

A Study on “differentiator in Marketing of fresh fruits and Vegetables from Supply Chain Management Perspective”

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ABSTRACT

In today's competitive marketplace the pressure on organizations to find new ways to shape and deliver value to customer grows ever stronger. Gradually, in emerging economies as well as developments markets, the power of the seller has overtaken that of the customer. Supply chain Management not only helps in cutting costs, but also adds to maintain and improve The Quality of fruits and vegetables marketed. In marketing fruits and vegetables, which are Perishable in nature, supply chain plays a crucial role. The very nature of land holding by the farmers, Varied climate conditions, production spread over wide geographical area, mainly in remote villages, diversified consumptions patterns and poor infrastructure makes SCM for fruits and vegetables complicated. In India, SCM is at its growing stage in marketing of Fruits and Vegetables. Marketing of Fruits and Vegetables are challenging because of the perishability, seasonality and bulkiness and consumption habits of the Indian Consumers. In addition to this, poor infrastructure, poor equity in SC and conventional small scale unorganized retailers, make state of the art supply chain challenging in the present scenario. The Indian retail market is mainly dominated by unorganized retailers. The unorganized retailers are homogeneous group. Recent development in retailing is the entry of large number of organized retailers. Current supply chain catering mainly to the unorganized retailers is riddled with number of drawbacks. As per this paper important drawbacks of the current supply chain are number of intermediaries, high level of wastage, quality degradation, poor infrastructural facilities and high cost. Government and private operators have to join hands to improve the physical infrastructure, information sharing and the service required for quality improvement of the supply chain.

Keywords: Fruits & vegetables, Supply chain management

INTRODUCTION

SCM is the coordination of material flows, information flows and financial flows among all the participating organizations so as to ensure that the right product in the right place, at the right price, at the right time, and in the right condition. Supply Chain Management plays an important role in marketing of goods and services. "It is the supply that compete, and not individual businesses" – is an accepted saying. Every business plans to cut costs, which do not adds to maintain and improve the quality of goods and services delivered. In this direction, supply chain has played major role across the world in varied sectors. SCM not only helps to cut costs, but also adds to maintain and improve the quality of goods and services delivered. In this direction, Supply chain has played a major role across the world in varied sectors. In marketing fruits and vegetables, which are perishable in nature, SC plays a crucial role. The very nature of land holding by the farmers, varied climate conditions, production spread over worldwide geographical area, mainly in remote villages, diversified consumption patterns and poor SC infrastructure make SCM for fruits and vegetables more complicated. Efficient SCM in marketing, not only increases the profitability and efficiency of retailers, but also adds value to different stakeholders like farmers, consolidators and consumers.

Fruit and Vegetables - Current Scenario

India is the fruit and vegetable basket of the world. India being a home of wide variety of fruits and vegetables holds a unique position in production figures among other countries. Over 90% of India's exports in fresh products goes to west Asia and East European markets. However, it needs to augment its food and processing industry at a mega scale, according to an agriculture consultant. The covered area under the fresh fruits in India was 5510000 Ha with the production of 58740000 MT in 2005-06. The major fruits grown in India are Mangos, Grapes, Apple, Apricots, Orange, Banana Fresh, Avocados, Guava, Lichi, Papaya, Sapota and Water Melons. This is due to its potential in different agro climatic zones India's Export of Fresh Fruits has increased from Rs. 225.67 Crores (USD Million 50.98) in 2005-06 to 256.43 Crores (USD Million 56.88) in 2006-07. The Major countries which import Fresh fruits from India are U.K, Netherlands, U.A.E, Russia, Bahrain, Qatar, Kuwait, Saudi Arabia, Bangladesh, Nepal.

Total vegetable production in India before independence was 15 million mt and since Independence for decades the growth rate was stabilized around 0.5%. The impetus on vegetable research and policy intervention to promote vegetable crops witnessed a sudden spurt in growth rate of 2.5%, a hike of five times during the last decade. Major vegetables grown in India are Potato, Onion, Tomato, Cauliflower, Cabbage, Bean, Egg Plants, Cucumber and Garkin, Frozen Peas, Garlic and okra. India's exports of Fresh Fruit and Vegetable has increased from Rs. 1658.72 Crores (USD Million 374.68) in 2005-06 to Rs. 2411.66 Crores (USD Million 534.97) in 2006-07.

India ranks fifth in the world in cropped area under cultivation and production of potatoes. India produces 41% of world's mangoes, 23%bananas, 24% cashew nuts, 36 % green peas and 10% onion The total export value of the main exporting fruit crop from India is mango. Exports of mangoes, grapes, mushrooms have started going to the United Kingdom, Middle East, Singapore and Hong Kong. and among vegetable, onion occupies first position

Potatoes and green vegetables like okra, bitter gourd, green chillies have good export potential.

