major benefit to the farmers.

4.5.7.2 Hariyali Kisan Bazaars

Hariyali Kisaan Bazaar is a pioneering micro level retailing effort from DCM Shriram Consolidated Ltd. (DSCL), which seems to be creating a positive impact in the way rural India shops and is also revolutionizing the farming sector. This is a chain of centers that aim at providing end-to-end ground level support to the Indian farmer to improve profitability and productivity. The first outlet came up at Del Pandarwa (near Shahjahanpur in Uttar Pradesh) in July 2002. On an average, each centre is attracting 150-200 farmers a day. Each “Bazaar” operates in a catchment of

[73] http://www.itcportal.com/businesses/agri-business/e-choupal.aspx

about 20 kms radius and approximately 15,000 farmers live in this area. Each center provides help to improve the quality of agriculture in the area through 24x7 support by a team of qualified agronomists. They provide a complete range of good quality, multi-brand agri inputs, access to modern retail banking and farm credit at reasonable rates of interest, farm produce buyback opportunities, agricultural equipment at the fair prices, and access to new markets. It provides irrigation equipment, easy crop financing and technical guidance related to crop production. It also provides the credit facility at the reasonable interest rate and without hassle. DSCL is involved in the agricultural extension activities and helps the farmers in providing scientific knowledge by its Shriram Krishi Vikas Kendras (SKVK) in order to increase the profitability. IT has been a critical backbone to this chain of centers. With support from Polaris Retail Infotech Limited, these outlets make use of IT to provide online support on latest technical advancements, weather forecasts and market prices. Maintaining extensive farmer databases with micro information about the farmers' field to provide them customized services is another innovation. It involves setting up of Bazaars in 200 locations in the next few years (Viswanadham & Patnaik, 2006).

4.5.7.3 Tata Kisan Sansar

The *Tata Kisan Sansar* (TKS) is a network of nearly 600 farmer resource centres that caters to more than 3.5 million farmers in 22000 villages in the northern and eastern part of India.[74] The centres are one-stop solution shops that provide farmers access to a wide range of agricultural inputs such as vital fertilizers, seeds, and pesticides along with agricultural services such as soil testing, crop advisory and foliar application services. New services being explored include financial services and IT enabled market information. TKS functions as a *hub and spoke* model. Each TKS centre is a franchised retail outlet and solution provider that caters to about 30-40 villages in the surrounding area. The centres are in turn serviced by about 30-odd resource centres (known as Tata Krishi Vikas Kendras or TKVK), with each resource centre looking after 17-18 TKS centres. There are more than 60 agronomists available at the hubs to provide advice on crops and farming issues. There are more than 150 organisers at the TKS level.

[74] http://www.tatachemicals.com/services/tata_kisan_sansar.htm

We reviewed the characteristics of fresh produce marketing channels and the changing landscape of fresh produce marketing in India. In the remainder of the chapter, we present the analysis of the fresh produce marketing channels of Malur, based on the interviews conducted during the field study.

4.6 Fresh Produce Marketing Channels of Malur

Figure 4.1 shows the marketing supply chain of vegetables in Malur as identified by our field study. Malur farmers have the following marketing channels:

- APMC markets (Direct and Commissioned)
- Traders and wholesalers
- Retail collection centers
- Agro-processing firm
- HOPCOMS cooperative procurement center
- Contract farming
- Self-selling/Local merchants.

A special relationship based alliance (*pre-harvest contractor*) is used for marketing fruits. Farmers trade in the above channels through various vertical coordination mechanisms: Auctions, spot/list price, one-on-one bargaining and negotiation, contracts, and oral agreements without enforceable contracts. As shown in Figure 4.1, the supply chain starts with the *farmers* in the *production* stage and ends with the following *consumers* in the *consumption* stage:

- Household consumers
- Institutional buyers (Small and medium enterprises like hotels, hospitals, caterers)
- Export to foreign consumers

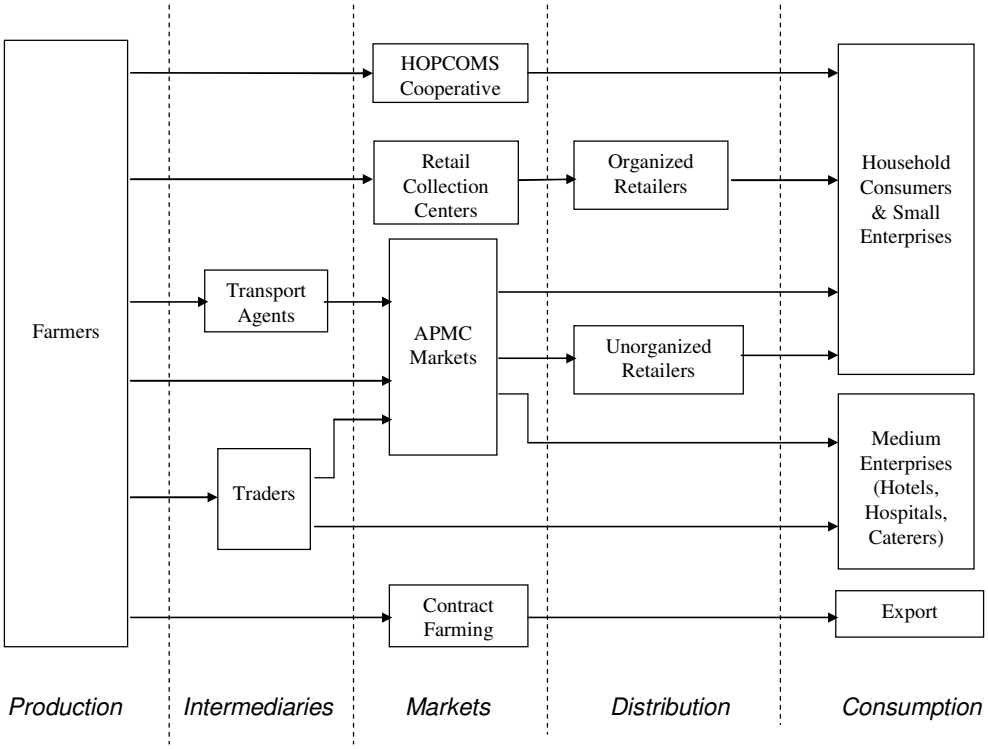

Figure 4.1 Vegetable Marketing Supply Chain of Malur

Source: Field Survey.

The entities in stages *intermediaries, markets,* and *distribution* are identified from the perspective of the farmers. From the perspective of end household consumers, APMC market and retail stores are *markets* to buy vegetables. However, for a farmer, retail store is not a *market*, as he does not sell at a retail store but rather at a retail collection center. Hence in the Figure 4.1, retail collection center is in the *markets* stage and retail store is identified as in the *distribution* stage. In the following, we explain the different marketing channels. Firstly, we summarize the data from the interviews with the farmers in the sample.

4.7 Farmers

In the field study, we interviewed a total of 259 farmers to identify and study the marketing practices and channels for vegetables.

4.7.1 Sample Design

The farmers for interview were selected randomly at the following locations:

- *Farms*: We visit the farms directly and interview the farmers. The farms were chosen randomly, depending on the locality and availability of the farmers at the time of visit.
- *Collection centers*: Farmers who arrive at the retail collection centers to sell the produce were selected randomly and interviewed.
- *Community places*: A small fraction of farmers were interviewed at local community gathering places.

Malur consists of 28 *gram panchayats*, and the sample of 259 farmers is from the following seven gram panchayats: Abbenahalli, Araleri, H. Hosakote, Kudiyanur, Madiwala, Nosagere, and Santhehalli.

4.7.2 Categorization of Farmers based on Land Ownership

After the data collection, we classified the farmers into following five categories based on land ownership: *Marginal*: <= 1 hectare (ha); *Small*: 1 – 2 ha; *Semi-medium*: 2 – 4 ha; *Medium*: 4 – 10 ha, and *Large*: 10 ha and above. [75]

In the above classification, the lower bound of the range is *greater than* (strict inequality) and the upper bound is a *less than or equal to*. For example, a farmer with 2 ha is classified as *Small*, whereas a farmer with 2.1 ha is classified as *Semi-medium*. All the farmers responded in *acres* for the land size (1 hectare = 2.471 acres), usually to the smallest denomination of 0.5 acres. Table 4.1 shows the distribution of the farmers in the sample with respect to the above categories and the locations. The overall sample had 34% *marginal*, 32% *small*, 18% *semi-medium*, 12% *medium*, and 3% *large* farmers. The pie chart depicting the sample distribution in percentages is shown in Figure 4.2. Table 4.1 also shows the distribution of the farmers in the sample from the seven *gram panchayats.* The highest percentage is from Nosagere (25%), followed by Kudiyanur (20%), Santhehalli (15%), Araleri (14%), Abenahalli (12%), H. Hosakote (8%), and Madiwala (6%). Figure 4.3 shows the pie chart of distribution of the sample from different gram panchayats and Figure 4.4 shows the bar diagram that shows distribution of farmer categories within each gram panchayat.

[75] Kolar District at a Glance: 2011-12, Govt. of Karnataka.

4.7.3 Demographic Profile

The demographic profile of the farmers in the sample is shown in Table 4.2, tabulating the average size of the land owned, average size of the household, farmers' education level, and the family education level, for each of the farmer categories. The average size of the land owned of all the farmers in the sample is 3.89 acres. Marginal farmers in the sample on average owned 1.5 acres, that of small farmers owned 2.3 acres, and that of the semi-medium farmers owned 6.84 acres. Medium farmers in the sample owned 11.56 acres of land on average and that of large farmers owned 21.67 acres of land.

The average size of the household of all the farmers in the sample is 5.85. The average size of household of *marginal*, and *small* farmers are 5.01 and 5.13, respectively, which are lower than the total average. The average size of *semi-medium, medium* and *large* farmers is more than the total average, with value 6.04, 8.59, and 11.57, respectively. Owing to the joint family structure observed with *large* farmers, the household size is as large as 30 in the sample. With either the father or the elder son as the head of the family, *medium* and *large* farmers generally exhibited joint family structures, holding joint ownership of total land. The family structure in *marginal* and *small* farmers is generally immediate family with more members but less land size. Figure 4.5 shows the bar chart of the average household size by farmer categories in the sample.

The *education level* is categorized as follows:

- ILL: Illiterate
- LIT: Literate, attended school, but never obtained a college degree
- COL: Obtained a college degree.

Table 4.1 Location and Category Distribution of the Farmers in the Sample

Farmers	Total	Abbenahalli	Araleri	H.Hosakote	Kudiyanur	Madiwala	Nosagere	Santhehalli
Marginal	89	8	15	7	17	6	22	14
Small	84	8	8	7	18	7	22	14
Semi-Medium	47	10	7	5	7	2	12	4
Medium	32	5	6	2	7	0	7	5
Large	7	0	1	0	3	0	2	1
All	**259**	**31**	**37**	**21**	**52**	**15**	**65**	**38**

Table 4.2 Demographic Details of the Farmers in the Sample

Farmers	Avg Size of Land Holdings (Acres)	Average Size of the Household	Farmer Education Level (%)		Family Education Level (%)	
			Illiterate (ILL)	School (LIT)	School (LIT)	College (COL)
Marginal	1.5	5.01	11	89	91	9
Small	2.3	5.13	12	88	76	24
Semi-Medium	6.84	6.04	4	96	70	30
Medium	11.56	8.59	3	97	44	56
Large	21.57	11.57	0	100	57	43
All	**3.89**	**5.85**	**8.8**	**91.2**	**75.7**	**24.3**

Source: Field Survey.

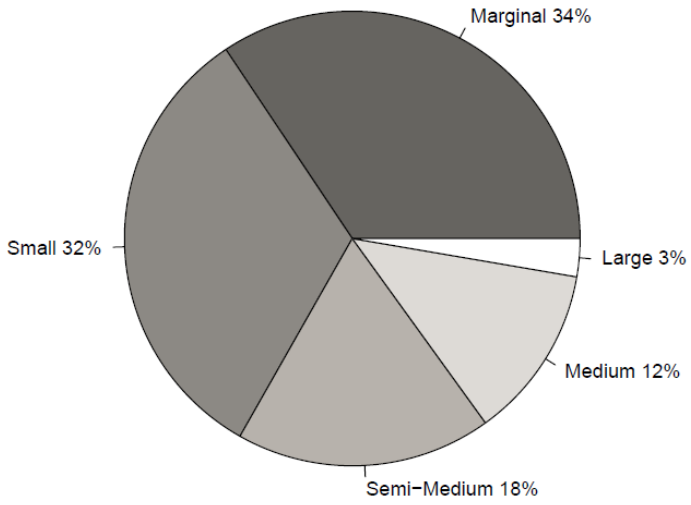

Figure 4.2 Distribution of Farmers from the Sample based on Total Land Owned

Source: Field Survey.

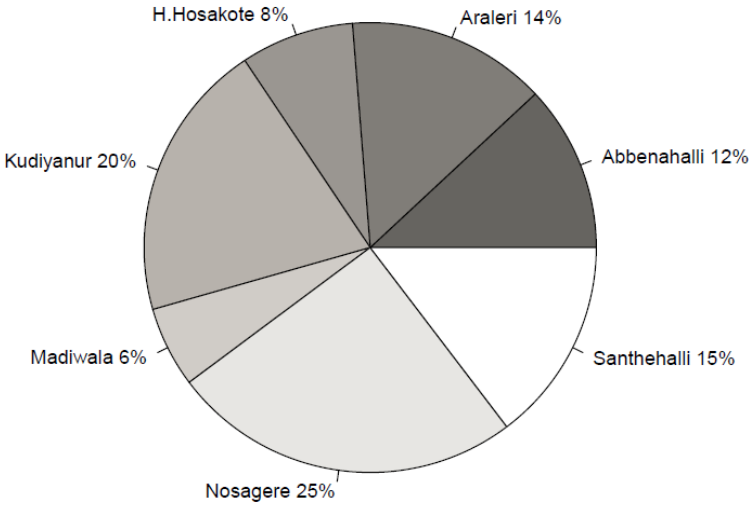

Figure 4.3 Distribution of Farmers in the Sample by Gram Panchayats

Source: Field Survey.

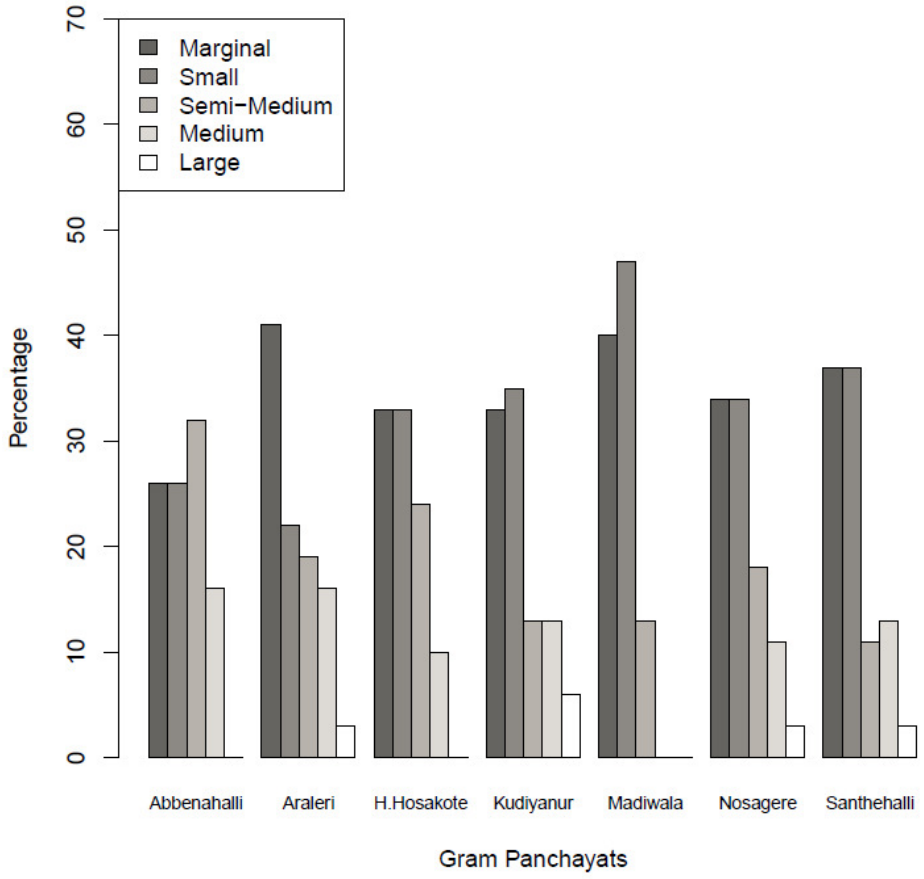

Figure 4.4 Distribution of Farmer Categories in the Sample by Gram Panchayats
Source: Field Survey.

The *education level* was obtained for both the farmer who was interviewed, and his family. For the family, if anyone in the household has obtained a college degree, then the *family education level* was categorized as COL. In the sample, we had no farmer with COL education level and no ILL family education level. The average LIT education level for farmers in the sample is 91.2%, with the remaining ILL level at 8.8%. As for the family education level, LIT is 75.7% with the remaining COL level at 24.3%. Further distribution of the education levels by the farmer categories are listed in Table 4.2. Figures 4.6 and 4.7 show the bar charts of the distribution of the education levels by farmer categories for the farmers' education and family education, respectively.

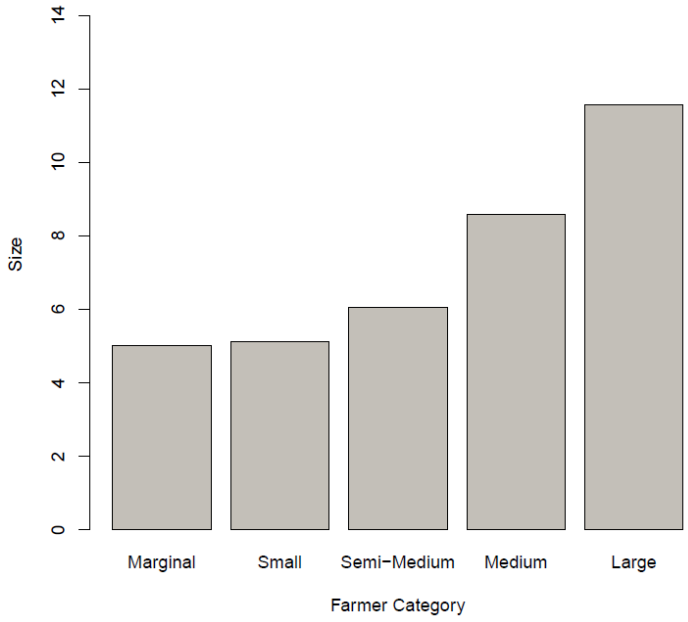

Figure 4.5 Average Household Size per Farmer Category in the Sample

Source: Field Survey.

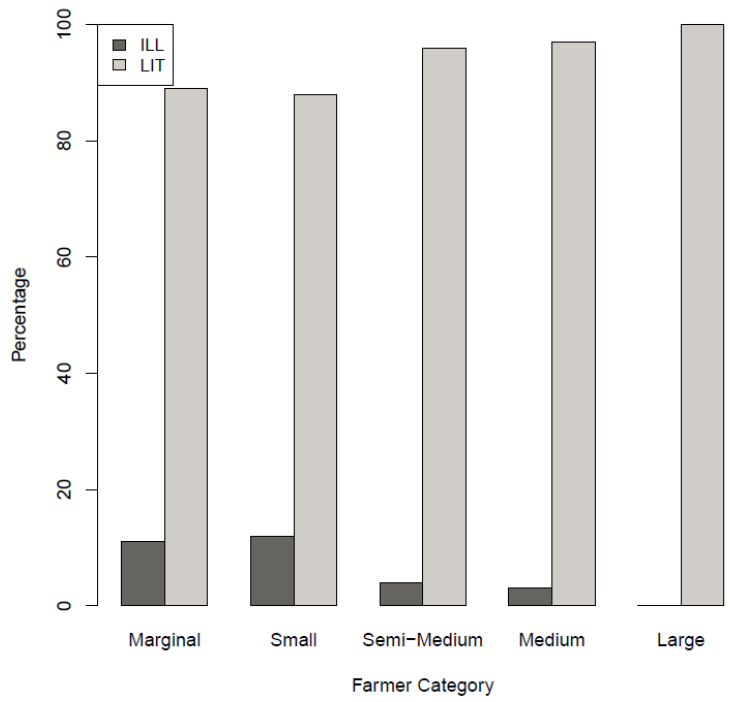

Figure 4.6 Average Percentage of Education Levels

Source: Field Survey.

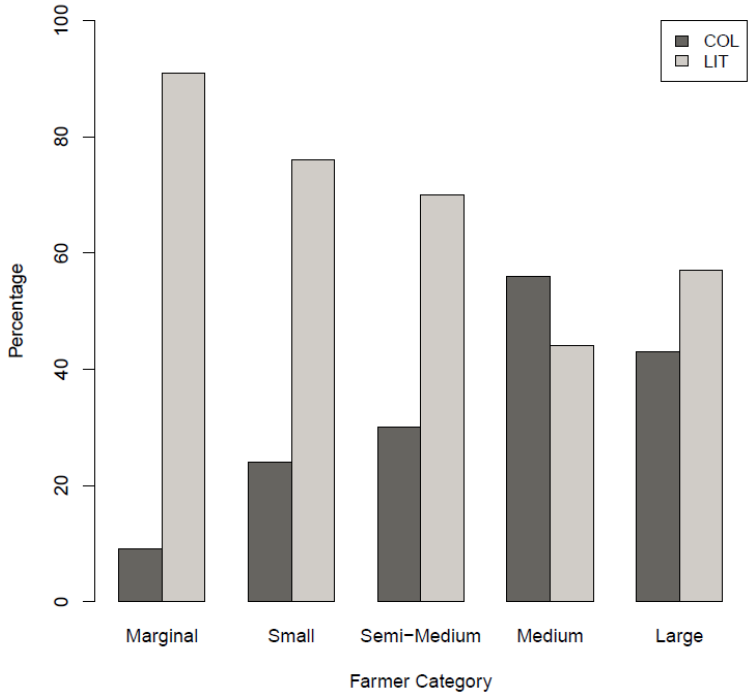

Figure 4.7 Average Percentage of Family Education Levels

Source: Field Survey.

Table 4.3 Usage of Land Owned for Eucalyptus

Farmers	Average Land Size (Acres) for Vegetables	Average Land Size (Acres) for Eucalyptus
Marginal	1.32	0.32
Small	2.69	0.81
Semi-Medium	5.64	1.54
Medium	11.70	3.78
Large	29.00	6.28
All	**4.03**	**1.30**

Source: Field Survey.

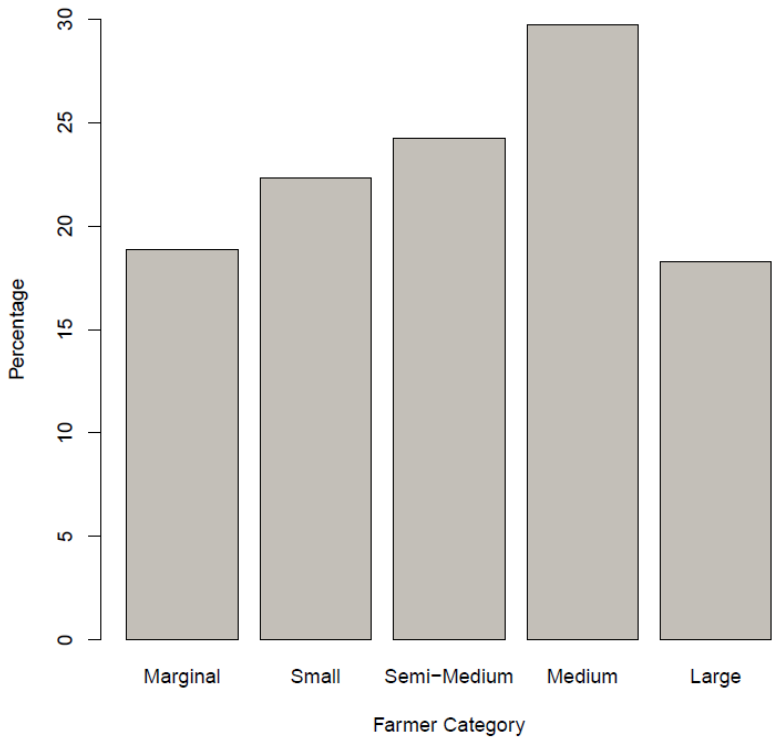

Figure 4.8 Percentage of Land Used for Eucalyptus

Source: Field Survey

4.7.4 Usage of Land for Eucalyptus

One of the common practices observed in Malur is the usage of certain amount of land owned for Eucalyptus plantation. Majority of the farmers in the sample used a percentage of land for Eucalyptus plantation. Eucalyptus is perceived as a risk free investment with returns of INR 60,000 – 80,000 per acre (two year duration) with negligible maintenance cost. Many small farmers during interviews expressed that Eucalyptus with guaranteed returns helps in planning for expenses of marriages and college fees in the household. Even large farmers engage in Eucalyptus plantation given the dearth of labor. Table 4.3 shows the average land usage for cultivation of vegetables and for Eucalyptus plantation in the sample. Figure 4.8 shows the bar chart depicting the average percentage of land owned that is used for Eucalyptus plantation for different farmer categories. On an average, farmers in the sample used 25% of the land for the Eucalyptus plantation.

4.7.5 Participation in Retail Marketing Channel

With the main focus of studying the vertical coordination mechanisms in marketing channels, one of important questions in the interview is *the participation of the farmers in the retail marketing channel*. The question was intended to identify farmers who regularly sell their produce at the retail collection centers. Out of 259 farmers interviewed, 164 regularly participate in retail marketing channel, owing to 63.3%. Table 4.4 shows the distribution of farmers by categories who have participated in retail marketing channel. Figure 4.9 shows the bar chart of the average percentage of participation of farmers (by categories) in retail marketing channels. The bar chart shows an approximate decreasing trend in participation with respect to the size of the land owned: *marginal* (67%), *small* (83%), *semi-medium* (60%), *medium* (16%), and *large* (14%). This observation counters the general notion that marginal and small farmers might find the new marketing channels costlier to participate (Pingali *et.al*, 2005). We will explore this issue further in detail in the chapter on *Transaction Cost Analysis* where we explain this observation using the notion of *apportionment cost* which makes participation of farmers with large quantities of produce costly to participate in retail marketing channels.

Table 4.4 Participation in Retail Marketing Channel

Farmers	YES	NO
Marginal	60	29
Small	70	14
Semi-Medium	28	19
Medium	5	27
Large	1	6
All	**164**	**95**

Source: Field Survey.

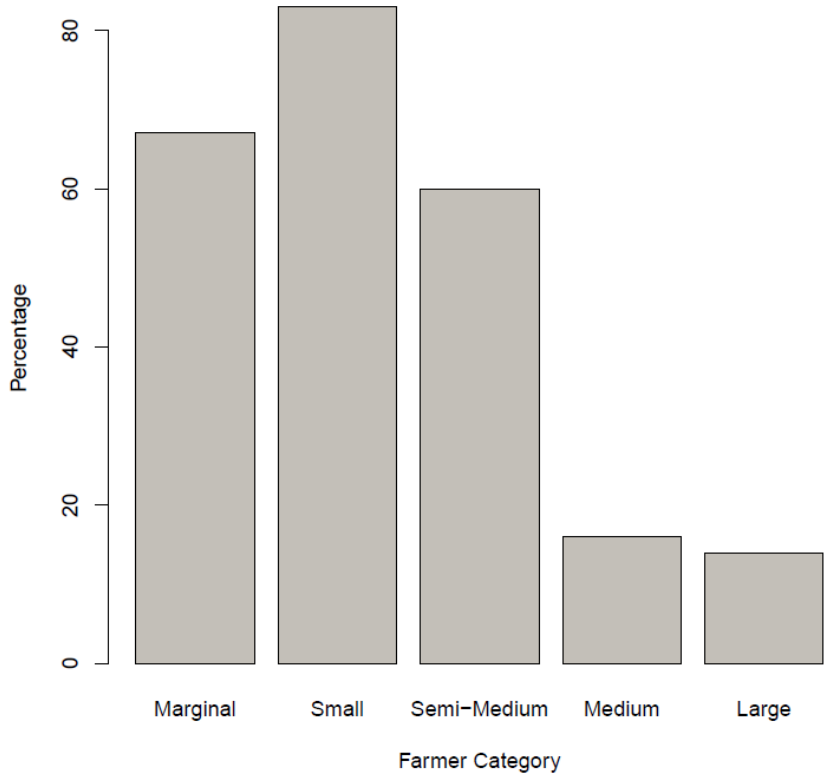

Figure 4.9 Average Percentage of Participation in Retail Marketing Channel

Source: Field Survey.

In the following sections, we describe the trade dynamics of each of the marketing channels in Malur.

4.8 APMC Markets

APMC markets are the highly preferred and traditionally used marketing channel by farmers. The Karnataka State Agricultural Marketing Board was established on 1st September 1972 as per section 100 of the Karnataka Agricultural Produce Marketing (Regulation) Act 1966 and Rules, 1968. All the major towns in Karnataka have APMC market yards with provisions for godowns (warehouses) and shops for traders and commission agents. Malur farmers sell directly at the APMC markets of Malur, Kolar, and Bengaluru. Kolar is 27 Km away and Bengaluru is 47 Km away from Malur. In addition, farmers engage in commissioned selling at distant markets like Chennai.

4.8.1 Direct selling

KR market and Yeswantpur market in Bengaluru, Kolar market, and the Malur market are preferred nearby markets for direct selling. Malur APMC market does not have the infrastructure for trading, despite the large number of farmers and year around harvesting. There is no dedicated infrastructure for storing, loading, except for a row of shops of traders and commission agents with basic facilities of weighing and billing. There is a functional APMC office that collects fees and handles licensing to agents. Farmers directly bring in the produce during the day and the price is determined through auctions. Transportation of the produce from the farm to the market is handled by the farmers. Large farmers use their own trucks or exclusively hire trucks for transporting their own produce. Small farmers aggregate their supply and pay the truck service on the basis of load and distance.

