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WEB SOLUTION FOR HORTICULTURAL CROP SPECIFIC MARKET

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Abstract-

As the Indian population is increasing, the demand for fresh fruits and vegetables is also increasing. Owing to the perishable nature and very short shelf life, these items require proper storage and transportation facilities in order to reach to the customer in fresh state. A lack of investment in agriculture makes the country vulnerable to international price shocks as well as exchange-rate volatility. The present study undertakes a thorough review of basic and contemporary literature available and tries to explain the challenges & opportunities in supply chain management to create a bridge between rural & urban market. It also brings out relevant research gaps and overlooked problems in the supply chain. The proposed research work is exploratory in nature using secondary sources.

Keywords: Price shocks, exchange rate volatility, supply chain management.

I. INTRODUCTION

The Indian economic growth in the recent years has been propelled by the growth of the service and manufacturing sectors, while agriculture sector is still playing a significant role by contributing 17% of the GDP and providing employment to 60% of the population. With the increasing focus and investments from the large national and international players in the food retailing, the agriculture sector is bound to modernize much faster in the coming years. As this sector has a

strong social implication, it has also been accorded a high priority status by the Government, which is facilitating its growth by charting favourable initiatives at different policy levels. The changing consumption dynamics coupled with the growth of modern retail sector, like the growing demand for the processed food offers a tremendous opportunity for all stakeholders in the

areas of production, processing, marketing, supply chain, infrastructure development, technology up gradation and education. Since organized retail sector has started showing interest in fresh fruit and vegetable marketing and already some of them have entered into food retailing with huge investments, but the supply chain management i.e., from the farm to fork is still in a very pathetic state. There is a need to manage the whole show in transparent and participatory ways with proper coordination with the stakeholders so that whole agriculture sector in India can derive the benefit effectively. The present study is undertaken after a thorough review of basic and contemporary literature available and tries to identify the challenges & opportunities in supply chain management in creating a bridge between rural producers & urban consumers. It also brings out relevant research gaps and overlooked problems in the supply chain management in India.

Indian food supply chain is full of challenges and throws open several questions which has drawn attention of contemporary

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researchers. According to Food Corporation of India (FCI) sources, an average of 20%-30% (Bhardwaj and Palaparthi, 2008) of harvested produce is lost during transport from farm to factory. It throws opportunities in the research areas of transportation, storage and logistics, which may concentrate on minimizing these losses. Present trends of food sector demands innovative, competitive and sustainable supply chains in the food sector. India is bestowed with one of the best natural resources in the world and several factors like globalization, information technology, and rise of organized retails are gearing up the Indian food supply chains for a better future. If properly utilized, these natural resources can be converted to an advantage. However, the path is full of challenges and hurdles. There is a comprehensive requirement of research in the area not only to fully understand the challenges in supply chains management but to identify the opportunities for improvement and also to reduce several inefficiencies in the supply chains. There is a huge potential for the researchers to take the challenge and develop a body of knowledge, which will help the government, corporate and cooperatives in handling their responsibilities by running the supply chains effectively.

II. PROPOSED SYSTEM

Natural resources for agro-based industry

India is a developing country and the economic growth of the country was dependent on agriculture for several decades. Unlike many nations, India has a large pool of natural resources, which can flourish into a large resource of food products for the evergrowing population. It is a known fact that, in India, although half of the total land is cultivable, but productivity per hectare is very low. The Gangatic plain is one of the most fertile plains in the world. India has more than

40 varieties of soil and a regular system of rainfall—the monsoon phenomenon. The irrigation projects, which have come up over a period of several decades, now ensure regular supply of water for irrigation in states like Rajasthan. States like Punjab and Haryana are pioneers in achieving one of highest per hectare production records. According to the FICCI report of October 2004, India is

- Second largest fruit and vegetable producer in the world (approximately 135 million tonnes);
- Second largest producer of milk;
- Fifth largest producer of eggs; and
- Sixth largest producer of fish with harvesting volumes of 5.2 million tonnes.
- The above statistics are encouraging and promise a greater future.

Population and demographic changes

Indian middle and upper middle class population is growing very rapidly and there is also increase in number of young working couples, resulted in increase in demand for semi-processed food, fast foods, packed foods, ready-to-eat foods. Changing taste and preference towards consumption of basic foods items, which is driven by longer working hours, increase in double income families, more exposure to advertising, for comfort and convenience etc. Especially people living in cities are become 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-food marketing.