India is 2nd largest onion growing country in the world. Indian onions are famous worldwide for their pungency. The Gulf countries are the main importers of the onion bulb, and neighboring Pakistan and China are India's main competitors in the global market. India's Export of Onion has increased from Rs. 708.15 Crores (USD Million 159.96) in 2005-06 to Rs. 1163.30 Crores (USD Million 258.05) in 2006-07. Bangladesh, Malaysia, Sri Lanka, U.A.E, Pakistan and Nepal are the Major market of Indian Onion.

Mango, called the king of fruits in India, accounts for 40 percent of the national fruit production of 22.168 million tonnes a year. It occupies 42 percent of the country's 24.87 million hectares land under fruit cultivation. India exported 79,060.88 MT of fresh mangoes with the value of Rs. 141.93 Crores (USD Million 31.48) in 2006-07. India is estimated to account for about 60 percent (9.5 million tonnes) of the world's mango production of 15.7 million tones. The major production areas in the country are in the States of Andhra Pradesh, Uttar Pradesh, Karnataka, Bihar, Gujarat and Maharashtra.

Fruits and Vegetables – Production and Consumption Scenario

F&V play a vital role in human diet as fresh foods sources of calories, vitamins, dietary fiber and special nutrients. India's vast geographical area coupled with varied climate conditions facilitates to grow a variety of F&V. If concerned effort is made by all the stakeholders, there is every possibilities that India emerges as the leading horticultural crops producing, processing, exporting and consuming country in the world. India is an agriculture based country. Hundreds of fruits and vegetables types are grown in all parts of India. Fresh fruit and vegetable reach small scale fruits vegetables suppliers, they are then sent to local markets as well as fruits and vegetables exporters. Last decades have seen the number of Indian fruit vegetables suppliers and fruits vegetables exporters rising to an all time high. Especially there has been a steep rise in the number of vegetable exporters.

The total production of fruits and vegetables in the world is around 370 MT. India ranks first in the world with an annual output of 32 MT. While there are almost 180 families of fruits that are grown all over the world, citrus fruits constitute around 20% of world's total fruit production. Major Indian fruits consist of mango, banana, citrus fruits, apple, guava, papaya, pineapple and grapes. The fruits are processed into various products such as fruit juices & concentrates, canned fruit, dehydrated fruit, jams & jellies etc.

India with its current production of around 32 million MT of fruit, accounts for about 8% of the world's fruit production. The diverse agro-climatic zones the country make it possible to grow almost all varieties of fresh fruits and vegetables in India. The fruit production in India has recorded a growth rate of 3.9%, whereas the fruit processing sector has grown at about 20% per annum. However, the growth rates have been extensively higher for frozen fruits & vegetables (121%) and dehydrated fruits & vegetables (24%). There exist over 4000 fruit processing units in India with an aggregate capacity of more than 12 lakh MT (less than 4% of total fruits produced). It is estimated that around 20% of the production of processed fruits is meant for exports, the rest caters to the defense, institutional sectors and household consumption, Mango and mango-based products constitute 50% of exports. India is the second largest producer of vegetables in the world (ranks next to China) and accounts for

about 15% of the world's production of vegetables. The current production level is over 71 million MT and the total area under vegetable cultivation is around 6.2 million hectares which is about 3% of the total area under cultivation in the country. In case of vegetables, potato, tomato, onion, cabbage and cauliflower account for around 60% of the total vegetable production in the country. Vegetables are typically grown in India in field conditions, the concept is opposed to the cultivation of vegetables in green houses as practiced in developed countries for high yields. The fruit and vegetable processing industry in India is highly decentralized. India produces 129 million tons of vegetables and the total area under vegetable cultivation is around 7.9 million ha. Among vegetables, potato, tomato, onion, cabbage and cauliflower account for around 60% of the total vegetable production in terms of Quantity. India ranks first in fruit production in the world with an annual output of 68 million tons. There are almost 180 families of fruits that are grown all over the world. Since liberalisation and withdrawal of excise duty on fruit and vegetable products there has been significant rise in the growth rate of the industry.

The per capita consumption of both F&V in India is far below the world Health Organization(WHO) recommendations. For example, the current production of 129 million tons of vegetables is sufficient to provide only a per capita availability of 120 gm of vegetables a day (as per 2001 population census) as against the balanced diet requirement of 400 gm as per WHO recommendations. Large number of farmers depending on monsoon, small land holdings, low yield, negligible investments and poor maintenance of cold storage, markets, all weather roads and transportation facilities are the major hurdles for the growth of the horticultural sector in India. In India just about 2% of F&V grown goes for processing, while over 25% is spoiled due to improper handling and storage, and the rest is consumed in fresh form. Keeping in mind the importance of horticultural products and the challenges faced by this sector. The National Horticultural Mission was Launched in 2005-06 by the Government of India with a mandate to promote integrated development in horticultural, to help in coordinating, stimulating and sustaining the production and processing of F&V, and to establish a sound infrastructure with a focus on post-harvest management to reduce losses.