Farmers selling at Kolar markets, directly send the produce from the farm to the market during the day or evening. Later they go to the market on their own to market to participate in the auctions. For Bengaluru markets, the produce is transported in the evening to Bengaluru and farmers leave to Bengaluru early morning.

4.8.2 Commissioned selling at distant markets

The farmers can commission transport agents to sell their produce at distant APMC markets on their behalf. The vegetables are loaded into trucks on the roadside with no proper storage facilities or docking stations. The transport agents collect fees for

transportation and represent the farmers for selling. The distant markets include Chennai, Salem, Coimbatore, Vellore, Trichy, Hyderabad, Ahmedabad, Calcutta, and Bhubaneshwar. Our interviews with the transport agents suggested that on an average 40 truck load of vegetables (each truck on average has capacity for 12 tonnes) use the commissioned selling at distant markets.

4.9 Traders and Wholesalers

The second traditional and commonly used marketing channel for farmers is selling to *traders* and *wholesalers.* The buyers at APMC markets are also called as traders. In the context of this thesis, we refer to buyers who directly buy from farmers and who are not representing retailers or food processors as *traders* and *wholesalers*. We differentiate traders and wholesalers in the scale of operations.

Traders sell to institutional buyers (small and medium enterprise customers) like merchants, hospitals, and hotels. Based on the demand from the customers, traders contact farmers specifying quantity and quality of the produce expected. Traders are located within the village limits and the farmers need to transport the produce on their own to the traders' shops. The trading price is negotiated on the basis of current or previous day's market price. Farmers' obtain the nearby market prices and discounting the cost of transportation and other intangible costs, settle for trading price. One of the main advantages for the farmers is the immediate cash payment by traders and a higher mark-up over the APMC market price for high quality produce.

We interviewed 12 small-scale traders from Malur. Table 4.5 summarizes the trade profile of the sample of traders in the field study. Many traders dealt with few varieties of vegetables on a given day. The range of the number of vegetables by the traders in the sample is 3 to 10. On an average, a total of 1 to 3 tonnes of vegetables are bought by a trader. The shops of traders are unsophisticated and do not have any facility for storage, sorting, and packing. Though the traders claim quality grading, there is no prescribed set of rules for grading the quality. Based on the graded quality, farmers are given appropriate mark-up price. Traders generally sell to other merchants who in turn clean, pack, and sell to unorganized supermarkets and stores. Other common institutional buyers include hospitals, hotels, and hostels which are pay different prices to different

qualities. Seasonal buyers like caterers (for marriages and functions) inform the traders few days in advance of the requirements. The traders generally buy to fulfill the known demand, thus greatly reducing the market risk. However, once sold by farmers, traders face the risk during transportation of the produce to the customers (mostly in Bengaluru). Farmers on the other hand, reduce both the market and transportation risk by selling to a trader with immediate cash payment.

Table 4.5 Trade Profile of Traders and Wholesalers in the Sample

	Traders	**Wholesalers**
Number of Vegetables	3-10	10-25
Daily average quantity	1-3 tonnes	10-50 tonnes
Medium of communication	Mobile	Mobile
Price discovery	Negotiation	Negotitation
Base price	Bengaluru market	Bengaluru, Kolar, Malur
Payment mode	Cash	Cash
Payment lead time	Immediate	Immediate
Transportation from farm to shop	Borne by farmer	Wholesaler
Storage, Sorting, Packing	No	No
Quality grading	Yes	No
Customers	Institutional buyers: Hospitals, hostels, caterers, hotels, supermarkets	Secondary wholesalers, terminal markets

Source: Field Survey.

Wholesalers are in similar category as traders, but usually buy more quantity of vegetables than traders. Unlike traders, the wholesalers do not work with assured demand from their customers. The wholesalers sell the produce to secondary wholesalers or sell at other terminal markets (by speculating the price). Wholesalers usually use the average of price from different markets as base price and there is no quality grading.

4.10 Retailers

Organized retail chains often use a *hub-and-spoke* supply chain model, shown in Figure 4.10. The *hub* is a central processing unit where all the vegetables from the *collection centers* are aggregated for sorting and packing. The packed vegetables are then transported to the retail shops. A hub is setup near every major city where the retailers have operations. The demand estimated from different retail shop locations are aggregated at the hub where *indents* for each of the vegetables for the different CCs are created. The CCs are then notified of the indented demand. The CCs are located at the villages where sourcing can be done directly from the farmers.

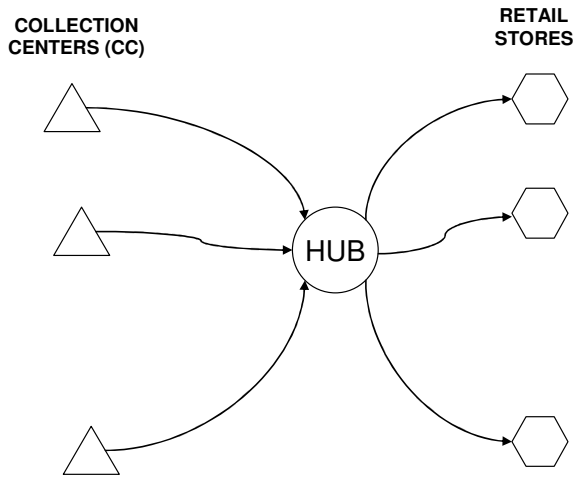

Figure 4.10 Hub-and-Spoke Model of Retailers

4.10.1 Collection Centers

Collection Centers (CCs) are equipped with basic infrastructure for washing, sorting, grading, weighing, packing, and transportation. The vegetables are packed on plastic crates. Some CCs also have cold storage for storing leafy vegetables. The CCs are important links in the vegetable supply chain for the retailers. The main functionality of a CC is sourcing the vegetables to meet the indented demand specified by the hub. Following are the sourcing mechanisms available to the retailers to procure the vegetables at the CCs:

- Direct buy from farmers,
- Buy from traders, and

- Buy from terminal markets.

The retailers use a combination of the above to meet the required demand. The first option is to directly buy from the farmers. The farmer brings in the produce to the CC, where it is graded, weighed, and traded. The retailer can also visit the farms and trade at the farm gate, thus saving on the transportation cost for the farmers. The second possibility is to buy from the traders, who in turn have sourced the vegetables from elsewhere. The third option is to buy from the terminal markets like APMC markets. Retailers prefer direct buying from farmers over traders and terminal markets for the following reasons:

1) Traders are middlemen and hence the cost of procurement is increased, and

2) Terminal markets do not have support for quality grading and hence difficult to monitor the quality of the produce.

The above points are further analyzed in Chapter 6 *Strategic Choice of Vertical Coordination Mechanisms*. In the following, we analyze the interviews with the following retailers in Malur, who have CCs to directly buy from farmers: Reliance Fresh, Heritage Retail, More Store, and Namdhari Fresh.

4.10.2 Reliance Fresh

Reliance Fresh is the convenience store format which forms part of the retail business of Reliance Industries of India. Since its inception in 2006, Reliance Fresh has grown into an organization that caters to millions of customers, thousands of farmers and vendors. Based on its core growth strategy of backward integration, it has made rapid progress towards building an entire value chain starting from the farmers to the end consumers.[76] The Reliance CC at Malur procures daily on an average of 8 tonnes of vegetables from farmers. The CC has basic facilities for weighing, sorting, grading, and transportation.

4.10.3 Heritage Retail

Heritage Retail is a unique chain of retail stores promoted by Heritage Foods - the leading dairy brand in South India. Heritage Retail has two formats of stores:[77]

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[76] http://www.ril.com/html/business/business_retail.html

[77] http://www.heritagefoods.co.in/retail/

1) *Flagship store* – Spread over 2500 sqft with a merchandise mix which fulfills all the essential home needs of the Indian housewife. This includes fresh fruits and vegetables, grocery, processed food, cleaning aids, general merchandise, bakery, dairy, beverages, and frozen food; and

2) *Daily format store* – Spread over 1000 sqft, this is essentially a food store with wide daily fresh needs and the immediate top up needs of the consumer.

Heritage procures directly from farmers and the produce is moved to the retail stores using its integrated cold chain. In Malur, the Heritage CC procures 3-4 tonnes of vegetables daily.

4.10.4 More Store

More is a pan-India retail chain operated by the Aditya Birla Group company, Aditya Birla Retail Ltd. Currently it has 509 supermarkets and 15 hypermarkets across the country.[78] More stores offer a wide choice of over 4000 products, ranging from fresh food to beverages, grocery to household care products. To ensure the freshest supply of fruits and vegetables, More has built direct linkages with the farmers for daily supplies of farm fresh produce. The CC at Malur is one such establishment to buy directly from the farmers.

4.10.5 Namdhari Fresh

Namdhari Fresh (NF) is a part of the Namdhari Seeds, a market leader in the Indian vegetable seed industry. Started in 2000 at Bidadi near Bengaluru, NF is currently growing in organised retailing of fresh fruits and vegetables.[79] The input is obtained through the following sources: 1) Production from own farms, 2) Direct procurement from farmers, and 3) Contract farming. The output is catered to three main segments: 1) Retail (own retail stores), 2) Institutional customers, and 3) Export. NF has a collection center in Malur to procure vegetables from the farmers and also engages in contract farming (more on this in the later part of this chapter).

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[78] http://www.morestore.com/

[79] http://www.namdharifresh.com/

4.10.6 Trade Profile of Retailers

Table 4.6 summarizes the trade profile of the above four retail collection centers. The CC receives demand information from the hub that needs to be procured from the farmers. The CC maintains a *supply registry*, which basically includes the following information about farmers: name, mobile number, address, bank account (for payment), and types of crops. By being part of the supply registry, the farmer agrees to be contacted by the CC for potential trade negotiation. Traders also maintain such supply registry, but the retailers maintain the registry as a computer database, along with the record of transactions done. The head who is in charge of the CC, consults the supply registry to identify the farmers to call via mobile phone. Farmers also call to the retail CC to enquire about the current day's indent for different vegetables.

The price discovery is through negotiation, but in general the price is calculated using the *base* or *reference price*. The base price is the calculated using the recently available market price. Different retailers use different markets for constructing the base price. Usually an average of different market prices is calculated for a vegetable and is used as the base price. Once the base price is available, following generic formula is used to negotiate the trade price:

Traded Price = Base Price – Transportation Cost – Brokerage Fee
+ Quality Markup

The price using the above formula is proposed by the retailer. The rationale for the formula is that the farmer at best is guaranteed of the *base price* (approximately) if he chooses to sell directly at any of the markets. However, the farmer has to incur the transportation cost and also pay brokerage fee at the APMC market. Hence, these two values are subtracted from the *base price*. In addition, the retailer gives higher mark-up for the higher quality produce. Thus the farmer gets a better deal than selling at the traditional marketing channel like APMC. The above formula is further analyzed in Chapter 5 *Transaction Cost Analysis.*

Mobile technology is extensively used to identify farmers for buying and also to negotiate prices. Farmers in turn use mobile phones to verify the *base price* from the markets and also engage in multi-party negotiations. Detailed analysis of usage of mobile phones for price discovery is done in Chapter 5 *Transaction Cost Analysis*. Once

the transaction is completed, payments are handed over by cash immediately. Some retailers use cheque as mode of payment and some also do the consolidated payment weekly (usually on Saturdays). Table 4.6 shows the difference in payment process adopted by the retailers.

Quality grading is general followed by the retailers, and the low quality produce are rejected. Table 4.6 shows the techniques used by different retailers for quality grading. The sorting and grading staffs at the CC are specially trained to identify and isolate different qualities. Reliance fresh displays large visual charts showing acceptable qualities of vegetables. Table 4.7 shows the quality grading chart used by the retailers.

The main functionality of the CC is to source the vegetables and send them to the hub on the same day. Hence, they do not have any cold or dry storage facilities, except for Namdhari Fresh. Namdhari Fresh CC in Malur is equipped with a cold storage facility with capacity for one day of inventory, mainly for storing greens.

Table 4.6 Trade Profile of Retailers in Malur

	Reliance Fresh	**Heritage Retail**	**More Store**	**Namdhari Fresh**
Number of Vegetables	14	15	25	10
Daily average quantity (tonnes)	10	3	7	4
Number of farmers in the supply registry	200	40	150	50
Markets for base (reference) price	Bengaluru	Bengaluru, Kolar	Bengaluru, Chennai, Hosur	Bengaluru, Kolar
Mode of communication	Mobile	Mobile	Mobile	Mobile
Payment mode	Cash	Cash	Cheque, Cash	Cash
Payment lead time	Immediate	Immediate	Immediate	Weekly
Farm gate trading	Yes	No	Yes	Yes
Storage	No	No	No	Cold storage
Grading	Strict grading with visual reference charts	Manual	Manual, reject only C grade	Strict grading
Sorting	Sorting table	Manual	Manual	Sorting table
Packaging	Crates	Crates	Crates	Crates
Accepted Quality	A	A	A, B	A

Source: Field Survey.

Table 4.7 Quality Grading Chart

Vegetables/ Fruits	Varieties	Defects Not Allowed
Pomegranate	Ganesh, Kesar, Arakhta, Kandheri	Black/Brown marks on surface; Dry skin; Bruises; Natural brown marks on surface; Pressure damage; Cut; Hole; Mechanical damage; Diseased; Rotting;
Pineapple	Queen, Kew	Over ripe; Cut; Hole; Long stem; Long crown; Without crown; Mechanical damage; Fungal infected;
Papaya	Papaya solo, Papaya	Misshape; Bruised marks; Damage; Soft; Cut; Fungal infected;
Sweet Orange		Misshape; Pressure damage; Sunburn; Cancur spots; Immature (not ripe); Mechanical damage; Bruises; Thick skin; Crack; Overripe; Russeting; Black/Brown spots on surface; Diseased; Rotting; Ruptured skin;
Sapota	Oval, Round	Immature; Dark brown marks on surface; Damage; Cut; Hole; Insect damage; Diseased; Fungal infected;
Carrot	Red, English, Black	Misshape; Twins; Nodes on surface; Cut; Natural growth crack; Broken; Secondary roots; Bruises; Pale look; Damaged; Bacterial rot; Rotten spot; Black/Brown marks; Purple top; Green top; Long stock; Fungal infected;
Capsicum	Green hybrid, Green local, Purple, Red hybrid, White hybrid, Yellow hybrid	Misshape; Without stock; Sunburn; Discoloration; Natural brown marks on surface; Packing damage; Shrivelled; Cut; Crack; Bruises; Borer infected; Rotting;
Bottle Gourd	Long, Round	Bruises; Misshape; Ruptured skin; Natural brown color; Cut; Shrivelled tip; Packing damage; Mature; Broken; Black tip;
Cauliflower		Loose curd; Bruises; Damage curd; Long stem; Riciness; Mature; Purple color; Insect damage; Stem end rot; Yellow curd; Long stock;
Okra		Slightly misshape; Badly misshape; Pressure damage; Mechanical damage; Black/Brown spots; Black ridges; Yellow color; Nodes on surface; Mature; Visible seeds; Insect damage; Rotten; Broken; Discoloration;
Brinjal	Long, Round, Bottle shape, Long green, Long purple, Small purple, White, Small green	Misshape; Double form; Bruised marks; Broken; Hole; Pressure damage; Cut; Mechanical damage; Shrivelled; Borer infected; Healed brown marks; Dull look; With calyx, without stem; Without stem and with calyx; Black/Brown calyx; Rotting;

Source: Field Survey

Table 4.7 Quality Grading Chart (Contd)

Vegetables/ Fruits	Varieties	Defects Not Allowed
Cucumber	Hybrid, Local, Color	Misshaped; Packing damage; Bruised marks; Cuts; Cracks; Pinched; Anthraecnoxe; Pressure damage; Mature; Mechanical damage; Borer infected; Healed brown marks; Discoloration; Hole; Rotting;
Tomato	Hybrid, Local, Oval, Cherry	Misshaped; Immature; Discoloration; Growth check; Growth cracks; Sunburn; Shrivelled; Punctured skin; Black spots on surface; Bruised marks on surface; Packing damage; Watery patches; Cut; Insect damage;
Onion	Onion, Onion white, Onion Sambar, Onion rose	Cut; Outskin; Dry rooting; Fresh rooting; Bottle neck; Open neck; Sun burn; Double sprouted; Mechanical injury; Smut; Discoloration; Seed stem; Rotting; Slimy soft;
Potato	Potato fresh, Mettupalayam, Potato baby	Minor hole; Black scurf; Bruised marks; Minor cut; Shrivelled; Double natural crack; Misshaped; Nodes on surface; Sprouting; Major cut; Green spots; Mechanical injury; Multiple cracks; Major hole; Chipped; Rotting; Fungal infected; Black heart;
Apple	Royal delicious, Delicious, Richie Red, Golden delicious, Hazretdall, Ambri, Fany, Maharagi	Fly speck; San Jose scale; Russeting; Misshaped; Packing damage; Mechanical damage; Internal browning; Dull pale look; Mature; Puncture skin; Rotting; Pressure damage; Shrivelling; Bitter pit; Bruised mark; Insect damage; Rotten spots;
Banana	Dwarf, Cavendish, Robusta, Nendram red, Elakkai, Rastali, Poovam, Hill, Karpooravalli	Bruises; Cut; Double; Black chitti; Black finger stalk; Natural crack; Natural browning; Mechanical damage; Ruptured skin; Pressure damage; Pest infected; Diseased;
Grapes	Anab-e-shahi, Bengaluru blue, Black seedless, Dilkush, Plain seedless, Muskat, Paneer Gulabi, Thomson seedless, Red globe, Sonaka seedless, Tas-a-Ganesh	Misshaped; Overripe; Discoloration; Brown stalk; Physical injury; Hole; Natural brown marks on surface; Insect damage; Rotten;

Source: Field Survey.

4.11 Innova Agri-Bio Park

Innova Agri-Bio Park was approved under the 10th Five Year Plan scheme by the Ministry of Food Processing Industries. Spread over 87 acres, the park hosts the following facilities:

- 2500 MT capacity cold storage;
- 1000 MT warehouse;
- Sorting and grading center;
- Quality control lab; and
- Gamma irradiation facility.

Table 4.8 Trade Profile of Innova Agri-Bio Park

Number of Vegetables	58
Daily average quantity	4-10 tonnes
Number of farmers in supply registry	200
Medium of communication	Mobile
Price discovery	Negotiation
Base price	Bengaluru market
Payment mode	Cash
Payment lead time	Weekly
Farm gate trading	Yes
Storage, Sorting, Packing	Yes
Quality grading	Yes
Cold storage	Yes
Institutional buyers	Hospitals, hostels, caterers, hotels, supermarkets

Source: Field Survey.

Innova procures directly from the farmers and supplies the sorted and graded vegetables to supermarkets, small retailers, and institutional consumers like hospitals and hotels. Agro-processing firms adopt a similar strategy like retail collection centers for the procurement of produce that merely gets sorted, cleaned, and packed as high quality vegetables to be sold at retail or supermarkets. Thus, both retail

collection centers and agro-processing firms use *supply registry* that contains information about the farmers and contact them based on demand requirements.

Figure 4.11 Sorting and Grading Infrastructure at Innova Agri-Bio Park
Source: Field Study.

Table 4.8 summarizes the trade profile at Innova Agri-Bio park. Figure 4.11 shows the sorting and grading infrastructure at Innova. With automated machinery and large cold storage, the infrastructure is aimed at handling a capacity of 1000

tonnes daily, including vegetables and pulses. At the time of the interview, Innova's vegetable trade volume was in similar capacity to retail collection centers in Malur. However, the clients of Innova are institutional buyers, similar to that of traders. Thus based on the demand from the institutional buyers, Innova would raise indents for the vegetables and contacts farmers for sourcing the vegetables.

The negotiation procedure with the farmers is the same as that with the retailers, where the Bengaluru market price is used as the *base price*. Payment is made in cash on weekly basis. Innova also does farm gate trading by visiting the farms directly.

4.12 HOPCOMS Cooperative

Horticultural Producers Co-operative Marketing and Processing Society (HOPCOMS) Limited were established under the Karnataka State Co-operative Act in 1959. HOPCOMS serves as a fair market channel for farmers through direct procurement. The members of the cooperative comprise of farmers, state financial organizations and the Karnataka state government. HOPCOMS is administratively managed by officials appointed by the state, drawn from the Department of Horticulture and the Department of Cooperation.

4.12.1 History and Growth

The cooperative society was founded in 1959 as *Bengaluru Grape Growers Cooperative Marketing and Processing Society Ltd*. The society started with 507 farmer members and Rs. 1,269 share capital (nominal terms). The society then started covering its operation to other vegetables since 1965 and was renamed as *Bengaluru Horticultural Producers Co-operative Marketing and Processing Society Ltd* in 1983. The current name of HOPCOMS is adopted since 1987. By 1997, HOPCOMS had developed a network of procurement centers, *godowns*, retail outlets and input supply centers in eight districts of Karnataka.

It expanded to 15,000 members in 2005, with a total paid up share capital of INR 258.54 lakhs. The state government's stake in HOPCOMS' share capital steadily increased from 35 per cent in 1970-71 to 96 per cent in 1996-97 (Rao, 1997). By March 2007, it had fallen to 228 lakhs (88 per cent of total share capital). Until 2006, the district level HOPCOMS had been functioning as one integrated entity, but in 2006 the organizational structure was decentralized into several independent units.

Currently, Bengaluru HOPCOMS has three districts - *Bengaluru Urban*, *Bengaluru Rural*, and *Kolar* - as its area of operations.

4.12.2 Aims and Objectives

The aims and objectives of HOPCOMS are:

- to ensure remunerative prices to producers of horticultural crops;
- to remove intermediaries between producers and consumers;
- to ensure quality supply of fruit and vegetables at reasonable prices to farmers;
- to expand marketing and cold storage facilities progressively for the benefit of farmers;
- to promote horticultural development on scientific lines by providing inputs and necessary technical advice to farmers.

As of 2007, there are 17 HOPCOMS in the state, each working independently within demarcated districts of operation. The societies have a network of 37000 farmer members, with decentralized procurement centers in 19 districts.

Malur has HOPCOMS procurement center which receives the demands daily along with a fixed quoted price. Based on it, HOPCOMS procurement personnel give indent to farmer members. The procurement prices are fixed (non-negotiable) for the day based on the prevailing market prices that morning at four or five reference APMC mandis (Kolady et al, 2007). The procurement prices are usually 10 – 15% higher than the market price. HOPCOMS accepts only high quality produce and a 10 – 15% rejection on average is observed.

4.13 Contract Farming

Namdhari Fresh (NF) engages in contract farming with farmers in Malur to meet the demand of export vegetables like chilies and bell pepper (yellow and red), which adheres to the EUREGAP standards of quality. The contract specifies fixed duration, quality, and also the price. The price is fixed a priori which the farmer has to adhere irrespective of the external market price. NF provides the farmers with seeds, fertilizers, pesticides, and supports farming know-how to achieve the target quality.

Table 4.9 shows contract farming practices of Namdhari Fresh in Malur. The price is fixed at the time of writing the contract. For example, if the contract dictates that the price is INR 8/- per kg of green chilies, then the farmer is paid after every harvest at the contract price, irrespective of the market price. The important criteria

for choice of farmers are the soil conditions and the location of the farm. The location of the farm is important as frequent weekly visits are required for monitoring and also the location should be conducive for grading and weighing (which is usually done at the farm).

Table 4.9 Contract farming by Namdhari Fresh

Crops	Green chilli, beans, brinjal, bell peppers
Primary drivers for CF	Quality control; quantity; timing of assured supply; technically difficult farming; unavailability in markets.
Criteria for choice of farmers	Location; Soil conditions; Irrigation facilities;
Contracting Cost	Land testing cost: 8000/-
Monitoring Costs	2-3 Weekly visits
Price	Fixed price agreed at the time of contract
Inputs	Seeds, fertilizers, pesticides, know-how technology, transportation
Standards followed	EUREGAP, GLOBAL GAP
Export countries	UK, Thailand, Germany, Dubai.

Source: Field Survey.

One of the significant costs incurred prior to contracting is for the testing of the land for the suitability of the produce. The monitoring costs are the weekly visits to check for the quality and also the quantity. NF provides the farmers with seeds, fertilizers, pesticides, labor for spraying fertilizers and pesticides, and labor for seeding and harvesting. Farmer's investments are the land, labor, and time, with assured price for the produce. Though NF is eager to expand its CF operations in Malur, majority of the farmers are willing due to the *fixed price* contracting. Further

analysis of this problem is described in detail in Chapter 6 *Strategic Choice of Vertical Coordination Mechanisms.*

4.14 Relationship based alliance for fruit trading

Trading of fruits like mangoes and grapes follow a relationship based alliance with a *pre-harvest contractor* (Sudha, 2007). Marketing channel using a pre-harvest contractor is common for fruits. In Malur, it is the dominating marketing channel for fruits. The pre-harvest contractor, usually from North India, visits the farmers, inspect the farm, and negotiate a relationship based arrangement. The arrangement is more of lease type, where the farmer agrees to sell all the produce at a specified rate. In return, the pre-harvest contractor helps the farmer with labor for taking care of the crops. Both parties work together to achieve the end goal of farming and selling the produce. We interviewed 4 farmers engaged in cultivation of mangoes, grapes, and sapotas, who use the pre-harvest contractor marketing channel for selling the fruits. As the primary focus is on the marketing channels for vegetables, we will not further study the fruit trading practices in Malur.

4.15 Self-Selling/Local merchants

Another marketing channel is the local market, where the farmer/farmers' family members directly sell or sell to the local merchants, to cater to the needs of the local consumers. The quantity sold through this channel is comparatively very less. Leftovers and rejected produce from other channels are usually sold as last resort through this channel.

4.16 Conclusions

This chapter focused on the marketing infrastructure in India and Karnataka, the laws related to agricultural marketing, different marketing channels for farmers in the country, in the state and finally for Malur, the area in question for this research to sell fresh produce like vegetables. The chapter started with the marketing practices of agriculture in general for India, followed by the changing scenario of marketing of fresh produce. The case of Malur was discussed in detail, based on the interviews with the farmers, traders & wholesalers, transport agents, retail collection centers, Innova Agri-Bio park, and HOPCOMS collection center. The fresh produce

marketing supply chain for Malur was mapped based on the field study. Trade profile of each of the different channels was analyzed.

Malur produces around 60 varieties of vegetables throughout the year, totaling to 190,000 MTons annually. However, APMC market at Malur lacks basic infrastructure for trading. A large percentage of fresh produce are traded directly at nearby markets of Bengaluru and Kolar. One of the main limitations in the study is the lack of precise data on the volume of fresh produce traded through different channels. Transport agents reported that commissioned selling to distant markets (Chennai, Trichy, Salem, etc) and wholesalers that happens at the Malur town area amounts to approximately 500 tonnes per day (average of 40 trucks with minimum of 12 tonnes per truck). Also data pertaining to farm gate sales (directly selling from farms) are not known precisely.

Retailers directly procure from farmers totaling to an average of 30 tonnes per day, which is very less in volume compared to the traditional channels. Retailers have lower demand, but expect higher quality produce. The collection centers have detailed visual charts that describe the defects and qualities in the produce that are not preferred. The charts aid the farmers in understanding the quality of the produce expected for procurement. The vegetables are sorted and graded on the inspection tables, where each piece is examined for its quality. The farmers are compensated for high quality produce.

The Innova Agri-Bio Park excels in modern grading, sorting and processing infrastructure, along with cold and dry storage facilities. The procurement functionality is similar to that of retailers, but the customers are institutional buyers. The value added services like cleaning, grading, packing, and storage offered by Innova are not yet popular among the retailers and small businesses.

HOPCOMS procurement center provides the highest price among all the channels (non-negotiable) for the produce but has very limited total indent of 4-5 tonnes daily. The buying price of a vegetable is fixed by HOPCOMS head office in Bengaluru, based on KR Market (Bengaluru) price. The price fixed by HOPCOMS is usually higher than the market price and thus has the highest price among all the channels.

It is interesting to note the availability of the different channels with different characteristics. There are traditional APMC *mandis* which accepts large quantities and many varieties of produce, with no special quality grading. Even among the

APMC markets, Malur farmers can choose to sell at Malur, Kolar (27 Kms), or Bengaluru (50 Kms). Also they can commission the sale at distant markets. The price discovery mechanism is generally driven through auctions in APMC mandis. The other traditional channels include selling to wholesalers and traders. The price discovery mechanism in this case is through mutual negotiations. HOPCOMS cooperative is another channel with non-negotiable listed price, which is usually above the market price. Retailers and Innova Agri-Bio Park are new channels which grade the produce and offer higher price for the produce. The price discovery is through negotiations and the demand at these channels is very low. Thus faced with a rich set of alternate marketing channels with different characteristics, it is important to understand the costs through these different channels. The mere fact that these different channels are existent and farmers are trading through all these channels show that a farmer chooses a channel based on his own constraints and needs that suits better. We study this in detail in Chapter 5 using transaction cost analysis. The decision to choose a channel to sell is on daily basis (though a farmer may not be selling every single day), we can consider these set of decisions to be *operational* decisions.

On the other hand, there is Namdhari Fresh that practices contract farming. As per the contract, the farmers have to sell all the produce to the retailer upon harvest. The price here is fixed *ex ante* to harvest, unlike the other channels. One can look at contract farming as a strategic decision which is done once during the cropping, to contrast of the operational decision of whom to sell daily. Setting up of a collection center to buy from farmers directly is a strategic decision made by retailers. Thus we can see that the strategic decisions result in the emergence of alternate vertical coordination mechanisms. We study the strategic aspects of coordination in Chapter 6 using the PWH framework from strategic management theory.