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Integration of primary sector, secondary sector and tertiary sector

Agri-sectors (primary sector) of many developing countries are undergoing drastic change in their production process and selection of crops and how they are integrating different crops for better production and profit. However, it is a relatively recent phenomenon (Hobbs and Young, 2000). One of the reasons that can be cited for the phenomenon is the transaction cost economics. According to the theory, economic transactions form a considerable part of transactions in an open market wherein buyer and seller incur costs in conducting a transaction. These costs arise specially when there are a large number of small players resulting in information asymmetry, bounded rationality and opportunism (Williamson, 1989; and Eggertsson, 1990). However, these costs tend to be low when carried out in an environment of a strategic alliance through contracting, or within a vertically integrated firm (Coase, 1937; and Williamson, 1979). For many agricultural commodities in the US, the trend has been away from spot market transactions and towards closer vertical coordination along the supply chain (Hobbs and Young, 2000). In India, setup of retail chains like Reliance Fresh or Food World has low overall transaction costs for a given volume of transactions.

Emergence of organized retail

The emergence of organized retail, which presents superstore as the primary outlet, goes together with new retail strategies demanding emphasis on the establishing retail brand as a source of competitive advantage. The scale and complexity of the retail store operation, along with these retail branding strategies, requires highly refined operating and control procedures and centralized management structures. From a supply chain perspective, the more important aspects of

emergence of organized retail have resulted in a close focus on identification and exploitation of hidden supply chain costs and efficiencies. In India Reliance Fresh and Spencer's are the pioneers in the organized retail sector. Emergence of organized retail is leading to direct benefits to the farmers, by giving better price by lowering the cost and providing better quality products to the end consumers. Local companies like Dabur, MTR, ITC, Godrej, and Amul are aggressively developing semi-process and ready-to-eat foods. Multiple restaurant chains such as McDonald's, Pizza Hut, Dominos, Coffee day, Qwiky's and Saravana Bhavan, and Sagar Chains are growing rapidly in fast food sector.

Emergence of technologies

One of the major benefits of Electronic Point of Sale (EPOS) technology is that, in concurrence with delivery information and frequent stock counts, the sales data collected presents a very clear picture of market demand patterns. Along with EPOS, salesbased ordering systems are becoming popular which enable orders to be generated automatically in response to customer demand. This provides retailers an opportunity to develop a seamless information flow, from the checkout to retail stock control and replenishment functions (Stone, 1995; and Collins et al., 1989). EPOS and Enterprise Resource Planning (ERP) are the technologies popular with Indian food retailers like Spencer's and Reliance Fresh. From the economics point of view, the costs associated with these technologies can be justified only in case of large organized and integrated players. In the US, the availability of EPOS data enhanced the attractiveness of centralized distribution (McKinnon et al., 1990), which was rapidly embraced by the major grocery retailers during the late 1980s and early 1990s through the establishment of

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composite distribution centres. Efficient centralized distribution is dependent on flexible and advanced information systems (Collins et al., 1989). In India, several companies like Reliance Fresh, Spencer's, and McDonald's are utilizing IT for their benefit. Sachin and Kuttayan (2003) conducted a descriptive case study on ITC's (Indian Tobacco Corporation) e-choupal initiative. This study delineates the effect of emerging technologies on Indian food supply chain and describes the benefits of information technology to the supply chain partners (ITC and farmers). It has been found that farmers get the benefits like faster processing time, prompt payment and access to a wide range of information, including accurate market price knowledge, and market trends, it also help them to make efficient selling decisions. The farmers selling directly to ITC through an e-choupal receive a higher price for their crops than they would receive through the mandi (traditional) system, on an average they get about 2.5% higher. The overall benefits to farmers include lower prices for inputs and other goods, higher yields, and a sense of empowerment. E-choupal saves farmers from the dreaded agents, time wasting mandi system and transportation costs. At the same time, ITC also gets the benefits like lowering of procurement costs (it saves the commission fee and part of the transport costs it would otherwise pay to traders who serve as its buying agents at the mandi). ITC recovers its equipment costs from an e-choupal in the first year of operation and the venture as a whole becomes profitable. The system also provides direct access to information about conditions on the ground and weather which helps farmers in planning for the next crop.

A need for paradigm shift to Improve...

Globalization

Many transnational companies have grown so large that their size exceeds that of some nation states. Thus they could override, neutralize, or even counteract the political will of a nation state". Economic globalization is due to capital movements and specifically Foreign Direct Investment (FDI). Julius (1990) described the flow of FDI in the 1980s between the three areas Japan, the EU and North America. This was 'marketdriven' trade in services as well as goods. Cable (1999) identifies that the flow to non-OECD (Organization for Economic Cooperation and Development) countries has increased as a share of the total to:

- Asian countries including China, Singapore, Malaysia, Thailand and Indonesia;
- Latin America including Mexico, Chile, Argentina and Brazil; and
- Eastern Europe.