Fruit and Vegetable - Production Scenario

Production of Major Fruits and Vegetables: India's Position in the World, 1996

Sr. No.	Fruits/ Vegetables	Production (000 MT)		India's Share	India's Rank
		India	World		
Fruits					
1	Mango	10000	19215	52.0	1
2	Banana	15073	55787	27.0	1
3	Apple	1200	53672	2.2	10
4	Pineapple	820	11757	7.0	5
5	Papaya	490	5867	8.4	4
6	Orange	2000	59558	3.4	6
7	Grapes	1083	5004	21.6	8
8	Lime	1700	9104	18.7	1

Production of Major Fruits and Vegetables: India's Position in the World, 1996(Contd...)

Sr. No.	Fruits/ Vegetables	Production (000 MT)		India's Share	India's Rank
		India	World		
Vegetables					
1	Tomato	4800	84873	5.7	6
2	Onion	4058	36544	11.1	2
3	Brinjal	8026	11981	67.0	1
4	Potato	17942	294834	6.1	6
5	Green Peas	270	5214	5.2	5
6	Cabbage	3300	46656	7.1	3
7	Cauliflower	4800	12725	37.7	1
8	Garlic	350	10401	3.4	3

Source: Horticultural Statistics, 1999, Department of Horticulture <http://www.Postharvestindia.com/indhrvst/fruits.htm>

METHODOLOGY

The study covers the marketing of Fruits and Vegetables from Supply chain perspective and elaborate this study by secondary data has been collected and analyzed. The present study is based on information collected from: the market officials of the selected fruits and vegetable markets, commission agents/wholesalers, retailers and farmers in and around the selected Areas. The market officials were consulted for gathering the information on the overall activities of these markets, marketing infrastructure and other related information.

The secondary information was collected from the report of National Horticultural Department of India, Standard books, International Journals, articles and websites were also referred to.

OBJECTIVES OF THE STUDY

The study has been made with the following set of objectives:

- To know the significant role of Supply Chain for Marketing of Fruit and Vegetables
- To know the role played by the various intermediaries in Supply Chain.
- To know the market segments of fruit and Vegetable.
- Identify the New possibilities in the Supply Chain Management for Fruit and Vegetables.
- Identify and develop the Organized Retailing of Fruit and Vegetable.

Introduction to the selected Markets

Before the establishment of regulated markets in Ahmedabad, wholesale trade in fruits and vegetables was largely controlled by a few traders. Unfair and exploitative practices were common at that time and the market efficiency was very low. Since the establishment of

Market Committee in 1948 under the Market Regulation Act, a governing body consisting of representatives of licensed commission agents, farmers, traders, co-operatives and the government have gradually taken control of supervising the fruits and vegetables wholesale trade. This Committee is known as the Agricultural Produce Marketing Committee (APMC) and it controls and administers the regulated markets. Members of this Committee include farmers, traders, cooperative marketing societies, cooperative/commercial banks, officials of local bodies and the government. As of today there are three wholesale market yards in Ahmedabad City for fruits and vegetables administered by the APMC.

Year of Establishment, Size of Market Yard and Licensed Traders in the selected Markets

Market	Year of Establishment	Plot size (Sq. Yds)	Number of licensed traders			Office Staff
			Commission Agent	Co-op. Soc.	Others	
Ahmedabad						
Sardar Patel Market	1980	16000	159	3		33
C J Patel Market	1996	50000	115	2	3	10
Naroda Fruits Market	1998	22577	120			9

Source: APMC, Ahmedabad

Rate of Commission/Market Charges at the APMC, Ahmedabad

Particulars	Rate (Rs.)	Unit	Recoverable from
Commission Charge	6.00	Rs. 100	Purchaser
Market Fee	0.50	Rs. 100	Purchaser
Weighman Charges (Unloading & Tolai)			
Green & Leafy Vegetable	1.00	Upto 30 Kg.	Purchaser
	2.00	31 Kg to 60 Kg	Purchaser
	2.50	61 kg & above	Purchaser
Tomato / Fruits	1.00	One box	Purchaser
Potato / Onions	1.75	Small bag	Purchaser
	2.50	Big bag	Purchaser
From B.G. Station to Market Yard	1.00	Big bag	Purchaser
	0.80	Small bag	Purchaser
From M.G. Station to Market Yard	1.20	Big bag	Purchaser
	1.00	Small bag	Purchaser
Marfat			
Goods Train	0.05	One bag	Purchaser
Passenger Train	0.10	One bag	Purchaser
Recording Charges	0.01	One bag	Purchaser

Source: APMC, Ahmedabad

Arrivals & Turnover

	April to March 2008-09	April to March 2009-10	April to March 2010-11
Arrivals of Vegetables in Quintals	71,57,154	76,85,120	75,36,246
Total Turnover of Vegetables Rs.	6,01,41,81,725	7,91,13,31,081	9,29,30,71,765
Arrivals of Fruits in Quintals	20,86,220	17,37,824	18,55,933
Total Turn over of Fruits Rs.	2,37,58,02,591	2,97,31,97,359	2,89,87,74,388
Total arrivals of Fruits, Vegetables & Grains in Quintals	95,23,778	98,25,117	99,27,707