5. Decision Making Under Alternate Marketing Channels: Transaction Cost Analysis

5.1 Introduction

On daily basis, farmers face the decision of choosing marketing channel(s) and buyer(s) to sell the fresh produce. Indeed, a farmer can choose different channels for different produce or divide the same produce and sell through different channels. If the produce is under *contract farming,* then the above issues need not be addressed as the contract dictates how and where the produce is sold. In this chapter, we focus on the daily selling of the produce, which is the *operational perspective* of the VC mechanisms in fresh produce marketing. We analyze by identifying and quantifying the different *transaction costs* associated with each of the marketing channel.

Coase (1937) introduced the concept of transaction costs associated *with information, negotiation, monitoring, coordination,* and *enforcement of contracts*. Since then, several ways of defining and measuring transaction costs has been proposed. Hobbs (1997) classified the transactions costs as: *a) information costs* (arising before the transaction), *b) negotiation costs* (costs of physically carrying out the transaction), and *c) monitoring costs* (costs of ensuring that the terms of the transaction are adhere). Key *et al*., (2000) classify transaction costs as *fixed* and *proportional* transaction costs. Fixed transactions costs include the search, negotiation, and enforcement costs that are invariant to the volume of trade. Variable transaction costs include transportation, packaging, and brokerage costs which are dependent on the quantity of the produce traded. Staal, Delgado and Nicholson (1997) classify transaction costs into *observable* and *unobservable* costs. The observable transaction costs include marketing costs such as transport, handling, packaging, storage, spoilage etc. that are visible when a transaction takes place. Unobservable transaction costs include cost of information search, bargaining, and enforcement of contracts etc.

There is no standard definition and classification of transaction costs, but it can be broadly interpreted as *costs associated with market exchange* (Singh, 2008). The general hypothesis of the *transaction cost economics* (TCE) paradigm is that institutions are transaction cost *minimizing arrangements*, which may change and evolve with changes in the nature and sources of transaction costs. Based on the above TCE hypothesis, analyzing the transaction costs associated with marketing

channels can help in understanding why a farmer prefers a specific marketing channel based on different farmer specific and market specific characteristics. Transaction cost analysis has been applied in the context of marketing and market choice in different domains. Hobbs (1997) studied the effect of transaction costs on cattle selling methods in UK. Frank and Henderson (1992) used transaction costs to study several agricultural industries in the United States. Wilson (1980) applied transaction costs to study the New England fresh fish market and Acheson (1985) studied the Maine lobster market using transaction costs.

5.1.1 Objectives of Transaction Cost Analysis

We study the marketing channels using the transaction costs faced by the farmers. The main objectives are:

- Identify and quantify different *transaction costs* in each of the marketing channels.
- Identify the *primary factors* or *determinants* that influence the choice of a marketing channel and quantify their *relative importance* in market selection.
- Is there *information asymmetry* between farmers and buyers (traders and retail chains)?
- Given the nearly *monopsonistic* nature of the market with relatively few buyers, do the buyers (traders and retail chains) collude and influence the price?
- Does the *commercialization* of agriculture with the advent of retail chains allow equity in participation from all farmer categories?

5.1.2 Chapter Organization

The rest of the chapter is organized as follows. Section 5.2 briefly discusses the production costs of five major vegetables produced in Malur. In Section 5.3, we identify and study the *transaction costs* faced by the farmers in Malur across different marketing channels. The study in this section is the foundation for the rest of the chapter and helps in the analysis of the individual objectives listed above. Section 5.4 identifies and ranks the primary drivers that influence the choice of the marketing channels. The information asymmetry issue is studied in Section 5.5 using mobile phone technology that reduces the information search costs. Section 5.6 addresses the issue of collusion of buyers and section 5.7 is devoted to the equal

participation of farmers from all categories in commercial agriculture. Section 5.8 concludes the chapter.

5.2 Production Costs

Transaction costs can be defined generically and are *not* restricted to the marketing stage. Indeed, transaction costs in agriculture can be classified according to the following stages (De Silva and Ratnadiwakara, 2008):

1. *Deciding*: This is the stage farmers decide on what crop to grow, how much land to allocate for each crop and also arrange financing.
2. *Seeding*: During this stage farmers either purchase seeds or prepare their own seeds. They might also prepare a seed bed during this stage.
3. *Preparing and planting*: Land preparation using labor or machines and actual planting occurs during this stage.
4. *Growing*: Applying fertilizer, pesticides and water occurs during this stage.
5. *Harvesting, packing and storing*: Labor for harvesting, harvesting and packing and storing are the main activities that happen during this stage.
6. *Selling*: In the final stage, farmers check prices at the market; find a method of transporting and transport the packed produce to the market and sell.

The costs associated with stages 1 to 5 can be aggregated as *production costs*. While the main focus of this thesis is on the *selling* or *marketing* of fresh produce, we briefly describe the production costs with the data obtained from the field study. Production costs are crop specific and in this section, we briefly analyze the production costs for the following five popular vegetables grown in Malur: 1) Capsicum, 2) Beans, 3) Cabbage, 4) Cauliflower, and 5) Tomato. Firstly, we study the costs that are common to majority of vegetables, namely the costs related to *land*, *water*, *electricity*, *labor*, and *finance*.

5.2.1 Common Costs

We summarize below the common costs associated with the farming of vegetables in Malur. The data is collected from the interview with the farmers and the officers from the Horticulture department.

5.2.1.1 Land

Farmers generally own the land and manage the entire production process. Some farmers are leaving the farm land barren without cultivation due to lack of water and labor. The market price per acre of land varies from INR 20,00,000 – 60,00,000 depending on the location of the land. Land adjacent to roads generally fetch higher costs, to be used for commercial real estate, rather than for farming. Farming on leased land is not very common. Lease cost would depend on water availability and location. The lease cost per acre per year for a favorable land is INR 15,000 with borewell facility and INR 5,000 without water. For lands that are interior to the town area, the lease cost per acre per year can go as low as INR 3000, even with water facilities.

5.2.1.2 Labour

Labour cost is INR 150 per day for male and INR 80 per day for female. With rapid growth of boundary of Bengaluru and urbanization of city outskirts, farm labor is getting diverted to real estate and construction, which pays two to three-fold higher than that of the farm labour.

5.2.1.3 Water

Malur's only water source is ground water and all the farms depend on borewells. Farmers are not required to pay any water cess. With depleting water levels, the average water level is 1000 ft below ground level. Digging cost averages INR 100 per ft, amount to INR 1,00,000 for 1000 ft. The cost of labor, pipe (INR 51,000 for 30 pipes each at 1,700), motor (INR 56,000 for 17-20 HP), wiring, and installation amounts to INR 3,00,000. Thus the overall cost of a 1000 ft deep borewell is INR 4,00,000, which has an life expectancy of 3 years. It is not uncommon for borewells to become non-functional within weeks of installation due to depletion of water. In addition to borewell, farmers invest in irrigation for better yield and productivity.

Drip irrigation facility, though is encouraged by the Government by providing subsidy, but not adopted by all. Many farmers feel that the subsidy is factored in at an inflated price. For example, the drip subsidy provided by the Government is INR 26,000 for installing a drip irrigation facility, which is of total worth INR 75,000. This is applicable to selected vendors of drip irrigation facility from Karnataka. Farmers can buy similar facility from vendors of Andhra Pradesh at the market price of INR 50,000. Thus the subsidy is not realized by the farmers who anyway end up paying the same amount.

5.2.1.4 Electricity

Farmers do not pay for electricity, but the 3-phase power supply is provided only for five hours in a day. Though the single phase power supply is not rationed, it cannot be used for borewell to water the farm. As per the government mandate, all farmers are required to use motors that are less than 10HP for borewells, but the commonly found motors in the field are in the range of 17 to 20HP.

5.2.1.5 Finance

Financing for farmers are availing credit through the following banks at Malur:

- Pragati Grameen Bank (formed by amalgamation of Tungabhadra Gramin Bank, Chitradurga Gramin Bank, Kolar Gramin Bank, and Sahyadri Gramin Bank, which are sponsored by Canara Bank)
- Corporation Bank
- State Bank of Mysore

Banks have different schemes of loans, at nominal government prescribed interest rates. Schemes targeted for production (for a period of nine to twelve months) mandate that farmers have functional borewells for the land. Loan amount of INR 25,000 per acre at 14% p.a. is one of the commonly utilized schemes by marginal and small farmers.

5.2.2 Crop Specific Costs

In this section, we analyze the crop specific production crops in Malur for the following five crops: Capsicum, beans, cabbage, tomato, and cauliflower. Table 5.1 shows the productions costs of the five crops, along with the average yield and the

market price range. All the costs are given per acre. Costs for cabbage and cauliflower are almost identical.

5.2.2.1 Field Preparation Cost

The *field preparation* cost is same for all the crops, amounting to INR 4750 per acre. This includes leveling and ploughing to prepare the land for seeding. All farmers use tractors (own or hired) for field preparation and the INR 4750 includes the labor.

5.2.2.2 Seeding Cost

Capsicum has the highest seeding cost of INR 12,000 among the five crops. Beans is the cheapest which requires 10Kg of seeds for one acre, costing around INR 200/Kg. Seeding for tomato is INR 6000, while for cabbage and cauliflower the cost is INR 8000.

5.2.2.3 Fertilizers

The cost of fertilizer is INR 450 per 50 Kg and an acre of land requires approximately 500 Kg for a crop. Labor of five people is required for applying fertilizers with INR 80 per person amounting to INR 400. The labor also varies with the schedule of application of fertilizers. The average cost of procuring fertilizers (along with incidentals) is INR 4250 for beans, INR 5000 for capsicum and tomato, and INR 5500 for cabbage and cauliflower.

5.2.2.4 Pesticides

Pesticides for crop protection require 10-12 sprays per crop. The cost of pesticide for one acre is approximately INR 10,250 that is approximately common for the five crops.

Table 5.1 Cost of Production, Yield, and Returns per acre

	Capsicum	**Beans**	**Cabbage**	**Tomato**	**Cauliflower**
Field Preparation Cost	4750	4750	4750	4750	4750
Seeding Cost	12000	2000	8000	6000	8000
Fertilizers	5000	4250	5500	5000	5500
Pesticides	10250	10250	10250	10250	10250
Wages	4800	1600	3600	8000	3600
Total Cost of Cultivation	**36800**	**23850**	**32100**	**34000**	**32100**
Average Yield (in Metric Tonnes)	7	4.5	12	14	15
Cost of Production (per Quintal)	525.71	530	267.5	242.85	214
Weighted Average Market Price (per Quintal)	1200	1400	460	625	550
Gross Income (weighted average)	84,000	63,000	55,200	87,500	82,500

Source: Field Survey.

5.2.2.5 Wages

Labour wages include wage for seeding, application of fertilizers, spraying of pesticides, and harvesting. Cabbage and cauliflower are one-time harvest crops where the entire produce is harvested at once. The common form of marketing for both of these crops in Malur is to sell to wholesalers at farm gate. In this form of marketing, wholesaler visits the farm, harvests the produce, and buys the entire produce at the farm. However, a small or marginal farmer harvests the produce and sells at a market or retail CC. The wages are INR 4,800 for capsicum, INR 1,600 for beans, INR 3,600 for cabbage and cauliflower, and INR 8,000 for tomato.

5.2.2.6 Total Cost of Cultivation

We calculated the total cost of cultivation as the sum of costs pertaining to field preparation, seeding, fertilizers, pesticides, and labor wages for fertilizers, pesticides, and harvesting. Common costs related to land, electricity, finance, and water are not factored in this cost, which would vary depending on the farmer category. Based on our field study of the above costs in Malur, our estimate of *average* cost of cultivation per acre for the five crops are as follows: INR 36,800 for capsicum, INR 23,050 for beans, INR 32100 for cabbage and cauliflower, and INR 34000 for tomato.

5.2.2.7 Average Yield

The yield varies depending on weather, rainfall, and pest burden. Farmers during the interview mentioned that yield variability is not very high in Malur due to less variability in weather as Malur's water source is ground water and annual variations in rainfall do not affect the yield much in short term (variations in rainfall does affect the ground water levels and would indeed affect the yield and costs in longer term). The average yields per acre for the five crops as reported by Malur farmers are: Capscium – 7 MT, beans – 4.5 MT, cabbage – 12 MT, tomato – 14 MT, and cauliflower – 15 MT. The yields above are given per acre.

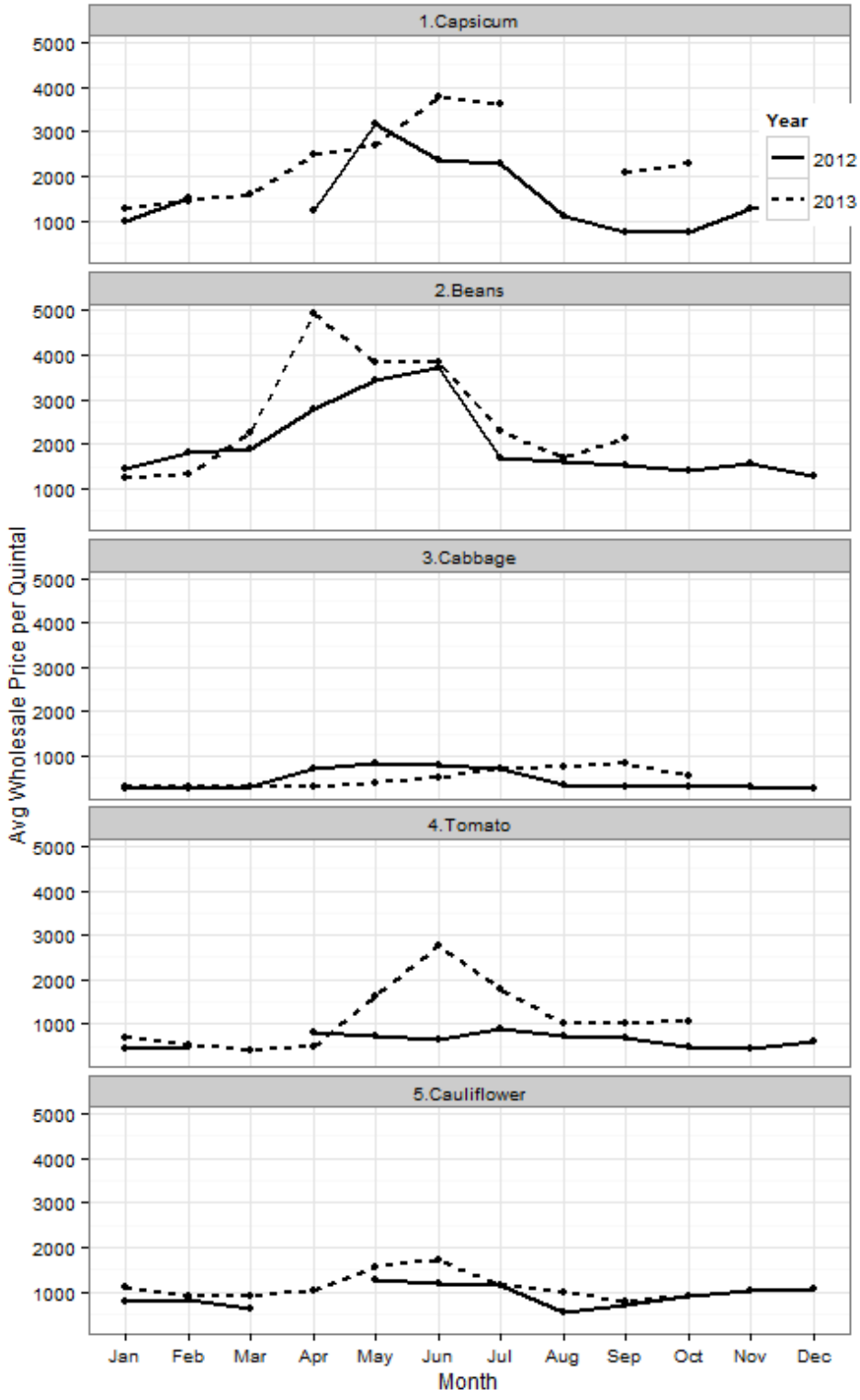

Figure 5.1 Average Monthly Price Per Quintal at Malur APMC Market

Source of Data: http://agmarknet.nic.in

5.2.2.8 Cost of Production

The cost of production is calculated from the cost of cultivation and the average yield. The cost of production per Quintal for the five vegetables are INR 525.71 for capsicum, INR 530 for beans, INR 267.5 for cabbage, INR 242.85 for tomato, and INR 214 for cauliflower.

5.2.2.9 Market Price

The price for each of the crops varies depending on the market conditions. Figure 5.1 shows the monthly average market price for the five crops at Malur APMC market for 2012 and 2013. The data is obtained from *statistical and analytical reports* of Agmarknet.[80] The missing points in the plot are due to the missing data in the above source. The price clearly shows annual seasonality with a single peak annually. However, the seasonality is not the same for both the years.

The price range for per Quintal of each of the crops is estimated from the field interviews, which includes the lowest to the highest price a farmer has sold the produce in the recent years. The estimated price ranges per Quintal are INR 500 – 4000 for capsicum, INR 500 – 4000 for beans, INR 200 – 1500 for cabbage, INR 200 – 3500 for tomato, and INR 500 – 3000 for cauliflower. As the higher prices are realized rarely, we use the weighted average of the price range to obtain the average market price. The average market price per Quintal thus obtained is INR 1,200 for capsicum, INR 1,400 for beans, INR 460 for cabbage, INR 625 for tomato, and INR 550 for cauliflower.

5.2.2.10 Gross Income

The gross income per acre for each of the crops is calculated using the average yield and the weighted average market price. As indicated in Table 5.1, the gross income is INR 84,000 for capsicum, INR 63,000 for beans, INR 55,200 for cabbage, INR 87,500 for tomato, and INR 82,500 for cauliflower. It is not possible to estimate the profits with this limited data as not all of the production costs (especially individual farmer specific costs

[80] http://agmarknet.nic.in/

such as finance, own land or leased, imputed labor) and none of the marketing costs are accounted in Table 5.1.

The production related costs in Malur for five crops were discussed in this section. As shown in Table 5.1, the market price for a crop can vary by a factor 6 – 15 times in a year. Once harvested, the last step in realizing the income and profits is the selling or marketing of the produce. The remainder of this chapter is devoted to the analysis of transaction costs in the marketing stage, which is central focus of the thesis.

5.3 Transaction Costs of Marketing Channels

For the daily selling of the fresh produce, the farmers at Malur have the following *marketing channels*:

- APMC Markets
- Traders & Wholesalers
- Retail Collection Centers
- Agro-Processing Firms
- HOPCOMS Cooperative
- Self-selling & Malur local market

Each marketing channel has alternative *points-of-sale* or *buyers*:

- APMC Markets:
    - *Direct selling*: Malur, Yeswantpur (BLR), KR Market (BLR), Kolar
    - *Commission selling (at distant markets)*: Chennai, Salem, Trichy, etc
- Traders & Wholesalers: Multiple individuals
- Retail CC: Reliance, More, Namdhari Fresh, Heritage, etc
- Agro-Processing Firms: Innova
- HOPCOMS Procurement center
- Local Malur market

The three price discovery mechanisms observed in Malur marketing channels are:

- Open market/auctions (APMC Markets)
- Fixed list price (HOPCOMS)
- Negotiation/bargaining (Traders, Wholesalers, and Retail CC)

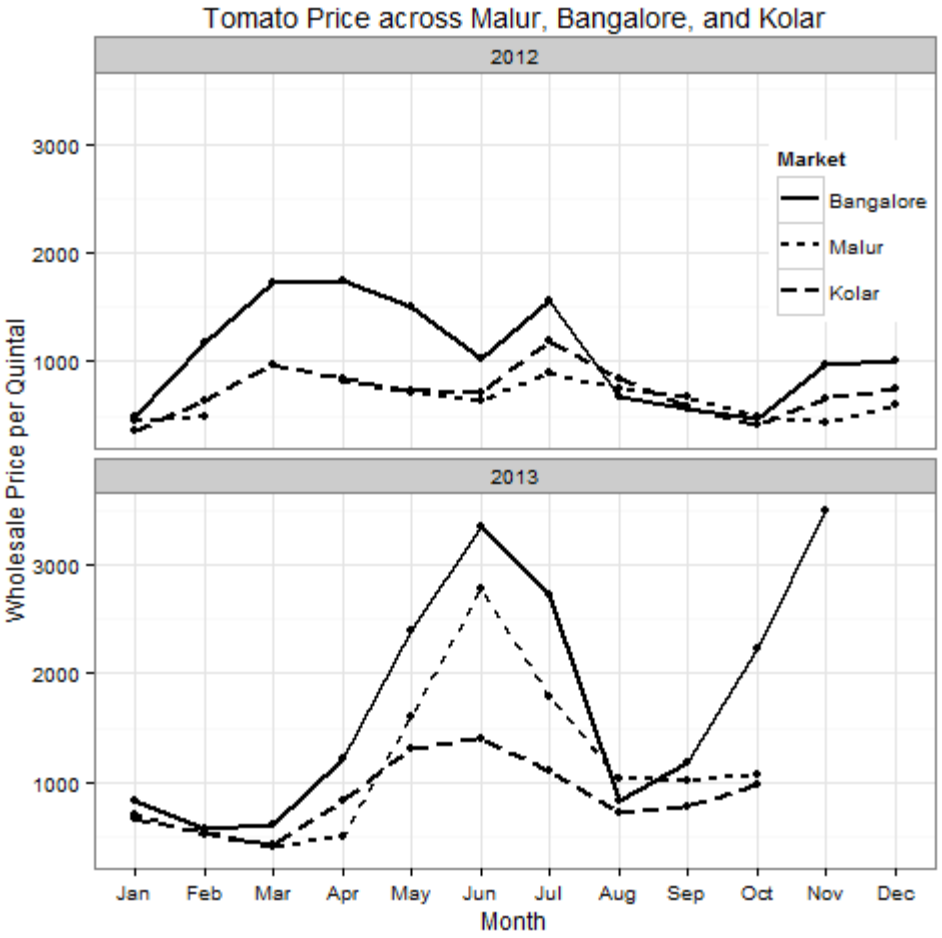

Figure 5.2 Average Monthly Price for Tomato at Malur, Kolar, and Bengaluru
Source of Data: http://agmarknet.nic.in

Figure 5.2 shows the average monthly prices for tomato in 2012 and 2013 at APMC markets of Malur, Kolar, and Bengaluru. The data is obtained from *statistical and analytical reports* of Agmarknet.[81] The missing points in the plot are due to the missing data in the above source. We have considered here the APMC markets of Kolar and Bengaluru as they are alternate popular markets for farmers of Malur. Kolar market is at a distance of 27 Kms and Bengaluru is approximately 47 Kms away from Malur. Bengaluru price is generally higher among the three markets. Kolar prices are higher than that of Malur in 2012, but vice versa in 2013. Consider the average market price in

[81] http://agmarknet.nic.in/

October of 2013 for the three markets: INR 1063.78 at Malur, INR 973.42 at Kolar, and INR 2230.04 at Bengaluru.[82] The market price in Bengaluru is nearly twice than that of Malur. Nevertheless, a fraction of farmers have sold the produce in Malur instead of travelling 50 Kms and selling at Bengaluru. Indeed there are different fractions of farmers who would have sold the produce in October of 2013 to Bengaluru, Kolar, retail collection centers, Innova, HOPCOMS, and to traders and wholesalers. The choice of a particular marketing channel and a buyer there in, would depend on following factors:

- Price,
- Transportation cost,
- Available supply from farmers,
- Required demand from the buyers,
- Availability of information (on price, buyer, demand),
- Risk due to market (low price), transportation (damage in transit), etc

Our focus in the remainder of the chapter is to identify and measure the transaction costs related to the above factors. Note that the focus is on *daily selling of produce*, which includes the important decision of the *choice of the marketing channel* and the *buyer.* In other words, we study the VC mechanisms from the *operational* perspective of fresh produce marketing.

The transaction costs faced by different players in the agri-food system can be categorized as (Pingali, Khwaja, and Meijer, 2005):

a. Farm specific transaction costs,
b. Firm specific transaction costs,
c. Crop specific transaction costs, and
d. Location specific transaction costs.

In this thesis, we focus only on *farm specific transaction costs*, which are the transaction costs faced by the farmers and specifically for the *marketing* stage. A farmer would choose a marketing channel to sell the produce that minimizes total transaction

[82] http://agmarknet.nic.in

costs. In the following discussion, we identify and describe the transaction costs with respect to the different marketing channels.

Transaction costs typically originate due to *information search*, *negotiation*, and *transfer* of physical goods. Information search incurs *costs* with respect to timeliness and quality of information. Farmers use variety of modes for information search: *social networks, media, agricultural extension services, and communication technologies* (De Silva and Ratnadiwakara, 2008). We measure the information search cost in terms of:

- Availability of information,
- Monetary cost spent in acquiring the information, and
- Time required.

For example, if a farmer uses newspapers to access the information, then he can obtain previous day's market price by spending less than INR 2, with negligible time (newspaper gets delivered at the doorstep). However, today's ongoing market price is unavailable in newspaper and hence newspaper is not a feasible medium if current market information is required. Information search cost increases with unavailability of information, money, and time.

5.3.1 Price Search Costs

One of the most important information the farmer seeks is the *market price* or *value* of the produce. When faced with various marketing channels, it is crucial to know the price offered at each of these marketing channels. Farmers use mobile phones to obtain the price information in different marketing channels. Table 5.2 lists the price search costs with respect to the three measurements mentioned above for information search costs.

Latest market price at a particular APMC market is obtained by calling the APMC office using mobile phones. APMC price is the market price determined through the daily auctions and is indicative of current market price a farmer would get if he sells in the market.

The price at HOPCOMS CC is the listed price, which is non-negotiable. The listed price is determined by HOPCOMS head quarters based on previous days APMC markets and is generally higher than other channels. However, due to membership issues

and limited quantity demand for high quality, HOPCOMS is not a preferred channel for majority of the farmers.

The price *offered* by the retail CCs, Innova food processing firm, and the traders are similarly obtained using mobile phones. However, this price is negotiable and the final price is also based on the quality of the produce. It is worth noting that the price search cost is negligible for all the marketing channels and is also uniform to all farmers, irrespective of the farm characteristics (small or large scale farmers).

5.3.2 Buyer Search Costs

Search for buyers incurs cost with respect to knowledge of potential buyers and obtaining price and demand information. A farmer should firstly be aware of existence and whereabouts of potential buyers and then need to obtain the buyer's price offering and demand information. Table 5.3 lists the buyer search costs.

In APMC markets, there is no explicit search for buyers – the farmers take the produce to the agents, who aggregate the produce from different farmers and auction to a group of buyers. Hence buyer search cost is 0 (*not applicable*) in this case.

In the case of collection centers (retail, Innova, HOPCOMS) and traders, the individual buyer maintains a *supply registry* that contains following information about the farmers:

- Contact information (Name, farm address, mobile phone)
- Produce information (vegetables, quantity, quality)

The buyers use the supply registry to contact the farmers stating their demand, offered price, and the expected quality. Thus, for some farmers, buyer and demand information is available without search. It is also not uncommon for farmers to reach out to the buyers with the produce information. As the number of buyers is relatively small and the farmer has had past transactions, the demand information is obtained simply using mobile phones. Thus we see that with respect to the three factors of information search costs – *availability, money spent,* and *time* – mobile phones provide the buyer and demand information at negligible cost.

Table 5.2 Price Search Costs for Different Channels using Mobile Phones

	Availability	Monetary Cost	Time Required
APMC Market	Latest Market Price	Local Mobile Call	3 Mins
Retail & Innova CC	Offered Price (Negotiable)	Local Mobile Call	3 Mins
HOPCOMS CC	Listed Price (Non-Negotiable)	Local Mobile Call	3 Mins
Traders	Offered Price (Negotiable)	Local Mobile Call	3 Mins

Source: Field Survey.

Table 5.3 Buyer Search Costs for Different Channels using Mobile Phones

	Availability	Monetary Cost	Time Required
APMC Market	0	0	0
Retail & Innova CC	YES (Supply Registry)	Local Mobile Call	5 Mins
HOPCOMS CC	YES (Direct Call)	Local Mobile Call	5 Mins
Traders	YES (Past Transactions)	Local Mobile Call	5 Mins

Source: Field Survey.

5.3.3 Transportation Costs

Hobbs (1997) classified transaction costs into three broad categories - information costs, negotiation costs, and monitoring costs. Transportation costs are also often included in transaction costs, since transportation costs borne by the seller are a transaction-specific investment not necessarily related to production (Bailey and Hunnicutt, 2002). Transportation costs are shown by Joskow (1988) to be a significant factor for the marketing method used in coal markets in the United Kingdom. Transportation related transaction costs are important in horticulture marketing given the perishable nature of the produce and the vulnerability to damage in transit. Key *et al*., (2000) identify

transportation cost as *proportional* transaction cost, as the cost of transportation depends on the volume of the produce. Staal, Delgado and Nicholson (1997) classify transportation cost alongside handling, packing, storage, and spoilage as *observable* transaction cost. Bailey and Hunnicutt (2002) classify transportation cost as *explicit* cost, in contrast to the implicit cost like trust between seller and buyer.

The cost of physical transportation of produce from farm to the point-of-sale is measured in terms of 1) *monetary cost for transportation*, 2) *distance*. Table 5.4 lists the transportation costs for different marketing channels, along with the indicative distance to different points-of-sale. A related set of costs for farmers are *personal costs* which cover the time and money spend by the farmer in person to conduct the sell. We measure the personal costs as 1) *personal expenses* and 2) *time invested*. Personal expenses are in lieu of TA and DA that covers travel and other miscellaneous expenses. The time invested is the average time required in the sale of the produce.

The farmers either directly sell the produce at Malur APMC or at the nearby APMC markets in Bengaluru and Kolar. Another option is to sell at distant markets like Chennai, Trichy, Salem, etc through commissioned selling. The Malur APMC market is next to the Malur town bus stand. The distance of the seven gram panchayats in the sample to the Malur market area is shown in Table 5.5. Farmers selling at Malur APMC have to travel less than 15 Km with the produce that would cost around INR 75 per tonne. The peak trading hours are 9 AM – 1 PM and 3 AM – 5 PM. The total time invested is two hours and the farmer spends INR 10 for personal expenses.

For direct selling at Kolar, the produce is transported in the night and the farmer visits the market early morning to participate in the auction. However for markets in Bengaluru, the farmer accompanies the produce in the night and stays till the produce is auctioned in the morning. Hence, the time invested is 4 hours for Kolar and 10 hours for Bengaluru, with the personal expenses of INR 40 and INR 110, respectively.

In the commissioned selling, the farmer invests time in taking the produce to the transport agent in Malur market area. The transport agent sells the produce next day representing the farmer in the distant market. The monetary cost for transportation is INR 80 per sack which can hold 30 – 50 Kg. As such the time invested by the farmer is only 2 hours which is much less than that of Kolar and Bengaluru, as the farmer does not

travel in person. Even though time invested is less, there is an increase in the monetary cost and the distance travelled by the produce. The distance is an important dimension in transportation of fresh produce. Damage in transit is an important source of post-harvest losses and hence the risk of damage increases with the distance travelled.

Table 5.4 Transportation and Travel Costs

	Distance	**Monetary Cost**	**Time Invested**	**Personal Expense**
Malur APMC Market	< 15 Km	INR 75 per tonne	2 hours	INR 10
Kolar APMC Market	~ 30 Km	INR 120 per tonne	4 hours	INR 40
Bengaluru APMC Market	~ 50 Km	INR 250 per tonne	10 hours	INR 110
Distant APMC Markets (Commissioned Selling)	200 – 500 Km	INR 80 per sack*	2 hours	INR 10
CC (Retail, Innova, HOPCOMS, Traders)	< 15 Km	INR 75 per tonne	1 hour	INR 10
Farm Gate (Retail, Innova, Traders)	0	0	30 mins	0

*A sack can hold 30 – 50 Kg depending on the vegetable
Source: Field Survey.

Table 5.5 Distance of Malur Market area from the Gram Panchayats in the Sample

Gram Panchayat	**Distance**
Araleri	5.5 Km
Abbenahalli	4.2 Km
H. Hosakote	6.7 Km
Kudiyanur	9.5 Km
Madivala	4.1 Km
Nosagere	7.4 Km
Santhehalli	6.5 Km

Source: Field Survey.

The retail collection centers, HOPCOMS procurement center, and several traders are in and around the Malur town area. Innova is located around 5 Kms away from the Malur town. Thus the transportation cost for the above is similar to that of Malur APMC. Some retailers, wholesalers, and the Innova food park engage in farm gate procurement where they directly buy the produce at the farm. The transportation related costs are zero for farm gate trading. Table 5.4 summarizes the transportation and personal costs for all the marketing channels. It is important to note an important limitation in Table 5.4. The monetary costs quoted are the costs while utilizing public and other third party transportation modes. Farmers using shared transport services to Malur, Kolar, and Bengaluru pay based on the weight of produce transported. However, for farmers with own transports the monetary costs would be due to fuel and driver, along with the capital and maintenance costs that are amortized over several years. In general, costs incurred with own vehicles would be very less than that of the paid services. Large scale farmers own medium to large size trucks, while small scale farmers own small sized motorized vehicles that can transport few hundreds of kilograms of vegetables.

5.3.4 Storage and Handling Costs

There are no specific storage and handling costs faced by the farmers for different marketing channels. For direct selling at APMC market, the produce is stored in the transport vehicle, while for commissioned selling, the transportation cost is inclusive of storage and handling (which is handled by the transport agent). Cold storage is not yet widely popular. Potatoes are predominantly used for cold storage where a sack (50 kgs) of potatoes is charged at INR 50 – 75 for 1 month. Cold storage facilities are available for rent at Kolar and also at Malur from Innova food processing park. Depending on the weather, farmers choose to dry store the potatoes at the farm.

5.3.5 Intermediary Fees

Intermediary fees are the cost incurred in monetary terms that are paid to intermediaries like brokers and commission agents. APMCs are authorized to collect market fee ranging from 0.50 % to 2.0 % of the sale value of the produce. In addition, commission charges vary from 1 % to 2.5 % in food grains and 4 % to 8 % in fruits and vegetables.

Further, other charges, such as, purchase tax, weighment charges, loading/unloading and *hamal* charges are also required to be paid. In some States, this works out to total charges of about 15 % which is excessive (Ministry of Agriculture, 2013). Malur farmers reported that they 10-15% of sale value as intermediary fee, depending on the APMC market. Additional 1-2% is paid to transport agents in commissioned selling for representing the farmer in auctions. However for selling at the CCs, there are no intermediary fees. Table 5.6 lists the intermediary fees.

5.3.6 Quality Grading and Rejected Quantity

There is no automated quality grading technology. The physical characteristics of the vegetables determine the grading as A+, A, B, and C. The CCs accept only A+ and A grade produce (sometimes B grade at lower price margin). Due to quality restrictions, some of the produce would be rejected and the farmer has to find alternate points-of-sale to sell the rejected produce. We measure this transaction cost in terms of 1) *time taken for quality inspection*, 2) *time taken to sell the rejected quantity*, and 3) *monetary cost incurred to sell the rejected quantity*.

In retail CCs, HOPCOMS procurement center, and Innova, 10 – 15% rejection is commonly observed (as reported by farmers and CC officials in the interview). Consider a typical scenario at a retail CC, which has an indent for 150 Kgs of capsicum (Innova and HOPCOMS also has similar indent quantity). A farmer goes to the CC with 100 Kgs of capsicum to sell, out of which, say, 12 Kgs is rejected. The 12 Kgs of rejected produce is of not acceptable quality to CC but not necessarily damaged or spoiled. Now the farmer incurs the extra cost of selling the rejected produce at other marketing channels that accept such quality, and more importantly such a low quantity of 12 Kgs.

Table 5.6 Intermediary Fees

	Monetary Cost
APMC Market – Direct Selling	10 – 15%
APMC Market – Commissioned Selling	(10 – 15%) + (1 – 2%)
CC (Retail, Innova, HOPCOMS, Traders)	0

Source: Field Survey.

Table 5.7 Quality Related Costs

	Inspection Time	**Rejected Produce**	**Time Taken to Sell the Rejected Produce**	**Cost Incurred for Selling Rejected Produce**	**Resolution of Quality Dispute**
APMC Market	Negligible	0	Not Applicable	Not Applicable	*Ex post*
CC (Retail, Innova, HOPCOMS)	~ 15 mins	10 – 15%	1.5 hrs	INR 10	*Ex ante*
Traders	~ 5 mins	5 – 10%	1.5 hrs	INR 10	*Ex ante*

Source: Field Survey.

Table 5.8 Quality Related Issues at Malur, Kolar, and Bengaluru APMC Markets

	Malur	**Kolar**	**Bengaluru**
Whether produce is cleaned/graded before sale?	No	Yes	Yes
Accepted grade in the market	Nil	Yes	General
Farmer level grading in practice	No	Yes	Yes
Are there quality disputes?	No	Yes	No
How are quality disputes settled?	On Appeal	Through dispute committee	Mutual understanding or through APMC

Source: http://agmarknet.nic.in/

Farmers sell the low quantities of rejected produce at local markets, or to small traders, or through self selling. The extra cost incurred at selling the rejected produce is estimated at INR 30 and takes around 30 minutes to sell. Traders who sell to intuitional buyers (hotels, hospitals, etc) engage in quality inspection, but the inspection mechanism is not rigorous as that of the retailers. There are no visual charts to indicate non-acceptable quality characteristics for different vegetables and there are no sorting tables. The rejected produce as reported by farmers and traders is around 5 – 10% and incurs an extra cost of INR 30 and 30 minutes to sell. Table 5.7 summarizes the quality related costs at Malur for the different marketing channels.

There are no strict criteria for quality grading in APMC markets and hence there is no rejection of produce, unless the produce is damaged or spoiled. Table 5.8 summarizes the quality related issues at Malur, Kolar, and Bengaluru APMC markets, as reported in individual *mandi profiles* of Malur, Kolar, and Bengaluru in Agmarknet website.[83] The typical quality inspection is done through checking the produce randomly from few sacks. In contrast, CCs check through every piece of the produce over the sorting and grading tables, by trained personnel (see Figure.. of sorting and grading tables at Innova). Another important distinction is *when* quality disputes are resolved. At APMC markets, quality issue or dispute is handled *ex post* through mutual negotiations or with the intervention from APMC officials. The problems with the quality are realized one or two days after the sale, when it reaches a second or third tier intermediary. Hence, there is *no* rejected produce during the transaction.

5.3.7 Payment Mode and Delay

It is generally perceived that immediate payment is preferred over delayed payment. Our interviews with farmers and other players revealed that this is subjective. Many small scale farmers preferred weekly payments than immediate payments. Innova clears all payments on Saturdays. The mode of payment as cash or cheques depends on both the parties. Further, it also depends on the marketing channel. Farmers generally trust CCs and accept late payments, whereas immediate payments are preferred with traders.

[83] http://agmarknet.nic.in/

Usually 1 – 2 days of delay is observed in APMC markets, whereas weekly payments are made at CCs.

5.3.8 Price Discovery Mechanism

Three price discovery mechanisms are observed in Malur marketing channels; 1) Auction, 2) negotiation, and 3) list price. Auctions are used in APMC markets to determine the sale price. Retail CC, Innova, and traders use negotiations to settle on the sale price. HOPCOMS use non-negotiable listed price, where the price is decided by the HOPCOMS central office in Bengaluru. Price discovery mechanism is not a *tangible* or *explicit* transaction cost. It is an *implicit* transaction cost (Bailey and Hunnicutt, 2002) that could play an important role in the market selection.

5.3.9 Multi-party Negotiation Cost

Negotiation or bargaining is the price discovery mechanism for CCs (except for HOPCOMS) and traders. A farmer is involved in a multi-party negotiation if he negotiates with more than one buyer for selling the produce. There are two reasons for multi-party negotiation: 1) *to strike a profitable deal* and 2) *to apportion the produce among different points-of-sale*. If the aggregate supply is less than demand for a specific vegetable on a given day, the farmers negotiate with different buyers to strike a profitable deal. The prices offered by other buyers are quoted by the farmers to increase their bargaining power and get a higher price. On the other hand, if the farmer has more produce than required by a single indent, then he negotiates with multiple buyers to apportion his produce to be sold at different points-of-sale. We measure the multi-party negotiation cost in terms of 1) *time invested* and 2) *monetary cost* incurred. As this is a special case of buyer search and price search cost, the results of Table 5.3 and 5.4 are directly applicable to multi-party negotiation cost.

Table 5.9 summarizes some of the above transactions costs for the different marketing channels in Malur.

Table 5.9 Summary of Transaction Costs for Different Marketing Channels

Markets	Price Discovery	Quantity	Quality		Intermediary Fees	Travel & Transportation	
			Inspection Time	Rejected Produce		Distance	Time
Malur APMC Market	Auction	Unlimited	Negligible	0	10%	< 15 Km	2 hours
Kolar APMC Market	Auction	Unlimited	Negligible	0	10%	~ 30 Km	4 hours
Bengaluru APMC Market	Auction	Unlimited	*Negligible*	0	10%	~ 50 Km	10 hours
Distant APMC Markets (Commissioned Selling)	Auction	Unlimited	Negligible	0	12%	200 – 500 Km	2 hours
Retail CC & Innova	Negotiation	150 Kg	~ 15 Mins	10 – 15%	0	< 15 Km	1 hour
						0*	30 mins*
HOPCOMS	Listed Price	150 Kg	~ 15 Mins	10 – 15%	0	< 15 Km	1 hour
Traders & Local Merchants	Negotiation	< 100 Kg	~ 5 Mins	5 – 10%	0	< 15 Km	1 hour
						0*	30 mins*
Wholesalers	Negotiation	1000 Kg	Negligible	0	0	< 15 Km	1 hour

* Farm Gate Sale

Source: Field Survey.

5.3.10 Illustrative Case of Selling through Different Channels

We present here a simple case study of a farmer selling 100 Kg of tomatoes. The case was developed with interview from a group of 14 farmers in Santhehalli gram panchayat. The 14 farmers comprised of 7 marginal farmers, 4 small farmers, 1 semi-medium farmer, and 1 large farmer. The scenario presented to the farmers is the sale of 100 Kg of tomatoes. There are five markets to sell the produce: 1) Malur APMC, 2) Kolar APMC, 3) Bengaluru APMC, 4) Retail CC/Innova, and 5) HOPCOMS. Given the price for each channel, we asked the farmers different costs encountered in the sale of the produce through each channel. Table 5.10 shows the different transaction costs as reported by the 14 farmers in the sample. All the 14 farmers discussed, shared their own experiences, and agreed on each of the cost component, which are summarized in Table 5.10. The price offered at each of the markets is: 1) 10.25/Kg at Malur APMC, 2) 9.50/Kg at Kolar APMC, 3) 14/Kg at Bengaluru APMC, 4) 13.35/Kg at Retail CC/Innova, and 5) 16.50/Kg at HOPCOMS. All the prices were the previous day prices at each of the markets. As discussed earlier in *price search costs*, information about the prices is easily available through mobile phone calls and hence we provided the farmers directly the price offered at different markets. The unit prices are shown as component (A) in Table 5.10.

We consider Retail CC along with Innova as their procurement operations are similar. The price of 13.35/Kg at CC was arrived at using the following formula:

Offered Price = 14 (Base Price) – 1 (Transportation Cost) – 1.5 (Brokerage Fee)
+ 1.75 (Quality Markup) = 13.35

The base price used above is the Bengaluru APMC price. The price offered by HOPCOMS is the listed price fixed at HOPCOMS central office in Bengaluru. As pointed out earlier, price offered by HOPCOMS is the highest (Kolady *et al.*, 2007). The costs of transportation of produce are (component (B) in Table 5.10): INR 8 for Malur APMC, Retail CC, and HOPCOMS, as they are within Malur town limits; 15 for Kolar APMC; and 25 for Bengaluru APMC.

Table 5.10 Returns for Small Farmer from Different Channels in Selling of Tomatoes

	Malur APMC	Kolar APMC	Bengaluru APMC	Retail CC & Innova	HOPCOMS
Quantity (Kg)	100	100	100	100	100
(A) Price/Kg (INR)	9.50	10.25	14.00	13.35	16.50
(B) Transport (INR)	8	15	25	8	8
(C) Personal Expense (INR)	10	40	110	10	10
(D) Quantity Sold	100	100	100	90	90
(E) Total Sale Price	950	1025	1400	1201.5	1567.5
(F) Intermediary Fees	95	102.5	140	0	0
(G) Sale of Remaining Produce	0	0	0	75.5	75.5
(H) Net Income from Sales	**837**	**867.5**	**1025**	**1259**	**1625**

(E): (D) x (A)

(F): 10% of (E) for APMC markets

(G): For Retail CC and HOPCOMS, rejected produce of 10Kg is sold at Malur APMC (9.50/Kg):

95 – 9.5 (Intermediary Fee) – 10 (Extra cost) = 75.5

(H) = (E) – (B) – (C) – (F) + (G)

Source: Field Survey.

Table 5.11 Returns for Large Farmer from Different Channels in Selling of Tomatoes

	Malur APMC	Kolar APMC	Bengaluru APMC	Retail CC & Innova	HOPCOMS
Quantity (Kg)	1000	1000	1000	1000	1000
(A) Price/Kg	9.50	10.25	14.00	13.35	16.50
(B) Transport	75	120	250	10	10
(C) Personal Expense (TA & DA)	10	40	110	10	10
(D) Quantity Sold	1000	1000	1000	150	150
(E) Total Sale Price	9500	10250	14000	2002.5	2475
(F) Intermediary Fees	950	1025	1400	0	0
(G) Sale of Remaining Produce	0	0	0	10350	10350
(H) Net Income from Sales	**8475**	**9065**	**12240**	**12332.5**	**12805**

(E): (D) x (A)

(F): 10% of (E) for APMC markets

(G): For Retail CC and HOPCOMS, remaining produce of 850 Kg is sold at Bengaluru APMC (14.00/Kg):

11900 – 1190 (Intermediary Fee) – 250 (Transport) – 110 (Personal Expense) = 10350

(H) = (E) – (B) – (C) – (F) + (G)

Source: Field Survey.

The farmers were from Santehalli gram pancahayat which is nearly 35 Kms away from Kolar and 55 Kms from Bengaluru. In addition to transportation cost, personal cost (cost of traveling to market, food expenses, etc) for Kolar is INR 40 and that of Bengaluru is INR 110, while INR 10 is incurred for the markets in Malur (component (C) in the table). All the 100 Kg can be sold at the APMC markets, whereas a 10 Kg rejection is anticipated at Retail CC and HOPCOMS. Hence, the total value of sale (component (E) in the table) are 950 for Malur APMC, 1025 for Kolar APMC, 1400 for Bengaluru APMC, 1201.5 for Retail CC, and 1567.5 for HOPCOMS. Intermediary fee of 10% of the respective sale value is paid at the each of the APMC markets, which is given by the cost component (F) in the table. There is no rejected produce at APMC markets and hence all the produce is sold. But for Retail CC and HOPCOMS, the remaining 10 Kg has to be sold. Considering the *best* possibility of selling the 10 Kg at 10.25 in Malur APMC, the total sale value realized is 88.25 (102.5 – 10.25 (Intermediary fee) – 10 (Extra expense for selling)). The sale value realized through rejected produce is given by component (G) in the table.

The net income from the sales is the total sale value realized minus the costs. Component (H) shows the net income from sales of 100 Kg of tomato through different channels: 847 from Malur APMC, 867.5 from Kolar APMC, 1025 from Bengaluru APMC, 1259 from Retail CC/Innova, and 1625 from HOPCOMS. Out of the three APMC markets, Bengaluru APMC provides the highest income in this case. Benchmarking on the income from Bengaluru APMC, the realized higher income from Retail CC and HOPCOMS are 22.82% and 58.53%, respectively. The case also illustrates the lower transaction costs in retail channels and we therefore accept the hypothesis that retail marketing channels have lower transaction costs. Similar observation is made by Singh and Singla (2010) for the cities of Ahmedabad, Belgaum, and Chandigarh (in addition to Bengaluru).

The case shows that a farmer benefits more by selling through Retail CC and HOPCOMS. The analysis only looked at the monetary costs and the time involved in each of the channel is not factored. Another important factor to consider is that the above analysis does not scale up in the same way if the total produce is say 200 Kgs or more. Firstly, the component (C) on personal expenses is invariant to quantity sold and hence will remain the same. However, component (D) will change as Retail CC and HOPCOMS have limited demand (average indent is 150 Kg). We illustrate this case in Table 5.11. We assume here for component (E), the indent (demand) is 150

Kg at the Retail and HOPCOMS. As the farmer has 1000 Kg at his disposal, we can assume that the farmer can satisfy the entire demand of 150 despite the rejection. The remaining 850 Kg is then sold at the best possible market – in this case the Bengaluru APMC.

Benchmarking on Bengaluru APMC price, we see from Table 5.11 that the increase in income through Retail CC and HOPCOMS are 0.7% and 4.6%, respectively. Following observations can be inferred by the above marketing cost analysis: 1) Farmers with less quantity of produce (marginal and small scale farmers) can benefit by selling at Retail CC and HOPCOMS, even with the 10-15% rejection of produce. 2) There is no significant increase in income for farmers with large produce (medium and large scale farmers), who have to *apportion* the produce and sell at multiple markets. We call this cost as apportionment cost, and its implications are discussed in Section 5.7. In the following sections, we study the questions of interest mentioned earlier using the above set of transaction costs.

5.4 Relative Importance of the Factors in Market Selection

Firstly, we study the factors that influence the choice of the marketing channel and buyer. These factors would vary across the individuals. However, the objective is to identify the *average* relative importance and weigthage for each of the factors. This is not a direct analysis of transaction costs, but the relative importance would reflect the underlying costs faced by the farmers.

During the second phase of the data collection that included in-depth interviews with 50 farmers, we identified a number of factors that were considered for the choice of the marketing channel for daily selling. The factors were then assessed using a series of five-point Likert scales.[84] The farmers were asked to assign weightage to each of the factors while choosing the marketing channel and/or buyer. The Likert scale used in the interview is: 1 – *Not Important*, 2 – *Low Importance*, 3 – *Important*, 4 – *Moderately Important*, and 5 – *Very Important.*

The mean scores obtained for each of the factors based on the response from 115 factors (after removing incomplete responses and missing data) for the different factors are:

- Price: 4.76

[84] http://en.wikipedia.org/wiki/Likert_scale

- Intermediary (brokers, commission agents) fees: 3.90
- Price premium for high quality produce: 3:82
- Transportation: 3.66
- Quantity (accepted and rejected): 3.23
- Successful past transactions with the buyer: 3.21
- Payment lead time: 2.8
- Price discovery mechanism (auctions, bargaining): 2.1

The ordering above does not indicate the priority of the factors considered in marketing channel or buyer selection, as they are not independent. For example, *price* in a retail CC takes into account factors like quality, transportation, etc. A farmer takes into account all the above factors while choosing a buyer. However, each farmer has subjective weightage to each of the above. The above mean scores capture the overall relative importance or weight given to a factor while making the market selection. In the following, we analyze each of the above.

5.4.1 Price

The most important driver is the *price* for the produce offered at a marketing channel. Any channel that offers the highest price is naturally preferable for the farmer as selling the produce at the highest price is the only remaining to activity to reap the benefits of the hard work of production. However, price is not the only factor that determines the net income, as there will be other costs, which were identified in the previous section. For example, HOPCOMS provides the highest price (fixed by the HOPCOMS head office and is non-negotiable), but the demand for a produce is in the range of 100 to 200 Kgs, which can be met with the produce from one or few farmers. Further, only high quality produce is accepted. Thus the quantity and quality constraints in HOPCOMS diverts majority of the farmers to other channels which offer lower price.

5.4.2 Intermediary Fees

The second important driver on the choice of marketing channel is the presence of *intermediaries*. By intermediaries, we mean here the middlemen between farmer and the buyer (who pays the farmer for the produce). Thus the buyer could be traders or wholesalers, who are also commonly referred as *intermediaries*, as they are in the

supply chain between farmers (producers) and consumers. In this analysis, we refer to intermediaries as middle men such as commission agents and brokers, who are between the farmer and the buyer. Paying brokerage fees of 10% is not appreciated by farmers and it is an important factor to prefer direct selling to traders, wholesalers, and CCs. It should be noted that all APMC market transactions mandates the presence of middlemen requiring compulsory payment of intermediary fees.

5.4.3 Price Premium for High Quality Produce

The third important driver is the price premium for high quality produce. Except for the HOPCOMS and Retail CCs, none of the other channels have quality grading mechanism. Some traders tend to follow quality grading, but they are less stringent than the above. APMC markets have simple sample quality inspection, but do not pay any premium for higher quality. Any disputes regarding quality are settled *ex post* by negotiations in the market, which are also unregulated.

5.4.4 Transportation

Transportation was identified as the fourth important driver. As identified in the previous section, different marketing channels have different transportation requirements. Transportation cost is measured in three dimensions as shown in the previous section: 1) distance, 2) monetary cost, and 3) time invested. We used a measurable attribute *distance* that indirectly models the risk associated with the damages in transit. The poor road infrastructure and the absence of APMC market infrastructure at Malur has given rise to large farm gate transactions, where wholesalers, traders, and CCs directly visit and buy at the farm.

5.4.5 Quantity

Quantity accepted and rejected at a marketing channel is the fifth important driver. The semi-medium, medium, and large farmers felt quantity as a more important driver. This factor leads to the identification of a new cost called as *apportionment cost*, which is discussed in detail later in the chapter.

5.4.6 Successful Past Transactions with the Buyer

Successful past history of transactions with the buyer fared as the sixth important driver for the choice of a marketing channel and a buyer. In the marketing of feeder

cattle, relationship and trust between a seller and buyer is found to be an important determinant to select the market in Utah (Bailey and Hunnicutt, 2002). In our case, the low weigthage of this driver well below price, quality, transportation, and quantity clearly suggests that farmers in Malur are flexible in choosing and changing buyers as per the need.

5.4.7 Payment Lead Time

Payment lead time is ranked in between *Important* and *Low Importance*. Farmers expressed that defaulting on payment is non-existent and a lead time of one week is generally acceptable. Many marginal and small farmers preferred periodic weekly payments from CCs, as it helped them manage the finances better and also preferred cheque payments, which also avoids the risk of insignificant expenses using cash.

5.4.8 Price Discovery Mechanism

The price discovery mechanism had the least importance. As explained later in the chapter, all the bargaining and negotiations (for traders, wholesaler, CCs) are based on the *market price* determined by APMC markets. The availability of price information reduced the information asymmetry between the farmers and the buyers, thus making negotiations a trivial task. Hence, the price discovery mechanism on average had low to no importance in the ranking, irrespective of farmer category and background.

In this section, we analyzed the relative importance of the primary drivers for the choice of marketing channel using responses from the farmers. The analysis ranked the *money* related factors like offered price, intermediary fees, price premium for high quality produce, quantity, and transportation, ahead of non-monetary drivers. Thus it shows that the transaction costs related to search of information and buyer are negligible to Malur farmers, irrespective of the farmer category. We analyze these costs in detail in the following sections.

5.5 Information Asymmetry

Knowledge and information are important factors for agricultural development through increased production and profitable marketing (Bertolini, 2004). Various kinds of information are required throughout the cropping cycle:

- *Planning stage*: What crops to produce?; Capital availability and access; Input requirements
- *Production stage*: Machinery and technology know-how; Application of fertilizers; Application of pesticides
- *Post-harvest*: Storage and packing
- *Marketing*: Marketing channels; Market prices and demand information

Our focus here is on the marketing stage pertaining to marketing channels, price, and demand information.

According to the *first fundamental welfare theorem*, the allocations of goods is efficient in perfectly competitive markets, where price taking producers and consumers are assumed to trade goods at publicly known prices. However, these assumptions are unlikely to hold in reality, especially for small scale rural farmers in developing countries. Particularly, small scale farmers' access to updated information on prevailing prices in market centers is limited due to low levels of information and communication infrastructure (World Bank, 2007). While rural farmers have little access to updated price information, traders that constantly travel between rural areas and the market centers are naturally relatively well informed about the prevailing market prices (Ferris, 2004). Thus the information asymmetry favoring traders with superior information than farmers may lead to sub-optimal market exchange, specifically resulting in realization of lower prices to farmers. However, easy access to market information for farmers reduces the information asymmetry. Communication technologies like radio, television, and the mobile phones help in timely information broadcast and retrieval.

In this section, we first briefly review the literature related to success stories of availability of market information for farmers. Then we discuss the role of mobile phones in Malur for price discovery.

5.5.1 Related Literature on Availability of Market Information for Farmers

The importance of information for the efficient market allocation has been a central concern of economic theory (Stigler, 1961). However, lack of information and asymmetric information, is rather considered the norm in most developing countries, which has changed since the ubiquitous adoption of cheap mobile technology. There are numerous studies highlighting the role of ICT (Information and Communication Technologies) in the growth of small, medium, and micro-enterprises, focusing on

the developing countries in Asia and Africa. Here we briefly review the works that study the role of mobile technology for marketing of agricultural produce by farmers.

One of the first success stories of use of mobile phones by farmers is from Senegal in Western Africa (BBC, 2002). An organization called Manobi, implemented a project that provides market price information via mobile technology. Manobi independently collects prices and uploads them to its central database using mobile phones. Farmers in the field can use their mobile phones to check prices before they set off and find out where they will get the best offer for their produce. It was found that the farmers have secured, on average, about 15% higher profits after having paid net costs, including the price of Manobi's service (IDRC, 2005). Moreover, an added benefit in reducing information asymmetry in the local context led to farmers realizing that there were often higher returns in producing for the local markets compared to the export markets.

Farmers and traders in Ghana used mobile phones to reduce several transaction costs, including the transportation costs (Overa, 2006). In addition to helping farmers in marketing their produce, mobile phones are used to coordinate logistics activities with traders leading to considerable cost savings. Aker (2008) used the data from Sub-Saharan African country Niger to show that mobile phones reduce the price dispersion in grain markets. A mathematical model that sequentially searches for traders to maximize selling price, predicts that mobile phone usage will increase the traders' reservation prices and the number of markets searched, thereby reducing the price dispersion. The model was tested with the data from Niger that showed a minimum reduction of 6.4% in the price dispersion. Mobile phones usage by farmers in Uganda reduced the information asymmetry between farmers and traders (Muto and Yamano, 2008). Mobile phones enabled higher market participation of farmers in remote areas and increased profitability in the sales with availability to information through mobile phones.

In India, positive evidence has been found for mobile phones usage contributing to increased productivity and profitability in agriculture (Mittal, Gandhi, & Tripathi, 2010). It is now generally agreed that mobile phone usage by farmers can reduce information search costs and lower transaction costs, thereby enabling greater farmer participation in commercial agriculture (De Silva and Ratnadiwakara, 2008). However, the usage pattern and the benefit accrued vary across different locations based on the *supply-demand* market dynamics.

Apart from agriculture, mobile phones have benefited fishermen in decreasing price dispersion. Fishermen from the State of Kerala in India, use mobile technology to know the demand requirements and price information (Jensen, 2007). Based on the demand requirements, fishermen change the catch pattern suiting the demand and also decide the best place to land to sell their catch. Such dynamic change in pattern based on real-time demand information is not possible in agriculture as the cropping cycle is in months. However, demand and price information at several points-of-sale can help the farmers choose the best one to trade. We show in the following that the supply-demand dynamics of vegetables for different marketing channels in Malur Taluk and the usage of mobile phones to reduce the transaction costs.

5.5.2 Role of Mobile Phones in Reducing Information Asymmetry

Mobile phones reduce information asymmetry for Malur farmers by allowing real-time access to following information from the different points-of-sale:

1) Offered/expected price,
2) Quantity demanded, and
3) Expected quality.