Source: APMC, Ahmedabad

Sub Yards	Area
Sardar Patel Market	16,211 Sq. Yds.
Rajnagar-Bhagubhai Vanda Market	7,519 Sq. Yds.
Municipal Manekchawk Market	4,237 Sq. Yds.
Naroda Fruit Market	22,577 Sq. Yds.
Pandit Dindayal Dascroi Grain Market	1,07,000 Sq. Yds

Source: APMC, Ahmedabad

Rate Published On: 13 September, 2011: [RATE PER QUINTAL]

Name	Maximum price [rs.]	Minimum price [rs.]
Potato local	650.00	400.00
Potato deesa	850.00	500.00
Onion saurastra	1,000.00	500.00
Sweet potato	1,300.00	1,200.00
Brinjal	2,000.00	1,000.00
Cabbage	1,000.00	700.00
Cauli flower	1,500.00	800.00
Beans broad	4,500.00	2,500.00
Tomato green	500.00	400.00
Tomato red (ripe)	900.00	500.00
Onion green	1,500.00	700.00
Garlic dry	4,500.00	2,000.00

Rate Published On: 13 September, 2011: [RATE PER QUINTAL](Contd...)

Name	Maximum price [rs.]	Minimum price [rs.]
Lady's finger	2,500.00	1,500.00
Cucumber	1,200.00	800.00
Tinda	3,700.00	3,500.00
Chilies green	1,100.00	700.00
Capsicum	3,000.00	1,000.00
Lemon	1,000.00	500.00
Ginger	1,800.00	1,200.00
Green banana	600.00	400.00

Source: APMC, Ahmedabad

Fruit and vegetable - Marketing Scenario

Marketing of agricultural produces is different and more challenging than many of the industrial products. The marketing of Horticultural products that too of the F&V, is more challenging because of the perishability, seasonality and bulkiness and consumption habits of the Indian Consumers. Indian consumer demands fresh F&V. The main stakeholders in marketing chain from growers to consumers are wholesalers, retailers and other middlemen. It is necessary to focus on marketing of F&V from the point of all the stakeholders from growers to consumers. Marketing efficiency not only helps in increased production and per capita consumption, but also contributes to economic development of the country. F&V marketing deals with all the activities, agencies, and policies involved in the procurement of F&V inputs by the farmers and the movement of F&V from the farm to consumers. The F&V marketing system is a link between the farm and consumers. It involves all the functional aspects of market namely pre and post harvest operations, assembling, sorting, grading, storage, transportation and distribution. There has been concern in recent years regarding the efficiency of marketing of F&V. High and fluctuating prices and availability of quality produce are matters of concern from the point of consumers. Only a small share of consumer rupee reaching the farmers is another major concern in marketing of F&V. India has a huge opportunity to become a leading global food supplier, if only it has the right marketing strategies and of course, agile, adaptive and efficient Supply Chain. India has a vast diversity in production, with several religious and sub-cultural groups, different food habits and cultural. As a result, it has huge and vibrant domestic market, too.

While china is currently the largest F&V producers with 34% of global production. India's share in the global exports of vegetables is only 1.7% and in fruits a inadequate 0.5%. China, Thailand, Chile and Turkey account for 58% of developing countries exports of

processed F&V, though the share of developing countries as a whole in the export of processed products is 36%.

Entry of Organized Retailers

Retail is one of the fastest growing sectors in the world. “The retail business in India is estimated to grow at 13% per annum from US\$ 322 billion in 2006-07 to US\$ 590 billion in 2011-12. While the unorganized sector is expected to grow at about 10% per annum, the organized retail is estimated to grow at 45-50% per annum during the same period” (ICRIER, 2008). However, organised retail constitutes only around 4% of the total retail sales in India, compared to 75-80% in developed countries such as USA, Japan and UK.

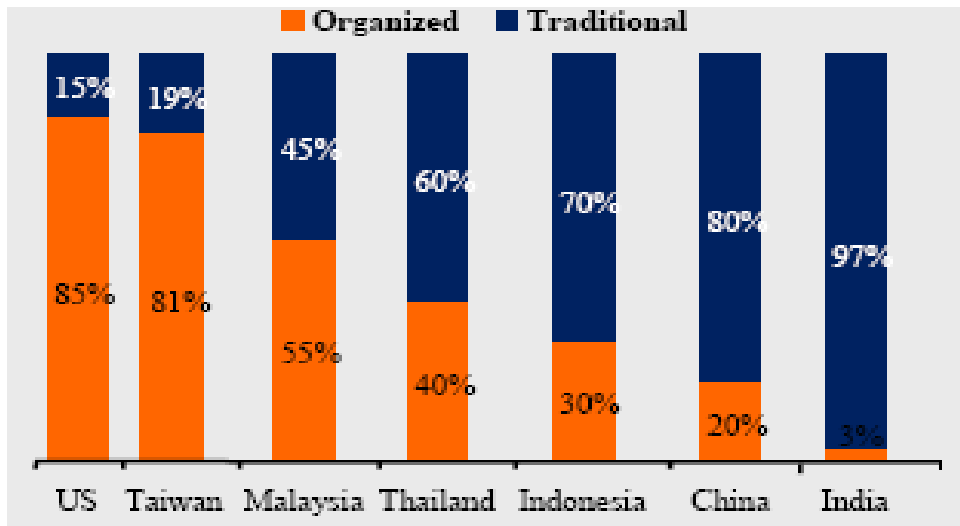
The Indian retail market is mainly dominated by unorganized retailers. The unorganized retailers are not a homogeneous group. Generally, these retailers operate on a small scale. Recent developments in retailing is the entry of large number of organized retailers. There are arguments both for and against allowing foreign Direct Investment in retailing in India. In this scenario, the country is going to witness rapid developments in retailing. Indian middle and upper middle class population is growing rapidly with an increase in the number of young working couples. Consumption of fast foods, packed foods and ready to make foods is rapidly increasing. Change in tastes and consumption patterns of basic foods, longer working hours, increase in double income families, increased exposure to advertising etc., are leading to dramatic change in agri supply chains. More and more career minded working couples are looking for comfort and convenience and are also becoming more and more health and hygiene conscious. In place of conventional wet markets, they prefer to buy vegetables, fruits and other agri-products from the super markets and modern retail stores, and this leads to the entry of more and more corporate into the agri-based business market. The tendency that more and more supermarkets are selling fresh produce is determined by the changes in consumer's demand. Markets with poor environment and no guarantee of quality cannot satisfy the demands of consumers pursuing high quality life. They want to buy desirable food in a comfortable environment.

Fruit and vegetables currently account for 3-4% of total supermarket sales for the group, which expects to end the fiscal in June with retail sales of 9,200 crore. The organised retail trade relies heavily on APMC 'mandis' and agents to source the bulk of its stock of fruits and vegetables. Among the large ones, Reliance Retail procures the most from farmers – about 50% of its daily need of 700 tone.

A team headed by S Radhakrishnan, a 15-year veteran of the retail trade, will manage the new company and own an equity stake in it. Mr Radhakrishnan helped set up the Food World chain for RPG Group's Spencer Retail and was head of Reliance Retail's value format businesses until the beginning of this year. The Future Group now outsources retailing of fruits and vegetables to vendors, who are allowed to use space in its shops in exchange for a share of their revenue.

The major Segments in Indian retail are food (77%), clothing (7%), consumer Durables (4%) and Books and Music (1%). However, organized retail penetration shows a different trends with current shares of these segments in the organized sectors as follows- food (20%), clothing (28%), consumer Durables (10%), and Books and Music (4%). The Major foreign

players too are bidding their time and testing the waters through JVs, Cash and Carry formats market Research and Sourcing operations.



Source: The 2007 BPC World Conference Proceedings

Figure 1: Comparative Penetration of Organized Retail

Supply Chain Management in F&V Marketing

A supply chain is a group of business linked together. It is one of the important marketing functions. SCM may be defined as, “ an integrative approach to dealing with the planning and control of materials flow from to suppliers to end-users. In the present scenario, farmers are not receiving the right price for their produce in the market. Even the major share of price that the consumers pay also go to middlemen. Always it is not true that the middlemen eat up all the profit. Often it is the inefficient. Supply chain that costs middlemen, consumers and more dearly the farmers. SCM is a modern paradigm for improving competitiveness by coordinating different stakeholders. By promoting coordination among several stakeholders, SCM enables each of them to develop beyond what would have been possible if they were on their own a individual stakeholders. SCM connects the participants that can reduce costs, improve customer service, develop the organizational’ s knowledge base, increase efficiency within the organization and create barriers for the entry of competing organizations. As a result of the continuing trends of expanding product variety, increased outsourcing, and continuous advances in information technology, managing SCs effectively is a complex and challenging task. A myriad of potential relationship combinations exist among SC members that can be analyzed in terms of how they partner or develop collaborative linkages with one another. SC helps to give quality products to the consumers. In order to satisfy the consumers from the quality front, all players in the SC have to understand the relationship between customer satisfaction and the quality parameters that the customers are interested in.

In the supply chain, generally the flow of information is opposite to the direction of flow of material. In order to make SC more efficient, it is necessary to make the flow of information

bidirectional. The generation of demand or an activity at one end flows down the SC till it reaches the root from where the basic flow of material begins. This information flow activates all the intermediaries nodes it pass through on its way down the chain. The nature of supplier-customer relationships can be described by several attributes, such as the level of cooperation, the type of information shared among SC actors, the time horizon of the relationship, the formality of cooperation and the degree of flexibility. The level of vertical integration is the extent to which the firms own the SC from raw materials to distribution. SCM practices today are indeed proactive and cooperative that requires joint forecasting and planning, information sharing, joint inventory management, and joint control to eliminate wastes throughout the SC and enhance the customer service for the purpose of obtaining a competitive advantage. An efficient SC drives consumer satisfaction, industry profitability and facilitates reasonable return to the farmers. Supply chain involves much more than simply the logistics of moving the product along the chain. The main focus of SCM is to integrate all the operations along the Supply Chain.