It is important to note that the above price and demand information is obtained in real-time and from local points-of-sale like retail collection centers and individual traders. We analyze the transaction costs related to the trading in the following steps:

- Firstly, a farmer searches for buyers and demand information.
- Farmer negotiates with the buyer.
- On successful negotiation, produce is delivered and sold.

5.5.2.1 Search for Buyers and Demand Information

Search for buyers incurs cost with respect to knowledge of potential buyers and obtaining demand information. A farmer should firstly be aware of existence and whereabouts of potential buyers and then need to obtain the buyer's price offering and demand information. For the scope of this work, we denote the traders, retail CC, and Innova food processing firm as *buyers*. Farmers negotiate with the buyers to sell the produce.

5.5.2.2 Negotiation

Once a potential buyer is identified, the second step is the negotiation. Based on our extensive interview with the farmers and the buyers (traders, retail CC, and Innova food processing firm), following generic formula is universally adopted by both the parties:

$$\text{Traded Price} = \text{Base Price} - \text{Transportation Cost} - \text{Brokerage Fee} + \text{Quality Markup}$$

The formula is based on the *alternate* possibility of selling the produce at the APMC market. Thus the *base price* is the current APMC market price (last available price). Depending on the produce, the base price could be calculated as the *average* price at Malur, Bengaluru, and Kolar APMC markets. Further the farmer incurs a certain transportation cost if he sells at the APMC market. The estimated transportation fee is subtracted as the farmer now directly sells to the buyer without extra transportation.

Intermediary fee is another cost that is subtracted from the base price which is usually around 10 – 15% in APMC markets. The traders and retail CC also provide higher premiums for better quality produce. The quality markup ranges from 5 – 10% depending on the quality (B, B+, A, A+). Thus the *base price* significantly influences the negotiated price. The farmers obtain this base price using mobile phone by calling to APMC markets and information kiosks that provide the information free of cost. Thus the base price is *common knowledge* to both the buyers and the farmers, and hence there is no information asymmetry with respect to market price for the produce. We accept the hypothesis that mobile technology reduces information search costs.

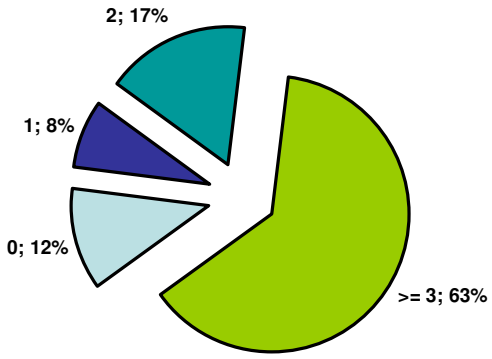

Figure 5.3 Number of Buyers Contacted before Final Transaction
Source: Field Survey.

5.6 Collusion of Buyers

The daily fresh produce marketing has large number of sellers (farmers) with relatively few buyers (traders and retail CC), resulting in a nearly monosponistic market. This being a typical scenario in many other markets in the developing world, it is widely suspected that the buyers collude and lower the trading price. We showed in the previous section that the generic formula used in negotiations is based on the alternate possibility of selling the produce at the APMC markets:

$$\text{Traded Price} = \text{Base Price} - \text{Transportation Cost} - \text{Brokerage Fee} + \text{Quality Markup}$$

Though the above formula is transparent, it still offers following sources of *grey* zones which can be utilized by buyers to their favor:

- The transportation cost also includes the component of time that needs to be invested in selling at the APMC markets. As this component is not easily quantifiable, the buyers can use it against farmers.
- The quality premium is another issue as the definition of quality standards is subjective and is usually done through visual inspection.
- The retailers can provide immediate payments as against markets where there is always a delay of 1 to 2 days.

Given the above factors that can act in the favor of buyers, the possibility of collusion among buyers can lead to unfavorable prices for farmers. To analyze the issue of buyer collusion, we use the *multi-party negotiation cost* for farmers as the transaction cost. The ability to conduct multi-party negotiations prior to a successful trade can be used as a proxy to analyze the presence of collusion. We define *multi-party negotiation* as negotiation with different buyers, by quoting the prices offered by the competitors. This is not a typical *search* operation where the farmer calls different retailers for the offered price and chooses the one with the best price. Rather, the negotiation involves quoting price offered by the competitors in striking a deal.

We measure the multi-party negotiation cost in terms of 1) time invested and 2) monetary cost incurred. Figure 5.3 shows the proportion of farmers contacting different number of buyers from the sample data. From the analysis, 12% of the farmers engaged in transactions without negotiating with competing buyers; 8% negotiated with one retailer or trader before selling; 17% reported negotiating with two competing buyers, and 63% of the farmers reported negotiating with three or more competing buyers before making the final transaction using mobile phones. Multi-party negotiation by farmers seemed more of a norm in Malur due to the prevalence of mobile phone usage.

Also the knowledge of offered prices and demand of different buyers is often used by the farmers for negotiation. Many buyers cite the usage of competitor prices by farmers while bargaining. Innova reported that on many accounts this has led to price war among the buyers specifically for cauliflower and capsicum. Buyers are forced to pay more for high quality produce if their customer is an institutional buyer (like hotels) or for export, which ensures them high price. Thus the negligible cost for multi-party negotiation by farmers can be used as an indicator for prevention of buyer collusion. It is worth noting that the discussion above is with respect to retailers and traders to whom farmers sell directly through negotiations. It is not relevant to the possibility of collusion of buyers in APMC markets.[85] Another important observation is that the retailers cannot collude to reduce the offered price less than that of APMC price (after factoring in transportation and intermediary fees),

[85] http://mrunal.org/2013/08/food-processing-nuisance-of-apmc-acts-commission-agents-marketing-of-agricultural-produce-issues-and-constrains-for-gs-mains.html

as farmers would opt to sell at APMC markets (APMC market price is easily available) rather than with the retailers.

5.7 Equity of Farmer Participation in Commercial Agriculture

The commercial agriculture (retail CC, food processing firms) is generally perceived to have high transaction costs that deter participation of small scale farmers (Pingali *et. al.*, 2005). We reproduce here the relevant table and figure from Chapter 4 on *Marketing Channel of Malur* as Table 5.12 and Figure 5.4. The table and figure show the participation of farmers in commercial channels, by farmer category. The farmers responded with YES or NO for *regular* participation in commercial marketing channels of retail CCs and Innova Agri-Bio Park. The answer of farmers who have tried the channel but are not pursuing on regular basis is recorded as NO. The figure shows an inverse relationship between farmer category and participation: lower the farmer category (less land owned), higher the participation. This observation counters the notion by Pingali *et. al.* (2005) that small scale farmers are likely to face higher transaction costs. In this section, we show how the current supply-demand dynamics in Malur indeed enables higher participation of small scale farmers and discourages large farmers.

Firstly, we perform a *logistic regression*, to identify the significant factors that influence the participation in commercial agriculture. The regression shows that the farmer category (size of land owned) is a significant predictor. Secondly, based on our transaction cost analysis, we identify a new transaction cost, called as *apportionment cost*, which is high for large farmers in Malur. The apportionment cost helps us explain the reason for higher participation by small scale farmers in commercial agriculture.

Table 5.12 Participation in Retail Marketing Channel

Farmers	YES	NO
Marginal	60	29
Small	70	14
Semi-Medium	28	19
Medium	5	27
Large	1	6
All	**164**	**95**

Source: Field Survey.

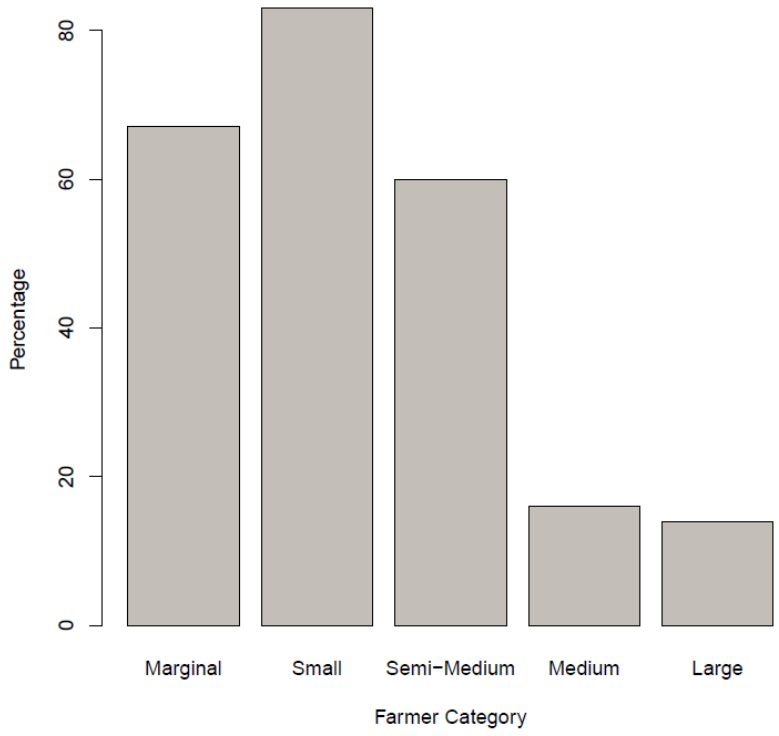

Figure 5.4 Average Percentage of Participation in Retail Marketing Channel

Source: Field Survey.

5.7.1 Regression on Farmer Participation in Commercial Agriculture

In order to identify the significant predictor for participation in commercial agriculture, we performed a *logistic regression* using the data obtained from the field study in Malur.

- The *response* variable is the participation in commercial marketing channel with the following responses:

- YES is coded as 1.
- NO is coded as 0.

- Following predictor or explanatory variables are used:
  - Farmer category (Category): Marginal (MG), Small (SL), Semi-Medium (SM), Medium (ME), and Large (LG)
  - Farmer education level (Education) : Illiterate (ILL), Literate (LIT)
  - Farmer family education level (Family.Education): Literate (LIT), College (COL)

Table 5.13 shows the summary of the logistic regression model. The coefficients show that the *Category* predictor variable for *marginal*, *small*, and *semi-medium*, and *Education* are significant at *p*-value of 0.05. Thus we see that the farmer participation in commercial marketing channel can be explained significantly using the farmer category, or rather the size of land owned. The farmers with less farm size show increased participation. We therefore reject the hypothesis that retail marketing has positive size bias. The rationale for poor participation from large farmers is explained using the new transaction cost called as *apportionment cost*.

5.7.2 Apportionment Costs

The quantity demanded by the buyer varies greatly with respect to the marketing channel. APMC markets being terminal markets, a farmer can literally trade large quantity of produce. But CCs and traders accept relatively lower quantity. The CCs have specific demand requirements and accept around 100 – 200 Kg for a vegetable. Thus, the advantage of selling all the produce at one sale point versus multiple buyers is determined by the quantity specific transaction costs. We measure this using the *apportionment cost*, which is the cost of apportioning the produce and selling the produce to multiple buyers. The apportionment cost is zero if sold to a single buyer.

Farmers with large quantity of produce generally prefer to sell all the produce at APMC markets. In our field study, we interviewed few large farmers who apportion and sell the produce at the CCs first (retail and Innova), where they get a premium for high quality produce. The remaining produce is then sold at APMC markets. But majority of large farmers felt that the transportation time and cost involved in apportioning is too high to benefit from the premium prices obtained at the CCs.

Table 5.13 Summary of Logistics Regression Model

Deviance Residuals:				
Min	1Q	Median	3Q	Max
-2.0086	-0.6136	0.5343	0.8269	1.9425

Coefficients:				
	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	-1.90794	0.67209	-2.839	0.004528 **
CategoryME	0.08763	0.64714	0.135	0.892287
CategoryMG	1.59019	0.60883	2.612	0.009005 **
CategorySL	2.14776	0.61354	3.501	0.000464 ***
CategorySM	1.33964	0.61694	2.171	0.029898 *
EducationLIT	0.78186	0.29077	2.689	0.007168 **
Family.EducationLIT	0.09056	0.21722	0.417	0.676742
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				

Source : Author's calculation based on Field Survey.

The analysis in Section 5.3.10 with Tables 5.10 and 5.11 illustrated the costs for small scale farmers and large scale farmers, respectively. The cost analysis summarized in Table 5.11 is an illustrative example of apportionment cost, which makes the selling of produce through multiple channels less attractive for large scale farmers. Apportionment cost is indeed the opportunity cost of time spend in selling the produce through different channels versus selling all of them in a single channel.

5.8 Conclusions

In this Chapter, we studied the choice of marketing channels for daily selling using transaction cost analysis. In particular, we identified and quantified the costs related to *price search, buyer search, transportation, storage and handling, intermediary fees, quality, payment mode,* and *price discovery mechanism*. All the above costs are with respect to farmers. The search for buyer and price are information search, which is accomplished using mobile phones. The transportation related costs are measured in three dimensions: distance travelled, time invested, and monetary cost. It is interesting to note that the distance travelled is related to produce and time invested is for the farmer spending time on transportation related work. While we can expect both to be linearly related, they are indeed different depending on the market channel. For selling to Malur APMC market, retailers, and traders – all within 15 Kms of Malur town area – the farmers travel with the produce. For commissioned selling to distant markets, farmers travel to Malur market and load the produce on

trucks. The transport agents sell the produce at distant markets on behalf of farmers. Thus the time invested for arranging the transport is less, but the produce is transported to longer distance. The distance travelled is an important dimension as the produce is perishable and also subject to damage to transit. Till the produce is sold at the market, the risk of post harvest damage is borne by the farmer and hence this cost has to be taken into account while measuring transportation related costs.

Quality related costs have important differences between the APMC markets and retailers. Quality inspection is *ex ante* to transaction while selling to retail collection centers, HOPCOMS procurement center, and Innova. The produce is inspected by trained personnel and the ones not meeting the quality standards are rejected. Thus there is inspection time and also cost and time related to selling the rejected produce. On the other hand, quality inspection in APMC markets is done through random sampling as there are resource and time constraints to check all the produce. The issues in quality are known after the transaction (probably one or two days later) and are resolved *ex post* to the transaction.

Costs related to price discovery vary depending on the channel, but the prices are all related. APMC markets predominantly use *auctions* to determine price; HOPCOMS use non-negotiable *listed* price; retailers and Innova use *negotiations*. HOPCOMS fixes the price based on KR Market price in Bengaluru. Similarly, retailers use Bengaluru and Malur APMC market price as base price to determine the offered price (around which negotiations happen). Thus all the prices are tied to previous day or recently available APMC market price.

Using transaction as a unit of analysis, we identified and measured the costs faced by the farmers while marketing the vegetables. We summarize below the analysis using the above transaction costs.

Our study identified the various factors that influence the choice of the buyer for selling the daily produce. The factors were then ranked in terms of their relative importance in market selection, based on the feedback from farmers on 5 point Likert-scale type analysis. Monetary factors like offered price, intermediary fees, price premium for high quality produce, quantity, and transportation cost had higher importance than non-monetary factors. In particular, past transactions with the buyer and the price discovery mechanisms are not considered as important as others. It suggests that farmers can easily switch between buyers and do not find negotiations as hard or less preferable than auctions and listed price.

India is a land of small farmers and challenges faced by marginal and small scale farmers are high in both the input and marketing stages (Mahendra Dev, 2012). It is generally argued that farmers in developing countries are unable to get fair price for their produce due to the information asymmetry between farmers and buyers. Also the higher transaction costs related to information in new commercial marketing channels would deter small scale farmers (Pingali *et. al.,* 2005). In the case of Malur, farmers have the option of selling at wholesale APMC markets. But many choose to sell with retail CCs and Innova, with day-to-day bargaining as the price discovery mechanism. If the buyers are well informed than the farmers, then the resulting information asymmetry could lead to less income for the farmers. The negotiations are based around the latest Bengaluru APMC price, which is the significant information that farmers should be aware of. The *information search cost for the farmers is* negligible due to the mobile phone technology. We accept the hypothesis that mobile technology reduces information search cost. All the price transactions are dependent on APMC price and as farmers are able to obtain this price through mobile phone, information asymmetry regarding market price is reduced. This is in support of the hypothesis that ICT technologies reduce information cost.

The number of retail buyers is relatively very small compared to the number of farmers, making it a nearly *monopsonistic* market. Thus the possibility of collusion among the buyers is very high to artificially lower the price. We found that the *multi-party negotiation cost* for farmers are negligible. In a multi-party negotiation, farmers negotiate with competing buyers by quoting the competitors' price offering. From our interviews with retail CCs and Innova, we found that multi-party negotiation by farmers often results in price war among the buyers, especially when there is high demand for a particular variety of produce (for e.g. Cauliflower). We believe that the multi-party negotiation can deter the retailers from colluding.

It is widely perceived that the commercialization of agriculture with the advent of retail chains and food processing firms would favor only the large scale farmers. The transaction costs associated with commercialization may deter the small scale farmers from participation in commercial agriculture (Pingali *et. al.*, 2005). We performed logistic regression on farmer participation in direct selling to retailers based on land size and education. The probability of participation was inversely proportional to land size – farmers with less land size showed higher participation than that with larger land. Given the less indent and demand requirements from the

retailers and Innova, farmers with large produce find it unattractive to sell at retail firms. We estimated income and costs for a small scale farmer with 100 Kgs and a large scale farmer with 1000 Kgs of tomatoes. Based on the cost figures provided by the farmers, small scale farmer with 100 Kgs can increase his income by 22.82% by selling to retailers, while for the same set of costs and price, a farmer with 100 Kgs can only increase his income by 0.7%. As the retailers procure limited quantities, large scale farmers do not find the retail channels attractive. This was explained through apportionment cost, which is the opportunity cost of time spend in selling the produce through different channels versus selling all of them in a single channel. We rejected the hypothesis that retail chains have positive size bias that favors large farmers. If the demand by the retail CCs increases in the future, it is highly likely that the apportionment cost would reduce for large scale farmers, enabling them to participate aggressively, which could deter small scale farmers. With large demands, retailers also prefer to trade with few large scale farmers than many small scale farmers. One of the crucial transaction costs faced by retail firms in dealing with larger number of small farmers is the *bureaucratic* costs associated with coordinating and managing large number of suppliers (Hayes, 2000). Thus the increase in demand by retailers might change the current pattern of participation due to reduction in apportionment costs for farmers and bureaucratic costs for retailers. The apportionment cost is hence an important indicator of equity in participation from different farmer categories and can be used for policy making to provide fair participation. One way is to enforce caps on quantity procured from individual farmers, which will force to keep the apportionment costs higher for large farmers. HOPCOMS uses cap on procuring vegetables from a single buyer, which discourages large scale farmers (Kolady *et al*., 2007).

This chapter focused on operational decisions faced by farmers in selling the produce on daily basis. The transaction is considered as the basic unit of analysis and related costs were identified, measured, and analyzed. In order to analyze strategic decisions, we use concepts from strategic management theory in the next Chapter.

6. Strategic Choice of Vertical Coordination Mechanisms

6.1 Introduction

Analysis of vertical coordination strategies based on Transaction Cost Economics (TCE) in the previous chapter (Chapter 5) focused on transaction costs of the marketing channels for *daily* selling of fresh produce. Daily choice of marketing channel for selling by famers is an *operational* decision. In this chapter, we study the strategic decisions faced by different stake-holders in Malur fresh produce marketing. Following are some of the examples of strategic decisions. Farmer engaging in contract farming is a strategic decision as the produce is then solely sold to the contracting retailer. Another example of a strategic decision is retailer setting up a CC (collection center) to directly procure from farmers, as there is investment and expenses incurred in establishing and running a CC.

This chapter focuses on choice of strategic decisions and also considers other stake-holders like retailers and institutional buyers (in addition to farmers). The strategic benefits of continuing with the current choice of coordination mechanism or adopting a new mechanism cannot be sufficiently handled through TCE approach. Based on the deep understandings offered by TCE, Peterson, Wyoscki, and Harsh (2001) developed an approach known as the *PWH* framework for addressing coordination strategy decisions. Earlier in the literature, Williamson (1975) has established the two extreme vertical coordination mechanisms:

1. Open markets
2. Vertical integration (multiple market stages under single ownership)

Open markets have the characteristic of *invisible-hand* coordination that allows individual economic agents to follow self-interest and engage in short-term and opportunistic transactions. On the other extreme, vertical integration is achieved by *managed* coordination of a centralized authority. However, there are several hybrid mechanisms that are possible between the two extremes. Many formal and informal mechanisms such as *contracts, joint ventures, information sharing*, etc are observed in practice and are assumed to be part of the continuum. PWH established the nature of the continuum as a function of *intensity of control* and showed an array of hybrid strategies in such continuum. Further, they presented a decision making framework to evaluate the alternate coordination mechanisms (within the continuum) to be used for a particular transaction.

The decision making framework (hereafter referred as PWH framework) can be used in following modes:

1. *Decision mode* where one can evaluate alternate vertical coordination mechanisms to change from the current one
2. *Prescriptive mode* that prescribes alternate mechanisms
3. *Descriptive mode* that explains why a particular mechanism is currently used or not used.

The PWH framework with the above modes is highly useful in analyzing the strategic decisions observed in Malur. The chapter is organized as follows. We briefly introduce the concept of PWH as a continuum of VC mechanisms in Section 6.2. In Section 6.3, we analyze the VC mechanisms observed in Malur and map to the PWH continuum. Section 6.4 describes the PWH framework for strategic coordination decision. The application of PWH framework to agri-food system is discussed in Section 6.5. Section 6.6 applies the PWH framework to analyze the various strategic decisions of VC mechanisms of Malur. Section 6.7 concludes the chapter.

6.2 The PWH Continuum of Vertical Coordination Mechanisms

In this section, we introduce the concept of the PWH continuum, based on the works of Wysocki, Peterson, and Harsh (2003, 2006). The vertical coordination mechanisms belong to a continuum with open markets and vertical integration as the two ends of the continuum. Starting from this generalized notion, Peterson, Wysocki, and Harsh (2001) establish the nature of the continuum with an array of hybrid strategies. Figure 6.1 shows the continuum hypothesized by the authors. Five major categories of mechanisms are suggested running from spot/open markets to vertical integration. The authors argue that the latent variable that creates this continuum is the *intensity of control*, which is obvious at the two ends of the continuum. The *invisible hand* coordination at the spot markets end emphasizes the absence of coordination by any individual participating entity. On the other hand, *managed* coordination is the characteristic of vertical integration. As suggested in the figure, the intensity of invisible hand coordination decreases as we move from the left, with an increase of managed coordination. As we move along the continuum and reach the vertical integration, the invisible hand coordination is completely replaced with managed coordination. Before the advent of PWH approach, earlier scholars in VC

discussed the general notion of continuum with mechanisms in the interior of the continuum as a hybridization of the two extremes – but with intensity of control as the latent variable, PWH defines a vertical coordination mechanism as a *function* or *hybrid* of invisible hand and managed coordination. The placement of a particular mechanism is based on the relative strength of the above two: *If the invisible hand is stronger, then it is closer towards the spot markets and vice versa*. Based on the work of Williamson (1973, 1975), Mahoney (1992), and Milgrom and Roberts (1992), Peterson, Wysocki, and Harsh (2001) posited that the vertical coordination continuum has five major categories of vertical coordination strategy:

1. Spot/Open/Cash Markets
2. Specifications Contract
3. Relation-based Alliance
4. Equity-based Alliance
5. Vertical Integration

In the following we briefly discuss the five hybrid strategies and their location in the continuum as a function of the intensity of control. The control measures can be divided as *ex ante* and *ex post* to the transaction. With invisible hand coordination, *ex ante* control measures are relatively more than that of the *ex post* measures. Similarly with managed coordination, the *ex post* control measures are relatively more than that of the *ex ante* measures. Thus, as one moves from the spot markets to the right, there is a increase in the *ex post* measures.

6.2.1 Open Markets

In open/spot markets, *invisible hand* of the market determines the price. The buyers and sellers have only control over their decision to engage in price discovery and then to accept or reject to make a transaction. Thus the opportunity to exercise control is *ex ante* to the transaction. The only *ex post* control is to decide whether to repeat the transaction with the same party.

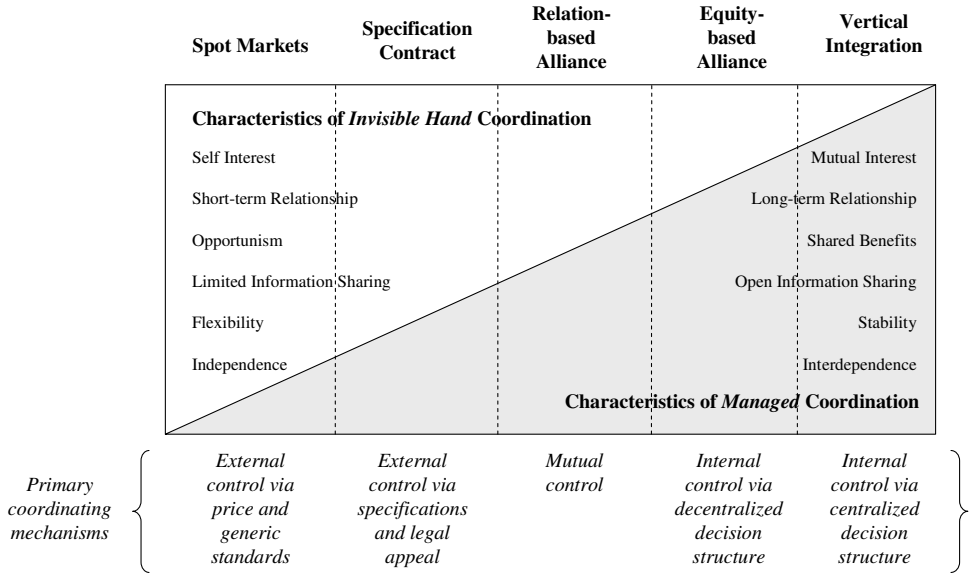

Figure 6.1 PWH Continuum of Vertical Coordination Strategies

Source: Peterson, Wysocki, and Harsh (2001)

6.2.2 Specifications Contract

Contracts are legally enforceable establishment of specific and detailed conditions of transaction or exchange. The intensity of control increases than that of the spot markets. The control and coordination is exercised through the *ex ante* negotiation of contract specifications, which might include:

- rules of transactions,
- incentives for meeting the specifications, and
- penalties for violating the rules.

Comparing the *ex ante* decisions to be made in spot markets (yes/no decision to participate in the transaction), contracts require the parties to invest time and due diligence in drafting the contract that is mutually agreeable and legally enforceable. *Ex post* the contract specification, the parties can exercise control by:

- monitoring the contract execution,
- renew/renegotiate the contract,
- third party enforcement if parties fail to adhere to the contract.

Thus the *ex post* control is also relatively higher than that of the spot markets. However, the success of the specifications contracts mechanism primarily lies in the *ex ante* decisions of making the contract mutually beneficial and legally enforceable,

so that *ex post* controls are easy to implement and less costly (Wysocki, Peterson, and Harsh, 2003).

6.2.3 Relation-based alliance

The third hybrid strategy proposed by PWH in the continuum is the *relation-based alliance*, defined as an exchange relationship in which the parties share risks and benefits emanating from mutually identified objectives. Following three characteristics uniquely identify a strategic alliance to be relation-based (Martin *et al*, 1993):

- mutuality in objective identification,
- mutuality in controlling decision making processes, and
- mutuality in sharing risks and benefits.

The coordination thus arises from mutual control. A commonly used analogy for relation-based alliance is that of marriage, where partners work together towards common and mutual interests and objectives, while maintaining individual identities. The intensity of control needed to align and maintain mutual interests involves processes that are more complex than the earlier two mechanisms. The focus of control is the *relationship* and the transaction or exchange is just one element of the relationship. Firstly, the control process starts with the building of relationship to identify and assure the mutual interests. The *ex ante* controls thus involve ensuring a strong relationship that is build on the mutual interests of the parties. Note that, there may not be any formal or enforceable agreements in the *ex ante* controls like the specification contracts. Hence the *ex post* controls focus on monitoring relationship and transaction performance. If the performance is not as expected, then the parties resolve the differences jointly, without the interference of a third party as there are no enforceable agreements. For successful coordination, parties must invest significant time and commitment to both the *ex ante* and *ex post* control processes. Thus it is the relationship that determines control and not any specific transaction *per se* (Peterson, Wysocki, and Harsh, 2001).

As shown in the Figure 6.1, the relation-based alliance is at the middle of continuum, marking the equal levels of invisible-hand and managed coordination. In other words, both *ex ante* and *ex post* controls are at equal intensities and the move to the right begins with the higher levels of managed coordination.

6.2.4 Equity-based Alliances

Equity-based alliances include a variety of organizational forms: *joint ventures*, *partial ownership relationships*, *clans*, *cooperatives*, and other organizational forms that involve some level of shared equity capital between the parties. The distinguishing feature from that of the previous mechanisms is the presence of a formal organization that is distinct from the exchange parties and that is designed to be their joint agent in the conduct of the transactions and also coordination. The center of control is accomplished by a formal organizational structure, thus emphasizing the dominance of managed coordination and control in the continuum as we move from the spot markets. The managed coordination and control are implemented through policies, procedures for conduct of exchange, responsibilities, roles, rights, and equity commitments of the exchange parties. Even though the control is accomplished by an organization, the control is decentralized among the ownership parties and the ownership parties still maintain a separate identity. The ownership parties can hence walk away from an exchange if they desire so and there is no binding control. The *ex ante* control process consists of negotiating the formation of the formal decentralized organization that will govern the *ex post* resolution of any coordination issues. The real control is exercised through the *ex post* processes and not by the *ex ante* ones (Peterson, Wysocki, and Harsh, 2001).

6.2.5 Vertical Integration

The continuum ends with the *vertical integration*, where coordination across various stages in the supply chain occurs under common ownership and management. In the view of the discussions of the prior mechanisms in the continuum, the parties to the transaction become *one* and a complete control is achieved. Such a formation of a single organization is possible through *merger* of two parties, *acquisition* of one by another, or one party creating resources through *internalization* by replacing the market function of another party (by starting a new subsidy). At this stage, the control is centralized and there are no parties with separate and independent identities. The *ex ante* control process involves negotiating the formal centralized *ex post* governance structure and the *ex post* control is the execution of governance policies and procedures for the centralized organization (Peterson, Wysocki, and Harsh, 2001).