Fresh produce (F&V) Supply Chain

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

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



Figure 2: Fresh Produce Supply Chain

The CPC carries out the following activities,

- Receipts
- Weighment
- Sorting Grading of Produce
- Check Quality
- Cut Vegetables Processing
- Ripening
- Create Standardization
- Bar Coding
- Scanning
- Picking and Staging for stores.
- Batch Marking
- MIS presentation

SCM stakeholders and New Possibilities

The supply chain is complex with perishable goods and numerous small and big stake holders. In many sectors like automobiles and apparel, SC is practiced with lot of precision. Data integration, demand forecasting, collaborative forecasting, bidirectional information exchange, efficient transport scheduling, matching demand supply and financial flow management are followed with continuous improvement. But in the Indian F&V marketing, most of these concepts are alien to a majority of the stakeholders. These best practices should find their way into the fruits and vegetables supply chain. In India, F&V supply chain stakeholders' work in silos. Basically the infrastructure is very poor in supply chain. Even the available little infrastructure is not used properly due to lack of coordination among different players.

Recent literature on SCM has been stressing the need for collaboration among successive actors, from primary producers to end consumers, to satisfy the consumer demand in a better way at lower costs. A collaborative relationship is one of the buzz words today in SCM. For the effective functioning of any SC, different players from the farm to the consumers have to work with mutual understanding, trust and collaborative spirit. This collaborative relationship facilitates information sharing and coordination.

The present supply chain that connects the farmers to both the organized, as well as the unorganized retail, is highly inefficient with several intermediaries and manual handling. The result is lots of wastages as much as nearly 30% and also less remuneration for the farmers. There is no supply chain integrator or channel master for the Indian retail channels. The survey is conduct by KPMG, substances the above statements. The Indian retail cannot be competitive until the supply chain is made integrated, efficient and customer centric.

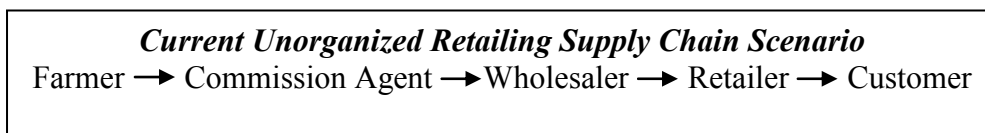
Indian unorganized retailers continue to play a key role in F&V retail. In the interest of the consumers, unorganized retailers, society and economy as a whole, it is necessary to strengthen the network of unorganized F&V retailers. In the coming decade's unorganized retailers play a crucial role in Indian retailing? The survival and acceptances of these traditional markets is a testimony for their competitiveness and cultural acceptability. Traditional markets competitiveness are based on price convenience of location, additional services they offer to frequent buyers and cultural factors which are important to a large majority of poor consumers. The traditional markets are in most cases strategically located and are easily accessible to the consumers. These outlets are located within the locality of consumers allowing them to take shorter time in making their procurement of the frequently purchased fruits and vegetables. In addition to this there is an advantage of purchasing the fresh produce from someone personally known to them.

Business relationship is the common language that every stakeholder understands easily in supply chain. One of the best way of empowering them is developing a collaborative model of supply chain. It brings synergy. Hence, collaboration is receiving the attention of academicians, researchers and supply chain practitioners. Commission agents and other wholesalers practiced redundant processes to shift produce from farm to market. The credit for introducing modern SCM practices goes to the organized retailers. Efficient implementation of SCM would benefit small and unorganized retailers. It is not necessary that those retailers only have to invest the capital required from the farmers end until the goods reach the ultimate consumers. The corporate or NGO sectors too can invest in Supply Chain.

Kaushlendra, an alumnus of IIM- A, has set up a foundation 'kaushalya' to ensure sustainable livelihood, improved quality of life and the human values under the project 'Samriddhi' by creating vegetable supply chain and thus linking together 600 farmers, 300 vegetable vendors, 11 farmer's self help groups and 26 women vegetable vendors in Bihar. Consumer demand quality produce at competitive price, at a convenient time and place. In order to provide this all the stakeholders who work from farm to plate have to coordinate their activities.

Drawbacks in Current Supply Chain

At present the unorganized retailers are linked with farmers through wholesalers or commission agents. Sometimes there would be more than one commission agent and wholesaler for the same produce to reach the retailer. The commission agents and wholesalers redundant supply chain practices make unorganized further inefficient.