Traditionally, vertical integration is synonymously used with single ownership. The above definition emphasizes single *control* rather than single *ownership*. Multiple owners but with a single organization of control is vertical integration. On the other hand, a single corporation that has multiple business units each operating autonomously in decentralized fashion is not vertical integration but more of equity-based alliance. Basically the emphasis is on the single point of control than ownership (Peterson, Wysocki, and Harsh, 2001).

Figure 6.1 summarizes the characteristics of *invisible hand* and *managed* coordination, and also the five vertical coordination strategies as the function of the above two. The diagonal line in the figure represents the mix of invisible hand and managed coordination characteristics found in each of the fives alternative strategies. The area above the diagonal indicates the relative level of invisible hand characteristics and the area below the diagonal indicates the relative level of managed characteristics.

6.3 PWH Analysis of Vertical Coordination Mechanisms for Fresh Produce Marketing in Malur

The analysis that follows in this section is aimed at understanding the coordination mechanisms in Malur from the perspective of *intensity of control*, which is the latent variable in the definition of PWH continuum. In Figure 6.2, the coordination mechanisms observed in Malur fresh produce marketing is mapped on to the PWH continuum. In the previous chapter, these mechanisms were discussed from the perspective of marketing options for farmers and the respective transaction costs were determined. In the following, we discuss the same mechanisms, but with the analysis of *ex ante* and *ex post* controls that can be exercised by the parties of the exchange. Note that in what follows, farmers are one of the parties, while the other party depends on the marketing channel.

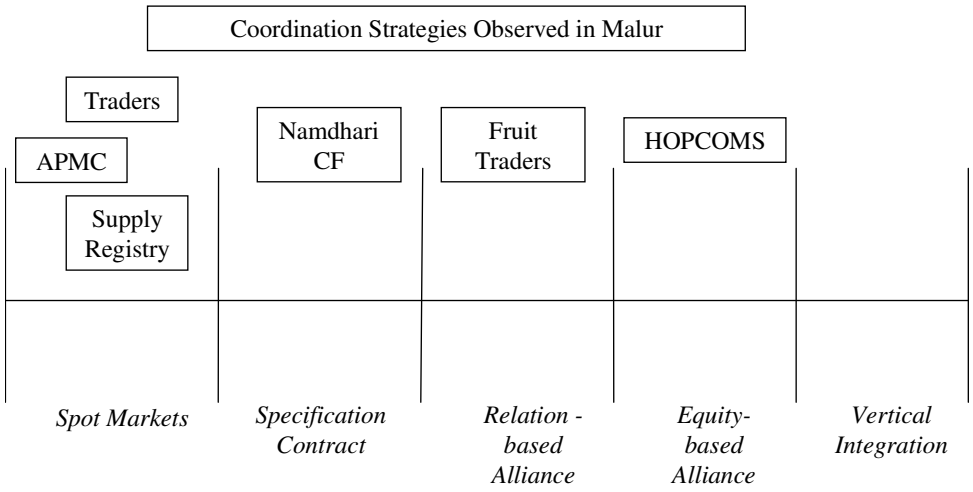

Figure 6.2 Mapping of the Coordination Strategies on the PWH Continuum

Source: Field Study.

6.3.1 APMC Markets

The APMC (Agricultural Marketing Produce Committee) markets are the traditional channel for selling large quantities of fresh produce. The market has basic infrastructure for trading including warehouses, transport facilities, shops, etc. As discussed in earlier chapters, Malur has a non-functional APMC market without basic facilities. With no physical infrastructure for trading, Malur farmers sell the produce at nearby markets in Bengaluru and also at other distant markets like Chennai, Hyderabad, Salem, etc. It is an open-market mechanism with low intensity of control for the farmers. The focus of control is the immediate transaction.

6.3.2 Traders and Wholesalers

Traders are intermediaries who buy from farmers and sell to institutional customers like merchants, hospitals, and hotels. Based on the demand from the customers, traders contact farmers specifying quantity and quality of the produce expected. The trading price is negotiated on the basis of current or previous day's market price. The intensity of control is low with ex ante dominate decision of whether to engage in the current transaction or not. Wholesalers are traders who large quantities from farmers

and sell at secondary markets. The trading mechanism is similar to that of small-scale traders.

6.3.3 Retail CC (Supply Registry)

Retail chains establish collection centers that function like private yards where farmers bring in their produce to sell. The collection centers receive their demand for various products from their respective retail stores and raise indents to be satisfied by the procurement from farmers. Collection centers maintain supply registry containing the information about farmers. Based on the indents, farmers are contacted through mobile phones to inform about the demand and the price. Once the price is negotiated, farmers bring in their produce to the collection centers where it is checked for quality, weighed, and traded. The intensity of control is low and is towards the open/spot market. It is generally perceived that traders and retail chains are relatively smaller in number than the farmers and with collusive behavior on their part, it will not be same as that of open market. But in Malur, farmers use mobile phones for multi-party negotiation and thereby reduce the information asymmetry and power disparity. Hence, we have mapped the traders and supply registry close to open markets in Figure 6.2.

6.3.4 Contract Farming

Namdhari conducts contract farming with farmers for certain export vegetables like chilies and bell pepper (yellow and red). The contract specifies fixed duration, quality, and also the price. The price is fixed a priori which the farmer has to adhere irrespective of the external market price. Namdhari provides the farmers with seeds, fertilizers, pesticides, and supports farming know-hows to achieve the target quality. This clearly maps to specifications contract in the continuum.

6.3.5 Fruit Traders (Pre-Harvest Contractors)

Trading of fruits like mangoes and grapes follow a relationship based alliance (Sudha, 2007). The *pre-harvest contractors*, usually from North India, visit the farmers, inspect the farm, and negotiate a relationship based arrangement. The arrangement is more of lease type, where the farmer agrees to sell all the produce at a specified rate. In return, the trader helps the farmer with labor for taking care of the

crops. Both parties work together to achieve the end goal of farming and selling the produce. This mechanism is thus mapped to relationship based alliance.

Table 6.1 Control Intensity of Vertical Coordination Mechanisms Observed in Malur

	Intensity of Control	**Focus of Control**	***Ex ante* Control Process**	***Ex post* Control Process**
APMC	Low (*ex ante* dominate)	Immediate transaction	- Price discovery through auction - Yes/No decision to transact	Yes/No decision to repeat the transaction
Traders	Low (*ex ante* dominate)	Immediate transaction	- Price discovery through negotiation - Yes/No decision to transact	Yes/No decision to repeat the transaction
Supply Registry	Low (*ex ante* dominate)	Immediate transaction	- Price discovery through negotiation - Yes/No decision to transact	Yes/No decision to repeat the transaction
Namdhari CF	Moderately low (*ex ante* dominate)	Contract terms	- *Specifications*: Fixed price, duration, quality, etc - *Setting Incentives:* Seeds, fertilizers, pesticides, etc	Decision to renew/renegotiate contract, or seek third party intervention for violation of contract terms
Fruit Traders	Moderate (mixed *ex ante* and *ex post*)	Relationship	- Relationship building - Setting informal parameters	Mutual resolution or dissolution
HOPCOMS	Moderately high (*ex post* dominate)	Rights of stakeholders in limited joint entity	Negotiating the formal decentralized *ex post* governance structure	Execution of governance policies and procedures in the limited entity

6.3.6 HOPCOMS

Horticultural Producers' Co-operative Marketing and Processing Society (HOPCOMS) Limited was established under the Karnataka State Co-operative Act in 1959. HOPCOMS serves as a fair market channel for farmers through direct procurement. The societies have a network of 37000 farmer members, with decentralized procurement centers in 19 districts. Malur has HOPCOMS procurement center which receives the demand daily along with a fixed quoted price.

The produce is then checked for quality and traded at the fixed price quoted by HOPCOMS. HOPCOMS is mapped to the equity-based alliances in Figure 6. 2.

6.4 PWH Framework of Coordination Strategy Decision

The main objective of the PWH framework is to identify the critical factors in the decision making process that lead to a selection or rejection of a vertical coordination mechanism. Defining the nature of the coordination continuum as a function of intensity of control is the first step. The second step is *decision making*: given a transaction, where to locate the VC strategy in the continuum. For example, a farmer in Malur is faced with various marketing channels. For selling his produce, which marketing channel or VC mechanism should he choose? Using the data collected from the field study, we showed in the earlier chapter that transaction costs play a crucial role in the choice of the marketing channel for a certain set of alternatives. However, transaction costs *alone* cannot explain the existence/emergence of the VC mechanisms. We are interested in answering following questions:

- Why did the retailers choose to buy directly from farmers?
- Namdhari's contract farming is not popular among the farmers, but still there are farmers who gain through such contracts. What is the reason for few farmers to adopt a VC mechanism that is rejected by majority of other farmers?
- If Namdhari or any firm wished to engage in a contract based VC mechanism, which contract will be accepted by farmers?
- Why institutional buyers (hotels, hostels, hospitals, caterers) buy from traders and not directly procure from farmers?

The above questions can be answered using the PWH framework of coordination strategy decision. As noted in the introduction, the previous chapter on TCE focused only on transaction costs faced by the farmers, while in this chapter we also analyze the decisions of other stake-holders in the fresh produce marketing like retailers, and institutional customers.

The foundation of PWH framework is the continuum defined in the previous section. The PWH framework essentially models the decision about *which strategy to pursue on the VC continuum* as a four-step decision process. The framework is shown in Figure 6.3. It is to be noted here that the framework first had *five* steps as

proposed in (Peterson, Wysocki, and Harsh, 2001), but was later made into four steps (Wysocki, Peterson, and Harsh, 2003). The steps 3 and 4 in the original framework were then combined to step 3 in the current four step process.

The PWH framework is essentially a *prescriptive* technique – a well-defined procedure that *prescribes* the decision maker *which* VC mechanism should be chosen. We shall see later that the mechanism can also be used as *descriptive* technique – why a particular mechanism is chosen.

6.4.1 The PWH Framework

The PWH framework assumes that there is currently a VC mechanism in use and the decision maker is planning to adopt a new alternative. This assumption is not restrictive and can also be used when a firm enters into a transaction for first time with no prior VC mechanism in place. In the following discussion, the entity who is involved in the decision making process is referred as *decision maker*. Depending on the analysis, the decision maker could be a farmer or a retail firm or a trader. In Section 6.6, we present different case studies, each with one of the above decision makers.

The four-step decision process that comprises the PWH framework is initiated with the first question: *is the current coordination mechanism too costly?*

6.4.1.1 Question 1: Is the current strategy too costly?

PWH hypothesize that the search for adoption of new strategy is initiated when the current strategy is costly. There are two possible reasons that would render the current strategy too costly to manage:

1. The current strategy allows unacceptably costly coordination errors to occur:
   a. Poor quality
   b. Inconsistent supply or demand resulting stock-outs or unsold inventory
   c. Opportunism of partner resulting in unfair pricing, etc
2. The method of coordination control creates more operating cost than the cost reduction in the coordination errors it is designed to control.

First reason is easy to understand: if the coordination errors are unacceptable, then the current strategy should be changed. The errors can happen due to the change in the business environment and hence a strategy that was once successful has currently become erroneous due to change in the environment.

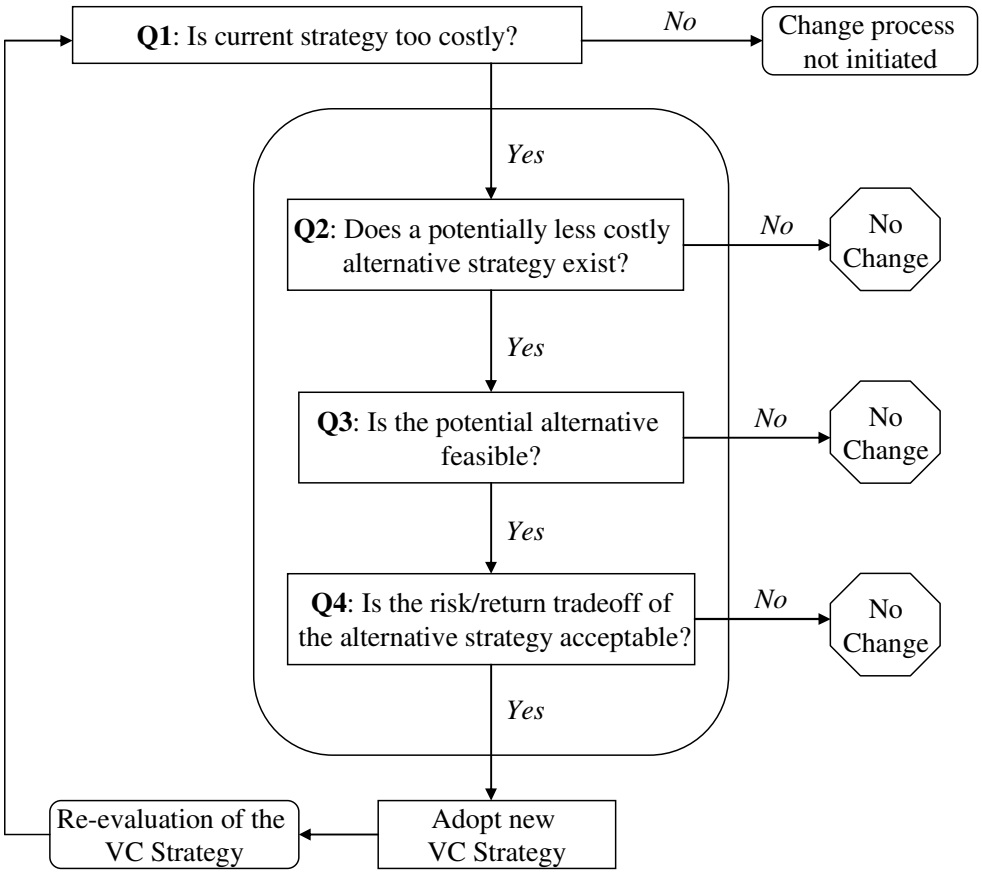

Figure 6.3 PWH Framework for Vertical Coordination Strategy Selection

Source: Peterson, Wyscoki, and Harsh (2001)

For example, the supermarket retailers initially bought the fresh produce from the open markets to be packaged and re-sold at the retail outlets. As the preference of the customers changed towards high quality vegetables (change in environment), coordination errors of poor quality were observed. Thus the change in the environment renders the current strategy costly.

The second reason that makes the current strategy costly is the *trade-off* between the operation costs of a mechanism versus the cost of errors it is designed to control. Implementing a VC mechanism incurs a certain cost – comprising of both the *ex-ante* and the *ex-post* costs. If this *operating cost* for implementing the mechanism is higher than the cost of coordination errors it is designed to control, then we say that the strategy is costly. As an example, consider the VC strategy of contract farming. A firm enters into CF with a farmer as the produce needs to adhere to certain standards that cannot be met in open market. Basically the farmers are *not*

aware of the standards and requirements; hence CF is required to make sure that such standards are met for marketing the product. As the market for the product matures and the knowledge about the requirements and standards becomes wide spread among the farmers, the product becomes easily available in the market. Now the firm which was initially engaged in CF will find its strategy costly. The operating cost of implementing the CF (preparation of contracts, monitoring, and inspection) is too costly than meeting the product standards and requirements, which can be achieved by buying from the open market.

If the decision maker (farmer, retail manager, etc) finds the current strategy costly for any of the above two reasons, then one can expect him to initiate the strategy change process.

6.4.1.2 Question 2: Does a less costly strategy exist?

In other words, the second critical question is *would an alternative strategy reduce the costliness of coordination?* This will depend on the costliness of coordination errors and also the operating cost of the alternative strategy. By definition of the coordination continuum, the operating cost will increase with the increase in the intensity of control as we move from left to right in the continuum. The higher intensity of control is required if the coordination errors are too costly. Thus, one should first understand the coordination errors in order to estimate the right level of intensity of control, which will tell us exactly where to locate the VC strategy in the continuum (see Figure 6.1).

Drawing upon Willamson (1973, 1975), Mahoney (1992), and Milgrom and Roberst (1992), two key variables are used to determine the costliness of coordination errors for a given transaction:

1. Asset specificity
2. Complementarity

Asset specificity is the degree to which an asset can be redeployed to alternative uses and by alternative users without the reduction in the productive value. General purpose assets like machinery, labor, capital etc can be used across various applications and users and thus their asset specificity is low. If a transaction requires tailor-made assets that cannot be used easily elsewhere, then we say the asset specificity is high. For example, in CF, the asset specificity is usually high. The produce is grown according to the contract requirements and may require special

machinery or employ talented labor. The coordination errors are costly in this scenario – thus higher the asset specificity, higher the costliness of coordination errors.

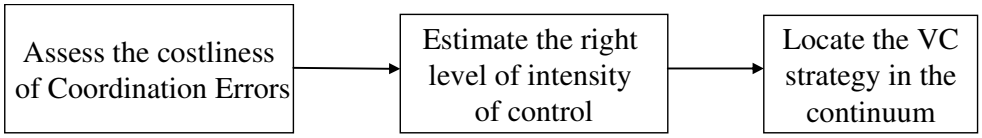

Figure 6.4 Existence of Alternative Strategy that reduces the Costliness of Coordination

Complementarity exists when the combining of individual activities yields an output larger than the sum of outputs generated by individual activities. The *synergy* of two activities is positive resulting in higher output than the sum of individual activities. The synergy thus indicates mutual dependence and the *marginal contribution* by each of the inputs cannot be easily measured without close monitoring requiring higher intensity of control. The trading partners should coordinate their actions in order to achieve an end goal. For example, if the produce needs to adhere to EureGap standards, then the following good agricultural practices should be followed:

- Integrated pest control;
- Quality management systems; and
- Environmental pollution management.

One can clearly see that the above cannot be assured by the retailer or distributor alone. The retailer has to ensure that these practices are followed starting from the farm – that is the retailer has to coordinate with the farmers to make sure that the produce adheres to EureGap standards and hence can be marketed to EU countries. Thus the increase in complementarity increases the costliness of coordination errors.

The decision maker after assessing the costliness of coordination errors using both the above key variables – *asset specificity* and *complementarity* – has to estimate the right level of intensity of control, required to handle the coordination errors. Once the intensity of control is determined, a VC mechanism that matches the control intensity is identified from the continuum.

6.4.1.3 Question 3: Is the potential strategy feasible?

If an alternative strategy offers a potentially better match than between the costliness of coordination errors and control intensity, then the next relevant question is: *Is the potential alternative strategy feasible?* This question ensures that mere existence of an alternative strategy does not suffice for adoption – the strategy should be feasible for implementation. The PWH model originally had five questions and the third question was *"Is the potential strategy programmable?"* that was later omitted. Programmability is ascertaining whether specific management routines exist to make the potential strategy workable. However, it was later found that programmability is implicitly addressed while choosing the range of alternatives – in other words, only alternatives that are programmable are *serious* enough to be considered. Hence, the programmability question is omitted and the subsequent relevant question is about feasibility. Feasibility or the implementability can be conceived as arising from the following four conditions: capital availability, existence of compatible partners, control competence, and institutional acceptability, which are briefly explained below.

Capital availability: Each vertical coordination strategy has capital implications for at least one of the trading parties, which increases with the intensity of control as we towards the right in the continuum. The decision maker should have the necessary capital to implement the vertical coordination mechanism.

Existence of compatible partners: Compatibility of partners is important to any transaction even though the mutual compatibility requirement may vary across different coordination strategies. For *spot markets*, compatibility is about comparable market power of a partner that limits opportunistic behavior. However, for *relation-based alliances*, compatibility is measured in terms of strategic and corporate culture alignment that strengthens mutual interests and trust.

Control competence: Each coordination strategy is based on different levels of control and hence the trading parties should be *competent* in exercising the required level of control. Farmers are generally comfortable with *spot markets* than the *specification contracts* given the historical prevalence of the open trading in markets

for goods in hand than on entering into a contract that specifies how goods in future would be traded. Thus the competence of control needed for a vertical coordination strategy is crucial for the feasibility of that strategy.

Institutional acceptability: The institutional acceptability broadly defines what economic behaviors and strategies are deemed appropriate and acceptable by given social, cultural, legal, industrial or group norms.

The *feasibility* of a vertical coordination strategy will depend on the overall assessment of the above four conditions. If the strategy is deemed feasible, then the next question concerns about the trade-off of risks and returns.

6.4.1.4 Question 4: Is the risk/return trade-off acceptable?

The fourth and the final question bring in the risk or uncertainty quotient, which was not explicitly addressed in the previous three questions. It can be assumed that the decision maker after asserting the first three questions with a YES would have accumulated enough information about the alternate vertical coordination strategy to analyze the tradeoff of risk and return. Implicitly, the risk preference of the decision maker is crucial to answer this question. Thus two farmers who are identical in terms of *social, financial,* and *educational* factors could have different risk preferences and hence have conflicting answers to this fourth question. In general, if the risk/return tradeoff is better than the existing strategy, one can expect an YES with higher probability of occurrence. This final question emphasize that the final decision to change vertical coordination strategy has multiple criteria to evaluate, which are based on the extensive set of information inputs that have been explicitly structured by addressing the YES/NO decisions at the first three questions in the model.

The PWH framework in Figure 6.3 proposes that a change in vertical coordination strategy is possible only if a YES is encountered at each of the four decision nodes. If a NO is encountered in any stage, then the process is discontinued for the currently considered alternate coordination strategy. The feedback back loop in the framework suggests that the coordination strategy evaluation process is dynamic in nature and a continual process. Any change in the transaction environment – supply conditions, demand conditions, institutional changes or new laws, new market players, etc – trigger the coordination evaluation process possibly resulting in the adoption of a new vertical coordination strategy.

6.5 Application of PWH Framework to Agri-Food Systems

The PWH framework for vertical coordination strategy decision making has been tested empirically on two different agri-food chains with two different approaches. A qualitative and quantitative approach was undertaken in the *Michigan celery and public-variety field seed agri-food chain* to test four research propositions supporting the PWH framework (Wysocki, Peterson, and Harsh, 2003). A case study based approach was used in Sao-Paulo fresh-produce market in Brazil to investigate the evolution of the vertical coordination strategies (Manville and Peterson, 2006). In this section, we briefly review both the approaches that uphold the applicability of the PWH framework.

6.5.1 Michigan celery and public-variety field seed agri-food chains

In Wysocki, Peterson, and Harsh (2003), a qualitative and quantitative approach was undertaken to test the PWH framework in Michigan celery and public-variety field seed agri-food chains. Structured, in-depth interviews with 25 decision makers were coded and categorized as responses to the four decision-node questions of the framework. The motivation was to empirically test the following research propositions (RP) that upheld the PWH framework:

- RP1 (Necessary condition for strategy change): IF a decision maker is willing to change vertical coordination strategy THEN a YES assessment has been made at ALL decision nodes.
- RP2 (Sufficient condition for strategy change): IF a YES assessment is made at ALL decision nodes, THEN the decision make is willing to change vertical coordination strategy
- RP3 (Necessary condition for status quo): IF a decision maker is not willing to change vertical coordination strategy THEN a NO assessment had been made at one OR more decision nodes
- RP4 (Sufficient condition for status quo): IF a NO assessment is made at ANY one decision node, THEN a decision maker is not willing to change vertical coordination strategy.

The structured interview procedure was conducted on the 25 seed potato and celery producers. For research propositions 2, 3, and 4, 100 percent of the decision makers upheld the PWH model. For RP1, three out of thirteen decision makers

indicated that they were *unsure* of the risk return trade-off decision node, leading to a classification of the research proposition not holding. Quantitative analysis revealed that the ability of an alternative to reduce uncertainty was critical to the willingness and unwillingness to change strategies. The acceptability of the risk/return trade-off was as important as the reduced costliness of coordination errors and the implementability was not found as significant as the above two (Wysocki, Peterson, and Harsh, 2003).

6.5.2 Sao-Paulo fresh-produce market in Brazil

Another empirical test for the PWH model was conducted by Manville and Peterson (2006) by drawing evidence from four firms' procurement strategies in Sao-Paulo's fresh produce markets in Brazil. The evolution of firms' coordination strategy decisions were analyzed using seven cases pertaining to the procurement decisions with the PWH framework. In six of the seven cases firms shifted their strategies to the right in the PWH continuum favoring strategies that offer higher intensities of control. In one case, the firm began with a vertical integration and moved left to de-integrate and chose a lesser control strategy. The underlying change in supply and demand is an important factor that was identified for shift towards higher intensities of control. Issues of *complementarity* and *asset specificity* also played a major role in the preference towards higher strategies on the right side of the continuum.

The results of the above two applications support the hypothesis that the PWH framework provides empirical and theoretical insights into managers' coordination decisions. PWH model posited that the determinants and processes like costliness of *coordination error*, *asset specificity*, and *complementarity* influence the decision making regarding strategy change. The above two applications provide supporting evidence to the influence of the determinants. Given the successful application of the PWH framework to the above agri-food chains, we applied the framework to the fresh produce marketing channels in Malur to study the determinants of strategy change.

6.6 Application of PWH Framework to Fresh Produce Marketing Channels in Malur

In the remainder of the chapter, we discuss five cases that analyze the vertical coordination mechanisms from the perspective of different stake-holders viz.

retailers, farmers, and institutional buyers. We follow the case study based analysis adopted in Manville and Peterson (2006).

6.6.1 Case A: Retailers' Choice of Direct Buying from Farmers

The first case considers the retailers' decision of direct buying from farmers, as against buying from APMC markets. Retailers in Malur (Reliance Fresh, More Store, Heritage Retail, and Namdhari Fresh) have set up CC to directly buy from farmers. Thus they have already changed the VC mechanism of buying from APMC markets to direct buying. We analyze this strategic decision *ex post* using the four step PWH decision process to understand the reason for such a strategic decision. We are hence using the PWH decision process in *descriptive* mode to understand the rationale behind the change in strategy.

Retailers are distribution channels providing fresh produce to mainly domestic customers. To discourage small institutional buyers, many retailers restrict the upper bound on the quantity of a vegetable bought to 5 kilograms. Such procurements from institutional buyers create deficits for the regular domestic customers who can easily switch to other retailers where available. As fresh produce are only a fraction of offerings at retail stores, loss of customers due to fresh produce creates other significant loses. Thus with the domestic consumers as the main target, retailers had to compete and differentiate with the competitors: Kirana shops, street cart vendors, and local markets.

The main differentiating factors are *quality*, *variety*, and *price*. Variety is a complementing factor, thus making the quality and price as main differentiating factors. Before the amendment of APMC act in Karnataka, the only channel of purchasing fresh produce is through the APMC markets. The APMC Act provided a monopoly status to the APMC in the procurement of fresh produce from the farmers. This was deterrent to both the farmers and retailers. The cartelization and presence of brokers led to reduced revenue realization for the farmers. Further, quality is never precisely taken as criterion in APMC markets (unless physically spoiled or damaged) and thus high quality produce are not differentiated in terms of higher price. The same quality issue affected retailers who had to buy from APMC markets for their retail stores. Filtering high quality from APMC purchases led to huge wastages and rejections, and the increased cost to consumers could not justify enough the quality

provided. After the amendment of the APMC act, the retailers can now but directly from the farmers.

The choice of direct buying from the farmers is analyzed using the PWH framework in Table 6.2. The four step decision process was interviewed with four retailers in Malur. We start with the initial strategy that *retailers procure from APMC markets*. This was the initial strategy used by the retailers before switching to collection centers.

Table 6.2 PWH Analysis of Retailers' Choice of Direct Buying from Farmers

PWH Variable	**Realization**
Initial strategy	Retailers procuring from APMC market traders
Alternate strategy	Retailers directly procuring from farmers
Q1: Is initial strategy too costly?	*Yes*. The quality requirements were not met. With competition from local kirana shops and cart vendors, retailers were not able to differentiate in terms of quality and price for domestic fresh produce varieties.
Q2: Does an alternative exist that is potentially less expensive?	*Yes*. Alternative is direct buying from farmers where the quality is strictly monitored and high quality produce are awarded with higher prices.
Q3: Is alternative feasible?	*Yes*. The amendment of APMC act in Karnataka enabled the retailers to establish collection centers in Malur.
Q4: Is the risk/return favorable?	*Yes*. Anticipated risks and returns of direct buying through collection centers deemed preferable.
Outcome	Alternative accepted with retailers buying directly from farmers through collection centers – as predicted by PWH framework with *Yes* to all the four questions.

The answer to *Q1* is *Yes*, as the quality issues make the initial strategy costly for the farmers. The answer to *Q2* is *Yes*, where the direct buying from farmers is deemed potentially less expensive than the initial strategy. Usage of *supply registry* of preferred and pre-screened farmers ensures tighter chain coordination. There are

no contractual or binding agreements, but repeated mutually beneficial transactions help in building long term trust and relationship with the farmers, who tend to provide high quality produce meeting the demand of the retailers. The strategy requires high asset specificity for retailers due to investment in collection centers (CC) that are close to the farmers with facilities and labor for quality grading, sorting, packaging, and cold storage. However, the investment in new assets is expected to pay-off in long terms by procuring high quality produce and gaining higher market share with high quality retailing.

The amendment of APMC act in Karnataka (allowing direct buying from farmers) answers *Q3* as *Yes*. Answer to *Q4* is *Yes* as the risk of a strategic investment of establishing a CC provides a long term reward of reduced costs due to quality control. As the answers to all the 4 questions are *Yes*, the alternative of direct buying from farmers is accepted by retailers, which is indeed the currently existing VC mechanism. The PWH analysis shows that the quality is the important factor that led to the new strategy of setting up collection centers. We therefore accept the hypothesis that the quality is the main issue in the creation of retail marketing channels.

6.6.2 Case B: Farmers' Choice of Fixed Price Contracting

The second case concerns the participation of farmers in *fixed price* contracting. In general, the farmers in Malur do not appreciate fixed price contracting from Namdhari, but there are farmers who participate in it. In this case, we analyze this differing participation farmers using PWH framework. The following case was developed based on the interviews with 55 farmers, out of which 7 have engaged in CF with Namdhari.

Namdhari conducts contract farming with farmers for certain export vegetables like chilies and bell peppers (yellow and red). The contract specifies fixed duration, quality, and also the price. The price is fixed a priori which the farmer has to adhere irrespective of the external market price. Namdhari provides the farmers with seeds, fertilizers, pesticides, and supports farming know-hows to achieve the target quality. In this case study, farmers are the decision makers. The initial strategy for the farmers is selling through non-contractual marketing channels, and the alternate strategy is engaging in CF with Namdhari.

Table 6.3 shows the PWH analysis with the answers to the four questions. It is evident from the analysis that all farmers answer *Yes* to questions *Q1* to *Q3*, except for the question *Q4* on *risk/return*. The main concern for farmers who answered *No* is the fixed price in the contract, which is not favorable when the market price for the produce is high. For example, we studied a specific farming of green chili under contract for a fixed price of INR 8 per Kg. The price of green chili during the year in concern varied from INR 2 to INR 35 per Kg. The farmers felt that it is unfair to sell the produce at INR 8 under contract when its market price was much higher. On the other hand, farmers who engaged in contract farming felt that the assured demand for the entire year and reduction in marketing costs provided a safe and assured returns (Singh and Singla (2010) report similar sentiments of farmers under contract in Malur). Thus the individual risk taking behavior of the farmers and also the knowledge of risk/return payoff played a significant role in CF participation.

Table 6.3 PWH Analysis of Farmers' Choice of Fixed Price Contracting

PWH Variable	**Realization**
Initial strategy	Farmers selling through non-contractual marketing channels
Alternate strategy	Farmers participating in contract farming with Namdhari
Q1: Is initial strategy too costly?	*Yes*. The current strategy is supply driven and the coordination in the marketing channels is mainly by *invisible hand* thus an individual farmer having no control over the price of exchange. Over supply creates fall in price leading to huge losses, given the perishable nature of the produce.
Q2: Does an alternative exist that is potentially less expensive?	*Yes*. Alternative is deterministic fixed price contract where the retailer provides inputs (seeds), provides maintenance (fertilizers, pesticides), and negotiates a fixed unit price for the produce cultivated for a fixed period of time (usually a year). The farmer is guarded against price fluctuations. The high asset specificity for the farmer is balanced by the availability of assured demand at a pre-fixed price.
Q3: Is alternative feasible?	*Yes*. The alternative is mutually beneficial to both the farmers (sure demand) and the retailers (quality, quantity, and price controlled supply), which can be enforced in written contracts (though not enforced in Malur by Namdhari).

Q4: Is the risk/return favorable?	*Yes* (20%), *No* (70%), *Not Sure* (10%). The risk/return is not obvious in this scenario and also tightly dependent on the risk nature of the farmer. The price of produce fluctuates highly throughout the year and during high price periods, farmers are not incentivized to adhere to the contract.
Outcome	Alternative accepted in very small proportion based on risk taking nature of the farmer. Farmers engaged in this contract answered *Yes* to all questions and those who rejected the alternative answered *No* to Q4.

6.6.3 Case C: Farmers' Choice of Contract Farming with Minimum Price Guarantee

The previous case showed the importance of risk/return trade-off and also illustrated the implicit dependence of this determinant on the risk attitude of the decision makers. The *fixed price* part of the contracting is the source of risk that the farmers are unable to quantify, given that the commodity for contracting has also domestic market which could fetch relatively high price at times than the contract price. We conducted the interviews with the same set of 55 farmers on a different pricing scheme called the *minimum price guarantee* instead of fixed price contracting.

The retailer provides inputs (seeds), maintenance (fertilizers, pesticides), and technical knowledge at subsidized costs. The written contract assures farmers of a minimum price. This state contingent contract ensures that farmer gets higher of market price (at the time of transaction) and the minimum guaranteed price.

Table 6.4 PWH Analysis of Farmers' Choice of Contract Farming with Minimum Price Guarantee

PWH Variable	**Realization**
Initial strategy:	Farmers selling through non-contractual marketing channels
Alternate strategy	Farmers participating in CF with minimum price guarantee
Q1: Is initial strategy too costly?	*Yes*. The current strategy is supply driven and the coordination in the marketing channels is mainly by *invisible hand* thus an individual farmer having no control over the price of exchange. Over supply creates fall in price leading to huge losses, given the perishable nature of the produce.

Q2: Does an alternative exist that is potentially less expensive?	*Yes*. Alternative is contract farming with minimum price guarantee.
Q3: Is alternative feasible?	*No*. Even though the alternative is mutually beneficial to the farmers (sure demand) and the retailers (quality and quantity controlled supply), the price does not favor the retailers who provide subsidized input, maintenance, and assured market.
Q4: Is the risk/return favorable?	*Yes* (100%). There is high asset specificity for farmers and also the inputs and maintenance are not free. However, the risk/return is deemed favorable due to the minimum price guarantee. The farmer is assured of demand and also minimum price which apparently nullifies the risk due to high asset specificity.
Outcome	As the answer to question *Q4* is *No*, the alternate strategy is not implementable.

The analysis in Table 6.4 shows that the minimum price guarantee is not an implementable outcome (answer to question *Q3* is *No*). Retailers unanimously disagreed to minimum price guarantee as it unilaterally favors farmers. In particular, there is no incentive for the retailers to engage in CF by providing all the inputs, maintenance, and direct procurement if the trading price is greater than or equivalent to market price. Basically, the risk/return uncertainty faced by favors in fixed price contracting is transferred to the retailers in minimum guaranteed price contracting.

6.6.4 Case D: Institutional Buyers' Choice of Traders

The fourth case is concerned with the institutional buyers who buy from traders instead from terminal markets. Institutional buyers are neither domestic consumers nor retailers who resell the produce – rather they are small and medium size institutions like hotels, caterers, and hospitals who use the fresh produce for their business. The quantity, quality, and variety requirements of institutional buyers are vary different than that of retailers and domestic consumers. Domestic consumers buy less variety and retailers on the other extreme buy maximum number of varieties, but the institutional buyers are moderate in the variety. In terms of quantity, institutional buyers can buy more quantity than a large retailer. However in quality,

the institutional buyers can settle for A-grade or B-grade depending on the size and type of institutional buyer. In general, small hotels, caterers and hospitals prefer B-grade vegetables allowing small physical defects. Certain high quality hospitals and hotels insist on A-grade vegetables. In addition to quantity, quality, and variety, another important dimension is the frequency of the transactions. Hospitals and hotels buy almost on a daily basis whereas caterers buy frequently depending on the demand.

As the quantity is large, with more varieties to be bought, APMC and wholesale markets were the first obvious choices for the institutional buyers. However the high frequency of transactions and uniform quality required continual relationship with the sellers, with some assurance and trust on quality. The institutional buyers moved from the extreme left open market strategy to tighter transactions with traders. The buyers are generally located in Bengaluru and directly transacted with the traders from Malur by sending indents. The transportation is provided by the trader who directly delivers to the buyer's premises. As shown in Figure 6.1, the strategy choice is not to the next tighter control of specification contracts but moderate between open markets and contracts. Table 6.5 shows the PWH analysis of institutional buyers (decision makers) buying from traders (alternate strategy) instead of buying from markets (initial strategy). Total of 11 institutional buyers participated in the case study including one two hospitals, five hotels, one hostel, and three caterers. All the institutional buyers are from Bengaluru.

Table 6.5 PWH Analysis of Institutional Buyers' Choice of Traders (over Markets)

PWH Variable	**Realization**
Initial strategy	Institutional buyers buying from wholesale markets
Alternate strategy	Institutional buyers buying from traders
Q1: Is initial strategy too costly?	*Yes*. The current strategy requires multiple sellers to meet the required demand in terms of variety and quantity. Though the multiple negotiations are costly, more cost is experienced in meeting the quality requirements. As wholesale markets do not guarantee quality, quality testing and failure to meet required grade made this channel for transaction very expensive.

Q2: Does an alternative exist that is potentially less expensive?	*Yes*. Alternative is buying through traders who have tighter relationship with multiple farmers, can ensure the required variety, quantity, quality. As the institutional buyers are big customers with frequent transactions, traders need to make sure that all the requirements are met to not to lose the business. By providing the *indents* advance in time (usually one day), the trader acts as a middleman/broker in finding the ideal set of farmers to procure from such that the demand in met. Given the longstanding relationship with the farmers, the trader can easily determine and identify the matching quality of produce required. Thus by paying an extra premium in the form of profit margin of the trader, the buyer can ensure the supply in the required quality, quantity, and variety.
Q3: Is alternative feasible?	*Yes*. The alternative is mutually beneficial to both the traders (sure demand) and the institutional buyers (sure supply with required quality, quantity, and variety).
Q4: Is the risk/return favorable?	*Yes* (100%). The risk for the buyers is relatively less as the failure of a trader to meet the requirements will result in replacement and hence the trader makes sure that the demand is met as required.
Outcome	Alternative accepted by institutional buyers to buy from traders – as predicted by the PWH framework with *Yes* to all the four questions.

Based on the above discussion, one can be easily tempted to believe that contracts would provide tighter control over the supply quality and quantity. We analyze this strategy in the next case.

6.6.5 Case E: Institutional Buyers' Choice of Engaging in CF

In this case, the institutional buyers (decision makers) have the initial strategy of buying from traders and consider the alternate strategy of engaging in contract farming. Table 6.5 shows the PWH analysis, conducted with the same set of institutional buyers from the above case. The answer to question *Q2* is *No,* as contracts are costlier than the coordination errors they are designed to control and

hence the institutional buyers rejected to shift to contract based procurement. This case study shows that the alternate strategy is *not* less expensive, even though it is feasible.

Table 6.6 PWH Analysis of Institutional Buyers' Choice of Traders (over Contracts)

PWH Variable	**Realization**
Initial strategy	Institutional buyers buying from traders
Alternate strategy	Institutional buyers engaging in CF with farmers
Q1: Is initial strategy too costly?	*Yes*. The higher frequency of the demand with almost fixed quantity of demand can be negotiated better through a long-term contract. Such contracts would also reduce supply failure and can guard against price fluctuations.
Q2: Does an alternative exist that is potentially less expensive?	*No*. The alternative is *specification contract* with traders or farmers through which buyer can negotiate price given the assured demand in terms of quantity, quality, and frequency. However, the cost required to invest in creating contracts (*ex-ante*) and enforcing the contractual terms (*ex-post*) are high. Specifically, the cost of coordination through contracts is more than the coordination error it is designed to control. As the fresh produce procured are commonly available in the market with no special needs, enforcing a contract to dictate the transaction terms are costlier
Q3: Is alternative feasible?	*Yes*. The alternative is feasible and legally enforceable.
Q4: Is the risk/return favorable?	*Yes*. The risk for the buyers is relatively less as the failure of a trader to meet the requirements will result in replacement and hence the trader makes sure that the demand is met as required.
Outcome	Alternative is rejected as answer to *Q2* is *No* and the institutional buyers continue with the initial strategy of buying from traders.

Table 6.7 Summary of Case Studies Using PWH Framework

Case	Decision Maker	Initial Strategy	Alternate Strategy	Outcome
A	Retailer	Buy from markets	Directly buy from farmers by investing in CC	Alternate strategy accepted.
B	Farmer	Selling through non-contractual channels	Engage in fixed price contracting	Accepted by few and rejected by others who were not convinced of the risk/return tradeoff.
C	Farmer	Selling through non-contractual channels	Engage in minimum guaranteed price contracting	Not implementable as retailers do not find minimum guaranteed price profitable
D	Institutional Buyer	Buying from markets	Buying from traders	Alternate strategy accepted.
E	Institutional Buyer	Buying from traders	Engage in CF with farmers	The alternate strategy is costly than the initial strategy and hence not implementable

All the five case studies are summarized in Table 6.6. Case studies A, B, and D analyzed the VC mechanism currently in practice. Thus the analysis is *ex post*, attempting to identify the reasons of the existence of the mechanisms. On the other hand, case studies C and E proposed strategies that are not in practice and analyzed why the mechanism is not implementable. The PWH framework posits that the four step decision process is a dynamic process which is continually used to evaluate the VC mechanisms, as the VC mechanisms themselves evolve with respect to market conditions and technology.

6.7 Conclusions

In this chapter we studied the existence and emergence of VC mechanisms observed in Malur using the PWH framework. Williamson (1975) established spot markets and vertical integration as the extremes of vertical coordination mechanisms. Many authors (Mahoney, 1992, Milgrom and Roberts, 1992) suggested that the other

mechanisms observed in real are hybrid of the two extreme mechanisms. Peterson, Wysocki, and Harsh (2001) hypothesized a continuum of VC mechanisms extending from open spot markets to vertical integration, with the intensity of control acting as the latent variable. Based on our field study interviews with fresh produce supply chain stake-holders in Malur, we identified and mapped the observed VC mechanisms on the PWH continuum. Interestingly, Malur fresh produce marketing comprises of VC mechanisms extending from spot markets till equity based alliance. We did not find any case of vertical integration.

The main objective of the PWH framework is to identify the critical factors in the decision making process that lead to a selection or rejection of a vertical coordination mechanism. The PWH framework is a four-step decision process to evaluate the costliness of current strategy in order to search for alternate strategy. TCE hypothesizes that *institutions* are transacting cost minimizing mechanisms. Hence the emergence of a new strategy is to overcome a cost with the current strategy. The *new* strategy need not necessarily be new in terms of practice – it just implies a change in strategy. The PWH analysis helped in understanding the strategic decisions faced by different stake holders of Malur in the choice of the marketing channels. The different cases studied here showcased different issues in the strategic choice. Cases A and D showed that the quality is the dominating factor in strategy change. For the retailers (case A), the new strategy is to setup CC to directly procure from farmers, whereas for the institutional buyers, the alternate strategy is to buy from traders to meet the quality requirements. Using Case A, we accept the hypothesis that quality is the main issue in creation of new marketing channels. Case B showed the risk/return uncertainty faced by the farmers in contract farming. Risk taking attitude is subjective and hence differing opinion of risk/return tradeoff from farmers is expected. However, during our interviews we found that many farmers are not open to contract farming simply because they refuse to sell at a fixed price below market price. The free input, maintenance, and assured market in contract farming are not factored in their decision. The awareness of contract procedures, legal rights, and risk/return tradeoff would help in increased participation in contracting farming.

7. Conclusions

The Indian agri-food system is undergoing various changes with the advent of organized retailing, food processing, and change of consumer preferences. Transformations in the global food system are also causing changes in food production and marketing in India. There is a growing domestic market for horticultural produce, in both traditional and exotic vegetables. The governing and regulatory institutions have also responded to these new requirements resulting in emergence of new channels in the fresh produce marketing. In particular, farmers are faced with multiple channels to sell the produce. Several studies in the Indian context focus on the marketing of horticulture produce in the presence of retailers and food processors (Gandhi & Namboodiri, 2002; Chengappa and Nagaraj, 2005; Singh and Singla, 2010; NCAP, 2010).

Farmers in general face many uncertainties from production to marketing stage. Rainfall instability, pest attacks, quality of seeds, weather, and so are the factors which are not in control of the farmer most often. Further price fluctuations, marketing pose further risk in selling. In the literature production risk has perhaps received quite substantial attention. One of the missing links is on trading coordination between farmers and the immediate buyers. The immediate buyer could be APMC market or a retailer or a cooperative or a food processor. Our interest is in studying the decision making of farmer in choosing a buyer. Given the choice of different marketing channels, why a farmer chooses a particular channel and in particular, what set of transaction costs influence the choice of the buyer.

Vertical coordination is the genre that deals with the trading mechanisms to coordinate the activities between the subsequent stages. The vertical coordination mechanisms between farmers and packaged food producers are widely studied for the western markets (Szabo and Bardos, 2005; Hobbs and Young, 2001; Frank and Henderson, 1992). We specifically focus on common vegetables and daily marketing of vegetables by farmers to the various marketing channels. The marketing channels include both the *traditional* (spot and terminal markets, traders, cooperatives) and the *new* (retail chains and food processors). Such channels are only expected to grow in number and complexity in future. Hence, it is important to study the problem to understand the dynamics in vertical coordination between farmers and buyers, which

would help in understanding the on-going issues and the policy implications for the future.

The study focused on the marketing of vegetables by the farmers in the Malur Taluk of Karnataka. The weather and soil conditions of Malur are favorable for horticulture cultivation throughout the year. Malur produces large varieties of vegetables, which are consumed at several cities including Bengaluru, Chennai, Salem, Trichy, Ahmedabad, Bhubaneswar, and Kolkata. It was also one of first locations recommended by the Government of India for establishing food parks. Given its vicinity to Bengaluru, the retail boom resulted in retailers setting up collection centers in Malur to buy vegetables directly from farmers. The choice of Malur as the study location thus provided rich opportunities and data to investigate the vertical coordination in fresh produce marketing. Primary data collection was through personal field work, which comprised of direct interviews with different stakeholders.

A total of 259 farmers, from the following seven out of 28 gram panchayats of Malur were interviewed: Abbenahalli, Araleri, H. Hosakote, Kudiyanur, Madiwala, Nosagere, and Santhehalli. The interview with the farmers dealt with various dimensions including socio economic status, cropping patterns, production costs, and marketing costs. The retail collection centers of Reliance Fresh, More Store, Heritage Retail, and Namdhari Fresh were interviewed for the procurement dynamics with the farmers. Innova Agri Food Park procures directly from the farmers and supplies the sorted and graded vegetables to supermarkets, small retailers, and institutional consumers like hospitals and hotels. We interviewed officials from Innova at various levels to understand the strategic positioning and daily operations. HOPCOMS is the cooperative of Karnataka, which has a procurement center in Malur that buys directly from farmers. We interviewed the procurement officer on the dynamics of trade and pricing. We interviewed 12 traders and wholesalers who directly buy from farmers sell to institutional buyers and other secondary markets. A total of 11 institutional buyers from Bengaluru who are customers of Innova and traders were telephonically interviewed. We had direct interviews and discussions with Officers of Horticultural Department, specially the Assistant Directors, at Malur and Bengaluru.

Secondary data was collected from various government sources at the taluk level, district level, state level, and at the country level as a whole. The variables used are crop area sown, production, and yield for fruit crops and vegetable crops. Time

series crop wise data on area, production and yield for India as a whole and Karnataka were collected from *Indian Horticulture Database-2011* and *Horticultural Crop Statistics of Karnataka State at a Glance: 2011-12*. Time series crop wise data on area, production, yield and value for Kolar district and Malur taluk were collected from various issues of *Horticultural Crop Statistics of Karnataka State at a Glance: 2002-12*. Data on Area & Population General Particulars, Agricultural Land Holdings & Area, Land Utilisation Pattern, Annual Rainfall, Irrigation Facility, Agriculture & Allied Indicators for Malur taluk and Kolar district were collected from *Kolar District at a Glance: 2011-12*.

The main focus of the thesis is on vegetable marketing by *farmers*. However, we take a holistic approach by taking into account the other stake holders like retail chains, food processors, and enterprise consumers. The main objectives of the study are: To understand how vegetables are marketed by the farmers in India; to understand the conceptual models of VC mechanisms in general and for fresh produce marketing in particular; to identify and characterize the factors that influence the choice of marketing channel by farmers; to understand the impact of ICT technologies on marketing and transaction costs among the farmers; to analyze the interplay between the competing marketing channels for each of the stake holders: *farmers*, *traders*, *retail chains*, and *enterprise consumers*; and to understand the strategic choice and evolution of VC mechanisms. We tested the four hypotheses: 1) Mobile technology reduces information search cost for farmers, 2) Retail marketing channels have lower transaction costs, 3) Retail marketing has positive size bias and 4) Quality is the main issue for the creation of retail marketing channels.

In Chapter 4, we identified and mapped the different marketing channels observed in Malur for fresh produce marketing. The trade dynamics of each of the channels were presented based on the sample data collected from the field study. Farmers at Malur have APMC Markets (Malur, Bengaluru, Kolar, and other distant markets through commissioned selling), Traders and Wholesalers, Collection Centers (retailers and Innova), HOPCOMS Procurement Center, and Contract farming with Namdhari as different marketing channels to sell the produce. Each marketing channel has various *points-of-sale* or *buyers*. Different price discovery mechanisms are used by different channels: Auctions are used at APMC markets, fixed list price by HOPCOMS, and negotiation/bargaining by retailers.

Given the above characteristics of marketing options, the thesis focused on two perspectives: *operational* and *strategic*. Operational perspective focused on choice of buyer for daily selling of produce by farmers. On the other hand, strategic perspective focused on reasons for emergence of alternate marketing channels.

The unit of analysis in transaction cost economics (TCE) is *transaction* itself and the transaction costs are costs associated with an economic exchange. In our work, the economic exchange is the selling (marketing) of vegetables by farmers. The channels vary in terms of the coordination mechanism, quantity, etc. We used TCE to study the varying marketing channels in terms of the transaction costs constituent to each channel. In Chapter 5, we identified, quantified, and measured the following transaction costs for the different marketing channels used for daily selling: Price search costs, buyer search costs, transportation costs, intermediary fees, quality and quantity related costs, storage and handling costs, payment mode and delay, and multiparty negotiation costs

The above costs are multi-dimensional and not all dimensions are tangible and not all tangible costs are monetary. All the above costs were studied and empirically measured from the perspective of *farmers*. We summarize below the important findings of the transaction cost analysis study.

Our study identified and ranked the factors that influence the choice of the buyer for selling the daily produce. The factors were ranked based on the 5 point Likert-scale type response from the farmers. The *monetary* factors like offered price, intermediary fees, price premium for high quality produce, quantity, and transportation, were ranked ahead of non-monetary drivers. Factors relating to search of buyers, availability of price information, and price discovery mechanisms were found to be less significant to Malur farmers for daily selling.

The study showed that the *information search cost* and *buyer search costs* are negligible for *farmers* due to the mobile phone technology. We therefore accept the hypothesis that mobile phones reduce information search costs. Widespread use of mobile phones for information search and sharing helps reduce information asymmetry between farmers and the buyers.

The number of retailers is relatively very small compared to the number of farmers, making the daily selling of vegetables through retail channels a nearly *monopsonistic* market. Thus the possibility of collusion among the buyers is very

high to artificially lower the price. The study showed that the *multi-party negotiation cost* for farmers are negligible, which can possibly avoid collusion among retailers.

It is widely perceived that the commercialization of agriculture with the advent of retail and food processing firms would favor only the large scale farmers. The transaction costs associated with commercialization may deter the small scale farmers from participation in commercial agriculture. We performed logistic regression on farmer participation in direct selling to retailers based on land size and education. The probability of participation was inversely proportional to land size – farmers with less land size showed higher participation than that with larger land. We therefore reject the hypothesis that retail marketing has positive size bias. Given the less indent and demand requirements from the retailers and Innova, farmers with large produce find it unattractive to sell at retail firms. We estimated income and costs for a small scale farmer with 100 Kgs and a large scale farmer with 1000 Kgs of tomatoes. Based on the cost figures provided by the farmers, small scale farmer with 100 Kgs can increase his income by 22.82% by selling to retailers, while for the same set of costs and price, a large scale farmer with 1000 Kgs can only increase his income by 0.7%. As the retailers procure limited quantities, large scale farmers do not find the retail channels attractive. This was explained through apportionment cost, which is the opportunity cost of time spend in selling the produce through different channels versus selling all of them in a single channel. Overall the analysis showed that farmers faced lower transaction costs in retail channels and we therefore accept the hypothesis that retails marketing lowers transaction costs.

The transaction cost analysis of marketing channels for daily selling showed the rich differences and commonalities among the marketing channels. While the differences between the traditional and new marketing channels are prominent in every dimension (quality, quantity, etc), one common denominating factor is the *base* price. A base price is a weighted average of APMC market prices of Bengaluru, Kolar, and Malur. HOPCOMS price is generally 10 – 15% higher than the base price and retailers negotiate the offered price using the base price. Though base prices used by different retailers could vary slightly depending on how they calculate the weighted average, they are indeed dependednt on APMC prices. Thus all the channels depend on APMC market price. In one way, this is expected as majority of the produce is still traded through APMC markets and hence serves as the leading price index. It is also an indicator of symmetry of information between the farmers

and the buyers, as both have access to APMC mandi prices using mobile phones. On the other hand, market inefficiencies in APMC mandis will directly influence the price at other channels, even though they are void of intermediaries.

The daily selling of fresh produce are operational decisions, while strategic decisions concern the choice of new or alternate channels. While neoclassical economics recognizes *profit maximization* (or *cost minimization*) as the criteria of efficiency for choosing the optimal mechanism, TCE insists that there is no optimal solution and all alternatives are flawed (Williamson, 1996). In TCE, institutions are transaction cost minimizing arrangements which change and evolve with the changes in the nature and source of transaction costs. Thus with the change in supply-demand dynamics or policy regulations, transaction costs change, giving rising to alternate marketing channels. The strategic choice is concerned with the decision to change from an existing VC mechanism to a new or an existing alternate mechanism. To study the strategic choice, we used the PWH framework from the strategic management theory (Chapter 6). The PWH framework assumes a continuum of VC mechanisms extending from open spot markets to vertical integration, with the intensity of control acting as the latent variable. The VC mechanisms in fresh produce marketing of Malur were mapped to the PWH continuum.

Given the location of the mechanisms in the continuum, five case studies were conducted using the PWH framework concerning the strategic choice for different stake holders. Case study A concerned with the strategic choice of retail chains to setup collection centers and buy from farmers directly. Quality of produce at wholesale markets is identified as the source of costs for retailers, who choose to invest in collection centers thereby increasing the intensity of control. We therefore accept the hypothesis that quality is the main issue for creation of retail marketing channels. Case study B is on the strategic choice of farmers of Malur to engage in contract faring with Namdhari Fresh. The PWH analysis showed that the fixed price contracting followed by Namdhari is not well accepted by the farmers in the sample. The main source of obstacle is the quantification of *risk/return payoff*, which was not understood and not acceptable to majority of farmers in the sample. Motivated by case study B, we proposed an alternate *minimum price guarantee* contracts in case study C. The minimum price guarantee resolved the risk/return uncertainty for farmers, but created the same for the retailer. As all farmers in the sample accepted the alternate mechanism, the retailer rejected the same. As for the retailer, the

minimum price guarantee cannot secure the price through the contract, though the demand (of desired quality) is secured. The incentive to provide inputs and maintenance is not compensated by the minimum price guarantee. Case study D focused on decision by institutional buyers to buy from traders. Quality is again identified the main source of costs for buying from traders instead of open markets. Motivated by case study D, case study E explored the possibility of higher intensity of control from institutional buyers by engaging in contract farming. But the coordination costs of contract farming are costlier than the coordination errors due to quality and hence contract farming is not accepted as suitable choice.

The important learning from the case studies is that the *quality* is the primary reason for existence of new channels. Quality inspection in itself is an expensive process requiring resources and time. Retailers are able to invest in such resources to control the quality of the procured produce.

In the following, we outline few policy implications and recommendations in general for fresh marketing, with specific focus on Malur. While some of the implications are inferred from the TCE based analysis, we also outline other issues specific to Malur that were identified during the field study, but were not considered in the thesis.

Lack of quality grading is identified as a significant issue in our study. Some retailers emphasize strict guidelines, but there are no standards for identifying and grading vegetables as A, B, and C. Some retailers and traders also use A+ and B+ grades which are not clearly defined and uniformly followed. As quality provides price mark-ups for farmers, regularization of quality grading standards is essential.

As identified in the study, apportionment costs are higher for medium and large scale farmers, which provide opportunities for marginal and small scale farmers to participate in retail marketing channels with higher profits. The main reason for higher apportionment cost for large farmers is the low demand requirements from retail channels. If the retail demand grows, the apportionment cost would reduce and large scale farmers would use the retail channels aggressively. Retailers also would prefer large scale farmers as the *bureaucratic costs* would be less. One of the crucial transaction costs faced by retail firms in dealing with larger number of small farmers is the *bureaucratic* costs associated with coordinating and managing large number of suppliers (Hayes, 2000). Thus in order to provide fair participation for marginal and small scale farmers, policy of cap on trade volume is required if the retail demand

grows. This would ensure that the retailers cannot meet the demand with few large transactions, but from many small transactions. This in turn would increase the apportionment costs for the farmers with large volume of produce, thus allowing higher participation from marginal and small scale farmers.

The PWH study showed the disagreement among farmers on the risk/reward tradeoff in fixed price contract farming. While farmers engaged in contract farming felt justified the fixed price (this claim is also supported by findings of Singh and Singla (2010) in Malur), majority found it as a disadvantage. The risk taking attitude is subjective and hence the disagreement is acceptable. However, proper quantification of risk/reward tradeoff is firstly required to make such subjective decisions. Our interactions showed the majority of the farmers in the sample are ill informed of contract farming and many are not aware of all the rules (including the ones that favor farmers like free input and maintenance). Thus the awareness of contract farming procedures would help in increased participation.

All the retailers and traders require similar kind of sorting, grading, and packing operations. Currently, each have own facilities with different levels of efficiency and quality. A common facility for backend operations by a food park like Innova would optimize the operations and reduce the cost. However, such backend pooling could lead to pooled demand, which would require the policy of cap on trade volume to ensure fair participation.

The thesis exclusively focused on marketing channels for vegetables and scantily touched on issues with fruit marketing. The primary fruit marketing channel is the *pre-harvest contracting* (Sudha, 2007), which is a kind of relationship based alliance where the trader and farmer share responsibilities and risks. The characteristics of this channel are not well understood in the case of Malur and require further study.

Innova Agri Food Park has cold storage facilities. Our interactions with farmers and the food park showed a large discrepancy in the knowledge of suitability of cold storage for different vegetables. Many farmers felt that cold storage is not particularly useful for wide variety of vegetables. Creating awareness of post harvest processing among farmers is important for efficient and beneficial use of technology and facilities.