The horticultural sector in India is facing several constraints. Major constraints in Production and marketing of Fresh F&V are non- availability of Quality seeds, inadequate irrigation facilities, inefficiency in pest management, credit availability constraint, high cost of production, lack of timely information, huge post harvest losses, lack of roads, cold storage, inadequate space, poor market network and high transportation cost. Cold chain

infrastructure will require an investment of Rs. 18000 crore to Rs. 20000 crore investment in the next five years. A study estimated that the strengthening of SC, the benefits to consumers and producers can increase by 20-25% in the most perishable commodity like tomato. Due to inefficient SC, the price received by the farmers is only about 24 to 58% of the retail price paid by the consumer. Post-harvest technology and management not only helps in reducing the level of wastages, but also facilitates to add value to quality of the produce and also facilitates the stakeholders to get better returns.

Difference in prices between the farm and the retail in India is highest in the world. Improved handling methods and the resolution of regulatory requirements allow access to more distant domestic markets. Post harvest technology of fresh F&V gained enormous momentum to save losses during harvesting, handling, storage and transportation. The extent of loss of F&V is about Rs. 1000 crore to Rs. 12000 crore per annum, and the loss of quantity ranges between 10 to 80% in some of the most perishable fruits and vegetables. 30% of India's F&V produces goes waste because of the lack of the storage chains.

Several research initiatives and considerable investments have resulted in the growth of supply and trade of fresh F&V during the past decade, but still a lot more needs to be done. Increased investments, technology and managerial resources are essential to reduce post-harvest losses, to increase productivity of farmers and to ensure better returns to farmers. This also facilitates to increase the per capita consumption of F&V in the country. Indian horticultural sector has huge potential as it has a vast domestic market, labor, fertile land, varied geographical conditions and horticultural dependent farmers. This can be used as a leverage to gain a leading position in the global market too. In the traditional system of wholesale marketing, the commission agents and traders dominate the SC and are the major price setters, and most of the time, farmers have to depend on them for credit. Small farmers have lack marketing power and have a low share in the final consumer price. Traditional wholesalers do not have the vision to make supply chain integrated. The wholesale markets are poorly designed with non-existent infrastructure for packing, grading, sorting, and cold storage. SCM needs proper business vision and to build a long term collaboration between farmers and retailers. The supply chain provides services for transportation, packing, sorting, grading, cold storage and post harvest technology. There is a strong need for government interaction in removing infrastructure constraints like setting up of distribution centers, cold chains, roads to the markets, etc. ensuring the quality and quantity of the produce to the stores is another basic requirement for smooth functioning of supply chain.

F&V supply chain has traditionally been fragmented. Structural changes are required to maintain and build supply chain infrastructure. For example, unorganized retailers do not have scale of operation to build their own SC. It is necessary to integrate them with an ever increasing fraternity of organized retailers, as far as SC concerned. Business process reengineering is an answer to many of these problems. In order to make SC effective, it is necessary to segment different customers. Caterers, hostels, small town unorganized retailers, unorganized retailers in a metro, organized retailers and processors of F&V cannot be considered as one segment of buyers. For make SC more effective, it is necessary to have different approach to all these stakeholders.

Demand planning for F&V is difficult and challenging. Farmers, wholesalers, food manufacturers and retailers are not working with philosophy of integration. Sourcing has

gone strategic in Industries. The cost of Procurement, transportation cost, regularity of Supply, quality of products, ethical practices of producers, terms and condition of payment and road connectivity are important factors which influence strategic sourcing, which is crucial for the success of F&V supply chain in the long run. New benchmark has to be set from time to time to make the Supply chain improve its performance. The biggest challenge to make any supply chain for F&V to work better is to make the stakeholders realize their role. The responsibility of each stakeholder changes with the change of scale of operation, and sometimes, the stakeholder perceive that their roles are conflicting.

The B2B relationship among different stakeholders makes cost sharing and collaborating a challenging task. Who has to share what cost is a big conflicting point in integrating Supply chain? Who has to share the cost of construction and maintenance of roads? Who has to pay for cold storage and how much? Who has to bear the cost of processing and analyzing information which is useful to farmers and consumers? Incompatible organizational cultures make it difficult for different stakeholders to agree for one size solution. As per the study the important drawbacks of the current supply chain are number of intermediaries, high level of wastages, quality degradation, poor infrastructural facilities and high cost.

Number of Intermediaries

The length of Supply chain is more with unorganized retailers, as they depend on intermediaries like commission agents/wholesalers. This makes the unorganized retailers to sell F&V to the consumers at higher prices. From below table it is clear that the organized retailers sell F&V to consumers at lesser prices than that of the unorganized retailers. This is mainly because of their efficient supply chain.

Fruit and Vegetable Movement from Producers to Retailer

Vegetables	Unorganized Retailers (in Rs/Kg)				Organized Retailers (in Rs/kg)	
	Producers	Commission Agent	Wholesaler	Retailer	Producers	Retailer
Cauliflower	3.5	4	4.5	12	5.5	10.9
Cabbage	2	2.5	3	10	3	7.25
Tomato	5	5.2	6.8	12	7	12

Wastage

Wastages close to 25% in unorganized retailing as shown in below table. The wastage is far less almost 16-19% with organized retailers compared to unorganized retailers. This proves the importance and necessity of Supply chain. In unorganized retailing, there is no real channel master who can lead the Supply chain effectively.