The National Commission on Agriculture, defined agricultural marketing as a process which starts with a decision to produce a saleable farm commodity and it

involves all aspects of market structure of system, both functional and institutional, based on technical and economic considerations and includes pre and post- harvest operations, assembling, grading, storage, transportation and distribution. The Indian council of Agricultural Research defined involvement of three important functions, namely (a) assembling (concentration) (b) preparation for consumption (processing) and (c) distribution[86]. Despite the high trade volume for vegetables, lack of basic infrastructure for trading in Malur is major concern for farmers. Large numbers of farmers sell to traders and wholesalers directly from the farms and many others sell at distant markets. The exact proportion and data of these channels are unavailable due to the absence of a physical market infrastructure at Malur.

Ground water is the only source of water for Malur. Government declared special economic zones for food processing industries, which unfortunately require large amounts of water. Irregular rains and over usage of water for brick industry is causing rapid depletion of water table. The deep bore wells and short life expectancy of installations due to rapid depletion increases production cost. One of the solutions proposed by Malur farmers is to redirect the sewage water from Bengaluru.[87] Currently the sewage water from Bengaluru is dumped as waste into Tamil Nadu. The solution is to redirect the water from Varthur Kodi to Malur. The project started with laying of pipes but was later shelved with change in governments.

Our study had certain limitations in terms of scope, data, and methodology. We limited the scope of marketing to the vertical coordination between farmers and the immediate buyers. Though we studied the role of end customers like institutional buyers, the scope of the work did not cover the end-to-end marketing supply chain. On the other hand, the scope of the study was large in covering all the vegetables, thus making the study more generic than crop-specific. There was limitation in data availability. As Malur APMC market lacks marketing infrastructure, majority of the farmers sell at Bengaluru, Kolar, and also at distant markets. The data related to volume of trade through different channels is not available. We could get more accurate data through survey and interviews with the retailers and Innova. However, non-availability of data across all the channels prevented us from performing various quantitative studies that can compare the alternatives. There was also inconsistency

[86] http://www.world-agriculture.com/agricultural_marketing/agricultural-marketing.php#facilities

[87] http://www.deccanherald.com/content/288286/malur-farmers-find-Bengaluru-sewage.html

among data provided by the farmers, specifically for the production costs and yields. In spite of the shortcomings, we believe that the transaction cost approach undertaken in this thesis to study the vegetable marketing in Malur will help us understand better the change in dynamics of vegetable marketing with the advent of the new channels. In particular, some of inferences of the study will help in policy making and strategy formation for retailers and food processors, as we expect these new marketing channels to grow in number and complexity in near future.

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Appendix A: Questionnaire - Farmers

1. **Farmer's Name:**
2. **Age:**
3. **Caste:**
4. **Name of the Village:**
5. **Sources of income:** **Total annual income:**

   A. Agriculture ……. Rs. …….
   B. Livestock ……. Rs. …….
   C. Business/Trade …… Rs. ……
   D. Job and Services……Rs. ……
   E. Labour ……..Rs……..
   F. Others (Specify) ……Rs. …….

5. Total household annual income (A+B+C+D+E+F) Rs……

6. Demographic particulars of household members:

No	Name	Relation to head	Gender (M/F)	Age (Years)	Education level	Main occupation	Subsidiary occupation	Remarks
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

7. Landholding Details:

A. Current value of land owned (Approx.) ….Rs. ……
B. Land cultivated (in ha) …….
C. Land put to non-agricultural use (in ha) …….

8. Details on plots of land

Plot number	Name of the location or/and place	Area (ha)	**U**p, **M**edium & **L**ow land	Soil type*	Lease status**	Terms of lease***	Irrigation source****
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1							
2							
3							
4							
5							

*Soil Type = Black/Red/Sandy/Muddy/Rocky/Mix etc
SC=Shared cropping

*** Terms of lease: **A**. Sharecropping (50:50), **B**. Cash rent (Rs. Per ha), **C**. Kind rent (Specify name of crop and quantity in kgs per ha), **D.** Any other agreement

****Irrigation Sources = Canal/Well/Borewell/Others

9. Crops grown during the year

9. A. Plot wise information on crops grown during **SUMMER** season, Nov-Dec to April-May

Plot No.	Crops	Area	Output	Yield

9. B. Plot wise information on crops grown during **AUTUMN** season, February-March to June-July

Plot No.	Crops	Area	Output	Yield

9. C. Plot wise information on crops grown during **WINTER** season, June-July to Nov-Dec

Plot No.	Crops	Area	Output	Yield

Notes on Column No.2

List of some crops: SUMMER season =

AUTUMN season =

WINTER season =

10.
Credit/Indebtedness/Borrowings

Sl. No	Source of loan/borrowing	Year of loan	Purpose of loan/borrowing	Total loan received (Rs.)	Interest rate	Nature of repayment	Amount repaid(Rs.)	Balance amnt(Rs.)	Remarks
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1									
2									
3									
4									
5									
6									
7									
8									

Sources: Bank, Co-operatives, Friends/Relatives, Village Rich, Village Committee, Traders etc.

11. Whether beneficiary of any govt. scheme? If yes, give details.

S. No.	**Name of scheme**	**Benefits**	**Remarks**
1	**2**	**3**	**4**
1			
2			
3			

12. Cost of Cultivation

	Cost		
	Summer	**Autumn**	**Winter**
Land Preparation			
Ploughing			
Leveling			
Marking			
Tractor			
Seeding			
Weeding			
Manure			
Fertilizer and Pesticide			
Material Cost			
Labour for Application			
Harvesting			
Transportation			
Irrigation			
Power Bill			
Water Cess			
Interest on the capital			
Rent on leased land			
Annual farm labour			
Imputed family labour			
Depreciation			
Pump sets			
Borewells			
Pipelines			
Others			
Total			

13. Storage facilities

Storage	**Period**	**Reasons for storing/not storing**
Home		
Other places		

14) Which markets do you use for selling your produce?

Vegetables	Fruits
□ KR	□ KR
□ Lal Bagh	□ Lal Bagh
□ Malur	□ Malur
□ Kolar	□ Kolar
□	□
□	□
□	□
□ Directly to households	□ Directly to households

15) Which retailers do you use for selling your produce?

Vegetables	Fruits
□ More	□ More
□ Reliance	□ Reliance
□ Namdhari	□ Namdhari
□ Heritage	□ Heritage
□ Innova	□ Innova
□	□
□	□
□	□

16) Do the retailers provide you with any seeds or information regarding seeds? (Yes/No) – If Yes, give details:

17) Have you changed your farming practice based on the needs of the retailers? (Yes/No) – If Yes, give details:

18) Do you know about contract farming? (Yes/No):

19) Have you done contract farming before? (Yes/No): If yes, give details about whom?

20) Are you interested in doing contract farming for retailers? (Yes/no)

21) Transaction Costs & Dynamics

	Markets/Retailers							
Mention the names of markets/retailers ->								
Fixed price/Bargaining								
Bargaining Time								
Transportation cost (% of selling cost)								
Transportation time								
Agent commission (% of selling cost)								
What quality grading is used?								
Do you believe in the above quality grading? (Yes/No)								
Do you feel cheated in the name of quality? (When your produce is rejected or offered lower price) (Yes/No)								
Payment lead time (same day/1 day/1 week …)								
Any help in Packaging? (Yes/No)								

Eucalyptus Related

22) Are you doing Eucalyptus farming? (Yes/No)

23) Do you think eucalyptus farming has reduced ground water levels in Malur? (Yes/No)

24) Should the government ban the eucalyptus farming in Malur? (Yes/No)

25) Any alternate suggestions for eucalyptus?

26) Motivations for trading with Retailers/Innova Food Park

	Yes/No
Market certainty	
Assured price	
Fair trading	
Provision of Inputs: Seeds	
Provision of Inputs: Fertilizers and Pesticides	
Knowledge about market demand	
Transportation facility for the produce	
Packing /Packaging facility for the produce	

Awareness about Innova and Value Added Services

27) Do you know that you can use cold storage at Innova? (Yes/No)

28) For what purposes have you/would you use cold storage?

29) Do you know that you can use grading, sorting, and packing services at Innova?

30) Government interventions required (Tick Mark as appropriate)

Areas of Interventions	1	2	3	4
Production (Cultivation) - related interventions				
Processing - related interventions				
Others				

Production (Cultivation) - related interventions :
1. Provision of fertilizers, improved pesticides and liquid nutrients at reduced costs
2. Quality grading standardization
3. Provide training on yield improvement
4. Subsidize cost of transportation from fields

Processing - related interventions:
1. Provide training on packing/packaging practices
2. Provide working capital at lower interest rates
3. Provide/increase support to set up infrastructural facilities
4. Provide information on appropriate fertilizer and pesticide use

Others:
1. New technological support
2. Better weather forecasts
3. Storage facility
4. Information about consumer tastes and preferences

Appendix B: Questionnaire – Retailers

Company Name:
Name: Designation:
Mobile: E-Mail:

Information about Collection Center

1) Number of Vegetables:
2) Quantity of Vegetables (Daily):
3) Number of Fruits:
4) Quantity of Fruits (Daily):
5) Number of Personnel:
   - Managers
   - IT
   - Labourers
   - Drivers
   -
   -
6) Facilities (with capacity):
   - Grading
   - Sorting
   - Packaging
   - Cold Storage
   - Dry Storage
   -
   -
7) Who is the distribution logistics provider?
   - Self
   - 3PL
   - Dedicated
8) How many days of inventory is usually kept at the CC?

Vegetables	Fruits
Same day delivery	Same day delivery

9) Information connectivity to the main retail center
   - IT – ERP system
   - Manual –Mobile Phone
10) Warehouse Management System?
   - Yes
   - No

11) % of Supply sources:

Vegetables	Fruits
□ Direct from farmers	□ Direct from farmers
□ Wholesale markets	□ Wholesale markets
□ Co-operatives	□ Co-operatives
□	□
□	□

Transaction Dynamics with Farmers

12) How long do you take to find a farmer?

Vegetables	Fruits
□ They come to us	□ They come to us
□ We go to them	□ We go to them
□ < 1 hour	□ < 1 hour
□ < ½ day	□ < ½ day
□ < 1 day	□ < 1 day
□	□

13) Who pays for transportation cost from farm to CC?

□ Farmer

□ Us

14) Payment lead time:

Vegetables	Fruits
□ < 1 hour	□ < 1 hour
□ < ½ day	□ < ½ day
□ < 1 day	□ < 1 day
□	□

15) How many farmers are there in your database?

16) Are the past transactions stored?

17) Do you perform any analytics on the past transactions?

□ Yes – Manual/Automated
□ No

18) Which market price is used as the reference?

Vegetables	Fruits
KR	KR
Lal Bagh	Lal Bagh
Malur	Malur
Kolar	Kolar

19) What is your offer price?

- Market price
- Market price – transportation cost
- Less than above (by how much %)
- More than above (by how much %)

20) How long does it to negotiate price?

- < 1 hour
- < ½ day
- < 1 day

21) Do you think farmers collude to negotiate hard?

- Yes – Format of collusion?
- No

22) Why do you trade with a particular farmer?

(1 – Not important; 2 – Less Important; 3 – Important; 4 – Moderately Important; 5 – Very Important)

- Price
- Familiarity (Past Transactions)
- Quality
- Quantity
- Contract
-
-

23) Factors affecting direct procurement from farmers:
(1 – Not important; 2 – Less Important; 3 – Important; 4 – Moderately Important; 5 – Very Important)

- Price
- Quality
- Quantity
- Intermediaries
- Transportation cost
- Variety
- Proximity
-
-

24) Factors affecting procurement from Wholesale markets:
(1 – Not important; 2 – Less Important; 3 – Important; 4 – Moderately Important; 5 – Very Important)

- Price
- Quality
- Quantity
- Intermediaries
- Transportation cost
- Variety
- Proximity
-
-

25) What kind of inputs do you provide to farmers?
- None
- Credit
- Seeds
- Information on seeds, variety
- Expected quality
-
-

26) Any other social initiatives for farmer welfare?
- Yes – What kind?
- No

27) Are you happy with the current direct procurement from farmers?
- Yes
- No

28) Would you prefer long-term enforceable contracts?
- Yes – What format?
- No

Quality

29) Is quality of produce an issue?
- Yes
- No

30) Should there be quality grading?
- Yes
- No

31) Factors to consider for quality grading?

Vegetables	Fruits
Size	Size
Freshness	Freshness
Infestation	Infestation
Color	Color

Cooperation/Coordination with Competitors

32) Are you aware of Innova Bio Park and its service offerings?
- Yes
- No

33) Have you used any of their services?
- Yes
- No

34) Reasons for not using Innova services:
-
-
-

35) Will you share a common space with your competitor for value added services?
- Yes
- No

36) Reasons for not sharing value added services?
-
-
-

37) Suggestions for cooperation/coordination with competing retailers:
-
-
-
-

Government Interventions

38) Are you satisfied with the current government regulations?
- Yes
- No

39) Suggestions for government policy interventions:
-
-
-
-

Appendix C : Questionnaire – Innova Food Park

1) Number of Vegetables:
2) Quantity of Vegetables (Daily):
3) Number of Fruits:
4) Quantity of Fruits (Daily):
5) Number of Personnel:

- Managers
- IT
- Labourers
- Drivers
-
-

6) Facilities (with capacity):

- Grading
- Sorting
- Packaging
- Cold Storage
- Dry Storage
-
-

7) Number of customers:

- Hotels
- Hospitals
- Hostels
- Caterers
- Retail shops and supermarkets
-

8) Who is the distribution logistics provider?

- Self
- 3PL
- Dedicated
-

9) How many days of inventory is usually kept at the park?

Vegetables	Fruits
Same day delivery	Same day delivery

10) Warehouse Management System?

- Yes
- No

11) % of Supply sources:

Vegetables	Fruits
□ Direct from farmers	□ Direct from farmers
□ Wholesale markets	□ Wholesale markets
□ Co-operatives	□ Co-operatives
□	□
□	□

Transaction Dynamics with Farmers

12) How long do you take to find a farmer?

Vegetables	Fruits
□ They come to us	□ They come to us
□ We go to them	□ We go to them
□ < 1 hour	□ < 1 hour
□ < ½ day	□ < ½ day
□ < 1 day	□ < 1 day
□	□

13) Who pays for transportation cost from farm to CC?

□ Farmer

□ Us

14) Payment lead time:

Vegetables	Fruits	Pulses & Grains
□ < 1 hour	□ < 1 hour	□ < 1 hour
□ < ½ day	□ < ½ day	□ < ½ day
□ < 1 day	□ < 1 day	□ < 1 day
□	□	□

15) How many farmers are there in your database?

16) Are the past transactions stored?

17) Do you perform any analytics on the past transactions?

□ Yes – Manual/Automated
□ No

18) Which market price is used as the reference?

Vegetables	Fruits
KR	KR
Lal Bagh	Lal Bagh
Malur	Malur
Kolar	Kolar

19) What is your offer price?

- Market price
- Market price – transportation cost
- Less than above (by how much %)
- More than above (by how much %)

20) How long does it to negotiate price?

- < 1 hour
- < ½ day
- < 1 day

21) Do you think farmers collude to negotiate hard?

- Yes – Format of collusion?
- No

22) Why do you trade with a particular farmer?

(1 – Not important; 2 – Less Important; 3 – Important; 4 – Moderately Important; 5 – Very Important)

- Price
- Familiarity (Past Transactions)
- Quality
- Quantity
- Contract
-
-

23) Factors affecting direct procurement from farmers:
(1 – Not important; 2 – Less Important; 3 – Important; 4 – Moderately Important; 5 – Very Important)

- Price
- Quality
- Quantity
- Intermediaries
- Transportation cost
- Variety
- Proximity
-
-

24) Factors affecting procurement from Wholesale markets:
(1 – Not important; 2 – Less Important; 3 – Important; 4 – Moderately Important; 5 – Very Important)

- Price
- Quality
- Quantity
- Intermediaries
- Transportation cost
- Variety
- Proximity
-
-

25) What kind of inputs do you provide to farmers?
- None
- Credit
- Seeds
- Information on seeds, variety
- Expected quality
-
-

26) Any other social initiatives for farmer welfare?
- Yes – What kind?
- No

27) Are you happy with the current direct procurement from farmers?
- Yes
- No

28) Would you prefer long-term enforceable contracts?
- Yes – What format?
- No

Quality

29) Is quality of produce an issue?
- Yes
- No

30) Should there be quality grading?
- Yes
- No

31) Factors to consider for quality grading?

Vegetables	Fruits
Size	Size
Freshness	Freshness
Infestation	Infestation
Color	Color

Value Added Services and Processing

32) What are the value-added services you provide for your customers?
- Cleaning
- Grading
- Packaging
-
-
-

33) Which of the following do you process?
- Vegetables
- Pulses
- Fruits

34) Are you interested in providing value-added services to retail chains?

Government Interventions

35) Are you satisfied with the current government regulations?
- Yes
- No

36) Suggestions for government policy interventions:
-
-
-
-

Appendix D: Questionnaire – Traders

Company Name:
Name: Designation:
Mobile: E-Mail:

Information about Trade

1) Number of Vegetables:
2) Quantity of Vegetables (Daily):
3) Number of Fruits:
4) Quantity of Fruits (Dailly):
5) Number of Personnel:
   - Labourers
   - Drivers
   -
   -
6) Facilities (with capacity):
   - Grading
   - Sorting
   - Packaging
   - Cold Storage
   - Dry Storage
   -
   -
7) Who provides the transportation?
   - Self
   - 3PL
   - Dedicated

8) How many days of inventory is usually kept at the shop?

Vegetables	Fruits
Same day delivery	Same day delivery

9) Who are your customers?
   - Institutional buyers (for their own consumption)
   - Retail shops (for selling)
10) What is the nature of demand?
   - Known demand from customers
   - Buying on speculation

11) % of Supply sources:

Vegetables	Fruits
□ Direct from farmers	□ Direct from farmers
□ Wholesale markets	□ Wholesale markets
□ Co-operatives	□ Co-operatives
□	□
□	□

Transaction Dynamics with Farmers

12) How long do you take to find a farmer?

Vegetables	Fruits
□ They come to us	□ They come to us
□ We go to them	□ We go to them
□ < 1 hour	□ < 1 hour
□ < ½ day	□ < ½ day
□ < 1 day	□ < 1 day
□	□

13) Who pays for transportation cost from farm to shop?

□ Farmer

□ Us

14) Payment lead time:

Vegetables	Fruits
□ < 1 hour	□ < 1 hour
□ < ½ day	□ < ½ day
□ < 1 day	□ < 1 day
□	□

15) How many farmers are there in your supply registry?

16) Which market price is used as the reference?

Vegetables	Fruits
KR	KR
Lal Bagh	Lal Bagh
Malur	Malur
Kolar	Kolar

17) What is your offer price?

- Market price
- Market price – transportation cost
- Less than above (by how much %)
- More than above (by how much %)

18) How long does it to negotiate price?

- < 1 hour
- < ½ day
- < 1 day

19) Do you think farmers collude to negotiate hard?

- Yes – Format of collusion?
- No

20) Why do you trade with a particular farmer?

(1 – Not important; 2 – Less Important; 3 – Important; 4 – Moderately Important; 5 – Very Important)

- Price
- Familiarity (Past Transactions)
- Quality
- Quantity
- Contract

21) Factors affecting direct procurement from farmers:

(1 – Not important; 2 – Less Important; 3 – Important; 4 – Moderately Important; 5 – Very Important)

- Price
- Quality
- Quantity
- Intermediaries
- Transportation cost
- Variety
- Proximity

22) Are you happy with the current direct procurement from farmers?

- Yes
- No

23) Would you prefer long-term enforceable contracts?

- Yes – What format?

□ No

Quality

24) Is quality of produce an issue?
□ Yes
□ No
25) Should there be quality grading?
□ Yes
□ No

26) Factors to consider for quality grading?

Vegetables	Fruits
□ Size	□ Size
□ Freshness	□ Freshness
□ Infestation	□ Infestation
□ Color	□ Color
□	□
□	□

Cooperation/Coordination with Competitors

27) Are you aware of Innova Bio Park and its service offerings?
□ Yes
□ No
28) Have you used any of their services?
□ Yes
□ No
29) Reasons for not using Innova services:
□
□
□
□
□
30) Will you share a common space with your competitor for value added services?
□ Yes
□ No
31) Reasons for not sharing value added services?
□
□
□
□
□
32) Suggestions for cooperation/coordination with competing retailers:
□
□
□

Government Interventions

33) Are you satisfied with the current government regulations?
- ☐ Yes
- ☐ No

34) Suggestions for government policy interventions:
- ☐
- ☐
- ☐
- ☐
- ☐

Appendix E : Questionnaire – HOPCOMS

Name: Designation:
Mobile: E-Mail:

Information about Procurement Center

1) Number of Vegetables:
2) Quantity of Vegetables (Daily):
3) Number of Fruits:
4) Quantity of Fruits (Daily):
5) Number of Personnel:
   - Managers
   - IT
   - Labourers
   - Drivers
   -
   -
6) Facilities (with capacity):
   - Grading
   - Sorting
   - Packaging
   - Cold Storage
   - Dry Storage
   -
   -
7) Who is the distribution logistics provider?
   - Self
   - 3PL
   - Dedicated
8) How many days of inventory is usually kept at the procurement center?
9) Information connectivity to the HOPCOMS headquarters
   - IT – ERP system
   - Manual –Mobile Phone
10) Warehouse Management System?
   - Yes
   - No

Transaction Dynamics with Farmers

11) How long do you take to find a farmer?

Vegetables	Fruits
☐ They come to us	☐ They come to us
☐ We go to them	☐ We go to them
☐ < 1 hour	☐ < 1 hour
☐ < ½ day	☐ < ½ day
☐ < 1 day	☐ < 1 day
☐	☐

12) Who pays for transportation cost from farm to CC?

- ☐ Farmer
- ☐ Us

13) Payment lead time:

Vegetables	Fruits
☐ < 1 hour	☐ < 1 hour
☐ < ½ day	☐ < ½ day
☐ < 1 day	☐ < 1 day
☐	☐

14) How many farmers are there in your database?

15) Are the past transactions stored?

16) Do you perform any analytics on the past transactions?

- ☐ Yes – Manual/Automated
- ☐ No

17) What kind of inputs do you provide to farmers?

- ☐ None
- ☐ Credit
- ☐ Seeds
- ☐ Information on seeds, variety
- ☐ Expected quality
- ☐
- ☐

18) Any other social initiatives for farmer welfare?

- ☐ Yes – What kind?
- ☐ No

Quality

19) Factors to consider for quality grading?

Vegetables	Fruits
□ Size	□ Size
□ Freshness	□ Freshness
□ Infestation	□ Infestation
□ Color	□ Color
□	□
□	□

Appendix F: Contract Farming Questionnaire – Namdhari

General Information

1. Crops under CF:
    a. Green Chilli
    b. Beans
    c. Brinjal (Big)
    d.
    e.
    f.
    g.
    h.
    i.

2. Organic crops under CF:
    a.
    b.
    c.
    d.
    e.
    f.

3. Seeds production under CF:
    a.
    b.
    c.
    d.
    e.
    f.
    g.

4. Reasons for CF: (Y/N)
    a. Quality Control -
    b. Quantity -
    c. Timing –
    d. Assured Supply -
    e. Technically Difficult Farming –
    f. Perishable Produce –
    g. Unavailability in the Market –
    h. High-value Produce –
    i.
    j.
    k.
    l.

Farmer Information

5. Criteria for choosing farmers under CF:

(1 – Not important; 2 – Less Important; 3 – Important; 4 – Moderately Important; 5 – Very Important)

    a. Location -
    b. Farm size –
    c. Irrigation –
    d. Literacy -
    e. Assets availability –
    f. Technology awareness –

g.
h.
i.
j.

6. What kind of farmers you prefer to deal with:
    a. Small number of LARGE farmers (> 10 acres)
    b. Medium number of MEDIUM farmers (4 – 10 acres)
    c. Medium number of SEMI-MEDIUM farmers (2-4 acres)
    d. Large number of SMALL farmers (< 2 acres)
    e. Mix of above

7. Destination market for CF produce from Malur:
    a. India –
    b. UK –
    c. Thailand –
    d. Japan –
    e. DF
    f.
    g.
    h.
    i.
    j.

8. Any political/government pressure to involve small/medium scale farmers in CF?

9. Any pressure from destination markets to involve small/medium scale farmers?

10. Any pressure from EUREPGAP to involve small/medium scale farmers?

Contract Formats, Costs & Risks

11. Contract format:
    a. Written
    b. Verbal
    c.
    d.

12. Price determination:
    a. Fixed (at the time of writing the contract)
    b. Maximum of Fixed or Market Price (at the time of buying the produce)
    c. Market Price
    d.
    e.
    f.

13. Contract costs: (If possible give average value in Rupees and Time spent for a single contract)
    (1 – Very High; 2 – High; 3 – Medium; 4 – Low; 5 – Very Low)
    a. Drafting a contract –
    b. Educate farmers on contract details –
    c. Sign-up farmers –
    d. Monitor compliance with contract –
    e. Enforcing contract –
    f.
    g.
    h.

14. How do you deal with a defaulting farmer:

a. In court (costly)
b. Local authorities (Who are those local authorities?)
c. Do not award him any more contracts
d. Collect back the inputs and investments
e.
f.
g.

15. Major risks with contracts:
(1 – Very High; 2 – High; 3 – Medium; 4 – Low; 5 – Very Low}
    a. Farmer selling the contracted produce to open market
    b. Farmer selling the contracted produce to competitor
    c. Quality requirements not met
    d. Health hazards – Food Poisoning
    e.
    f.
    g.

Inputs to Farmers

16. Inputs to farmers: (Y/N)
    a. Seeds -
    b. Credit –
    c. Fertilizers –
    d. Pesticides –
    e. Technology –
    f. Detailed Farming Methodology –
    g. Transportation –
    h.
    i.
    j.
    k.

Crop Characteristics

Answer with appropriate figures or
1 – Very High; 2 – High; 3 – Medium; 4 – Low; 5 – Very Low

Crop Name	Labour Intensive	Technology Intensive	Number of visits to monitor quality	Frequency of pesticides application	Yield per Acre	Perishability
Chilli						
Brinjal						
Beans						

Appendix G: Contract Farming Questionnaire – Farmer

General Information

1. Name:
2. Age:
3. Education:
4. Family Size:
5. Family Education Level:
6. Farm Size (Total):
7. Farm under Eucalyptus:
8. Farm under CF:
9. Crops under CF:
10. Criteria for choosing CF:

(1 – Not important; 2 – Less Important; 3 – Important; 4 – Moderately Important; 5 – Very Important)

   a. Assured demand -
   b. Assured price -
   c. Free input –
   d. Free maintenance –
   e. Understanding technology -
   f. Understanding export market demand –
   g. Technology awareness –
   h.
   i.
   j.
   k.

Contract Formats, Costs & Risks

11. Contract format:
    a. Written
    b. Verbal
    c.
    d.

12. Contract costs: (If possible give average value in Rupees and Time spent for a single contract)
    (1 – Very High; 2 – High; 3 – Medium; 4 – Low; 5 – Very Low)
    a. Drafting a contract –
    b. Understanding contract details –
    c.
    d.
    e.
    f.

13. Major risks with contracts:
    (1 – Very High; 2 – High; 3 – Medium; 4 – Low; 5 – Very Low}
    a. Market price higher than the fixed price
    b. Retailer defaulting on buying due to damage in produce
    c. Quality requirements not met
    d.
    e.
    f.

Inputs

14. Inputs from Retailer:
    a. Seeds -
    b. Credit –
    c. Fertilizers –
    d. Pesticides –
    e. Technology –
    f. Detailed Farming Methodology –
    g. Transportation –
    h.
    i.
    j.
    k.

Appendix H: Questionnaire – Institutional Consumers

Company Name: Customer Type: Hotel/Caterer/Hospital
Name: Designation:
Mobile: E-Mail:

Demand Information

1) Number of Vegetables (Daily):
2) Total Quantity of Vegetables (Kgs/Day):
3) Number of Fruits (Daily):
4) Total Quantity of Fruits (Kgs/Day):
5) Facilities (with capacity):
   - Cold Storage
   - Dry Storage
   -
   -
6) How many days of safety stock is usually kept at your storage facility?

Vegetables	Fruits

7) Price/Quality Trade-off (%):
   - Price
   - Quality

Quality

8) Is quality of produce an issue?
   - Yes
   - No
9) Should there be quality grading?
   - Yes
   - No
10) Factors to consider for quality grading?

Vegetables	Fruits
Size	Size
Freshness	Freshness
Infestation	Infestation
Color	Color

Supply

11) Supply channels (%):

Vegetables	Fruits
□ Direct from farmers	□ Direct from farmers
□ Wholesale markets	□ Wholesale markets
□ Co-operatives	□ Co-operatives
□ Retailers	□ Retailers
□ Innova	□ Innova
□	□

12) Factors that influence the choice of a supply channel

(1 – Not important; 2 – Less Important; 3 – Important; 4 – Moderately Important; 5 – Very Important)

- □ Good Price
- □ Familiarity (Past Transactions)
- □ Quality
- □ Quantity
- □ Convenience
- □ No alternative
- □ Services
- □ Contract
- □ Payment
- □ Variety
- □ No Intermediaries

13) Which market price is used as the reference?

Vegetables	Fruits
□ KR	□ KR
□ Lal Bagh	□ Lal Bagh
□ Malur	□ Malur
□ Kolar	□ Kolar
□	□

14) What is your offer price?

- □ Market price
- □ Market price + transportation cost
- □ Less than above (by how much %)
- □ More than above (by how much %)
- □
- □

15) Are you happy with the current supply channels?

- □ Yes
- □ No

16) What kind of value added-services you expect from your supply channels?
    -
    -
17) Would you prefer long-term enforceable contracts?
    - Yes – What format?
    - No

Government Interventions

18) Are you satisfied with the current government regulations?
    - Yes
    - No
19) Suggestions for government policy interventions:
    -
    -
    -
    -