Wastage of Fruit and Vegetable with organized and Unorganized Retailers

Vegetables		Unorganized Retailers (in Rs/Kg)					Organized Retailers (in Rs/kg)		
		Producers (%)	Commission Agent (%)	Wholesaler (%)	Retailer (%)	Total (%)	Producers (%)	Retailer (%)	Total (%)
Cauliflower	Field	6 to 9	2	2 to 3	5	20 to 24	(6 -9) + 5	5	16 - 19
	Market	5							
Cabbage	Field	6	1	3 to 5	5 to 8	15 to 24	6 + 3	7	16
	Market	10							
Tomato	Field	9	1	2	5	23 to 27	9 + 5	5	19
	Market	6 to 10							

Quality Degradation

The very nature of F&V is perishable. With more number of intermediaries, the number of times the produce loaded and unloaded increases. This leads to wastages. These intermediaries are not following any scientific handling and packaging practices. This makes the quality of produce sold by unorganized retailers inferior.

Poor infrastructural facilities

The infrastructural facilities at the disposal of unorganized retailer is almost nil, but for a few redundant shelves. The unorganized retailers have neither their own transport facility nor any other beak end enabling technology. In India close to 30% of F&V grown gets wasted annually due to gaps in cold chain facilities and poor transport infrastructure.

High Cost

The cost of distribution is more with unorganized retailers. The cost of distribution is far less with organized retailers. This difference in cost of distribution is mainly due to the way in which supply chain is used and the number of intermediaries. The present supply channel scenario is as diversified as number and type of retailers. The organized retailers are trying to set their feet on the retail map of metros and a few big cities.

Measures for improving Supply Chain and its Effectiveness

There has to be structural changes at different levels - farmers, intermediaries and consumer. The government, private, public-private partnership, cooperatives, technology providers, and even media can play a crucial role. Infrastructure like roads, transport, information and communication technology and cold storage are basic requirement for better results in Supply chain.

1. Demand forecasting is one of the important requirements for improving SC effectiveness. Due to poor forecasting, there is a imbalance between supply and demand. In some months vegetables are either not plucked from the farm due to lack of demand. In some reasons, produce is not available and a result, prices are boost up.
2. The Department of Horticulture acts as the facilitator for creation of infrastructure facilities for marketing of fruits and vegetables in the state. The Department of Agricultural Marketing is facilitating the marketing of agricultural/horticultural

produces in the state. The Department of Agricultural Marketing recently established ‘Raithra Santhe’ wherein the growers/farmers can bring their fruits and vegetables to the market and sell them directly to the growers. The Department of Agricultural Marketing is also handles the notified Fruits and Vegetables in the state through APMC’S.

3. Vertical coordination of farmers through cooperatives, contract farming and retail chains would facilitate better delivery of output, reduce market risks, provide better infrastructure, attract more public interest, acquire better extension services, and create awareness regarding the prevailing and new technologies.
4. Customized logistics is another important immediate requirement to make logistic effective. This reduces the cost, facilitates the maintenance of quality of the produce and fulfills the requirements of targeted customers.
5. The State Government is providing a subventions of Rs.1/- per KWH of electricity consumed by cold storages in the horticulture sector. Further, National Horticulture Board is providing a back ended subsidy of 25% (maximum of Rs.50 lakhs whichever is less) for construction/modernization of cold storage units. Cold storages are classified as Agro Food Processing Industry for providing incentives and concessions available to Agro Food Industry.
6. Information system for better coordination among different stakeholders from farmers to consumers is the need of the hour. The internet and mobile communication can also be used to enable information and financial transfer between the stakeholders.
7. Public private partnership is another strategic solution. Supply chain like washing, waxing, grading, sorting, packing, pre-cooling, handling facilities, insurance, finance, transport and processing facilities would add value to supply chain functioning.
8. The main objective of establishing Food and Technology Parks it to promote agro and processing industries in cluster in area where there is predominant production of processable agriculture and Horticulture Products. These parks will also provide the required infrastructural and common facilities which are essential for sustenance of the industries. Quality assurance laboratories, Ware housing including cold storages, common effluent treatment plants etc.

CONCLUSION

Fresh produce market has immense influence on the socioeconomic and even political conditions. The existing supply chain is not effective. All the stakeholders have to join hands to improve the supply chain to take produce from farmers to consumers. This would not only improve the economic and social status of consumers, but also facilitates the consumers to get quality produce at economical rates. The intermediaries and all the stakeholders in the supply chain benefit from the improved supply chain infrastructure. In a country like India, where majority of population lives in rural areas, the benefits of improved supply chain would have implications on a good number of people. Government has to join hands with private players in building infrastructure which require huge investments and long term and

multiple uses like roads and communication technologies. India has the potential not only to cater the domestic demand but also to the major global requirement.

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