The major beneficiaries of food supply globalization are considered to be consumers who now have greater choice and lower food prices. The 'chain captains'—those who control the supply chain—have also seen significant financial benefits. Organizations, seeking to improve performance, shareholder dividends and share price, are constantly looking to new markets to lower operating costs. Operating in a global rather than a national market will not only give rise to increased opportunities, i.e., a potential reduction in operating costs whilst increasing the size of the market the organization can potentially trade with, but also increased threats, i.e., increased competition in the individual national markets. Gaining globally recognized quality standards such as ISO9000 may mean they can access markets, which are otherwise unavailable to them. Rapid demands

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of globalization have resulted in Indian companies to gear their efforts to expand their horizons. No wonder the exports have shown a rising trend. They have increased from Rs. 28,764 lakh in 2002-2003 to Rs. 43,002 lakh in 2006-2007. Multinational companies have entered the food value chain in India; Cargill and Conagra, Tropicana are few of the examples. These companies will generate competition among the Indian counterparts thereby improving the processes and supply chain practices.

Role of the government

Food and Agriculture are two important national activities and which affect the well being of its people of the country. In formulating the policies of farming, production, processing, distribution and retailing and also in financing these activities the Governments should play a leading role. This becomes all the more important in view of the globalization of the food industry. Allowing foreign operators for food production, distribution and retailing is a decision of national importance. The decisions need to be consistent all along the supply chain and mutually reinforcing and not contradictory.

There are several regulatory measures handled by multitude of departments divided between State and Central governments. While some of this is inevitable but streamlining them would be extremely productive. Further, research should be initiated to develop indigenous packaging materials, machines, laboratories for developing new food products and more importantly protocols for storage and processing food raw materials.

The Government of India is also aware of the importance of the sector and has taken several steps to boost the sector. In the light of

high perishability of the products in the sector, the government allows import of cold storage equipment or establishing cold storages in India without any restrictions. Foreign companies are allowed to have a share of up to 51% in cold chain projects. There are several arrangements to provide subsidies in the sector, for example, National Horticulture Board (NHB) drives a subsidy scheme which provides 25% (maximum Rs. 50 lakh) subsidies to the promoter in overall capital investments. There are about 60 Agri-Export Zones (AEZ) in India promoted by Agricultural and Processed Food Products Export Development Authority (APEDA) which are geared to increase the exports of several agri-products. These zones not only channel proper exports but also tend to reduce inefficiency in the value chains of the agriproducts. According to the web sources of APEDA, the following activities are carried to improve the level of various food sector-related processes:

- Development of database on products, markets and services;
- Publicity and information dissemination;
- Organization of product promotions abroad and visits of official and trade delegations abroad;
- Participation in international trade fairs in India and abroad;
- Organization of buyer-seller meets and other business interactions;
- Information dissemination through APEDA's newsletter, feedback series and library;
- Distribution of annual APEDA awards;
- Provides recommendatory, advisory and other support services to the trade and industry;

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- Problem solving in government agencies and organizations, RBI, customs, import/export procedures, problems with importers through Indian missions abroad.

Furthermore, to handle the expected higher agricultural production during the Tenth Plan Period, the Inter Ministerial Task force on Agricultural Marketing Reforms constituted by Ministry of Agriculture, Government of India has recommended the creation of additional cold chain facilities at an investment cost of Rs. 2500 crore of which Rs. 625 crore are to be provided as subsidy and the rest has to come as private investment. They have also suggested modernization of existing facilities with an investment cost of Rs. 2100 crore of which Rs. 525 crore are to be subsidy and the balance to come as private investment.

The state governments also have initiatives in the food processing and cold chain sectors.

For example the Gujarat government has accorded priority to agro processing and horticulture, in view of the high export potential for fruits like mango, banana and chikoo. The government supports the sector by providing assistance to farmers for agricultural inputs, developing systems like drip irrigation and encouraging development of infrastructure facilities like warehousing, cold chain, etc for better pre-harvest and post-harvest crop management. Gujarat also has good logistical infrastructure such as airport, seaport and extensive road & railway network. Other states such as Maharashtra, Andhra Pradesh, Kerala and Punjab have similar schemes in place.

Agri export zones (AEZs)

The concept of the Agri Export Zone attempts to take a comprehensive look at a particular produce/products located in a

contiguous area for the purpose of developing and sourcing the raw materials, their processing and packaging, finally exporting them. Thus, the entire effort is centered on a cluster approach of identifying the potential products, the geographical region in which these are grown and adopting an end to end approach of integrating the entire process, right from the stage of production till it reaches the market. The government helps in sourcing for raw materials, the setting up of processing facilities, providing finance at low interest rates and even matching with international buyers. The export zones mooted by the Agricultural and Processed Food Products Export Development Authority (APEDA) to increase international trade in agri-commodities are an attempt to take a holistic approach to encouraging trade in specific commodities located in contiguous areas. For instance, in Tamil Nadu, the AEZs would focus on grapes, mangoes and chikoo, in Kerala -- vegetables, in Punjab and Haryana -- Kino, wheat and rice, Karnataka -- vegetables and flowers, Maharashtra -- mangoes, grapes and flower, Gujarat -- bananas, mango, castor and garlic, and in Uttaranchal -- litchi and medicinal plants.

State governments have several schemes to boost the efficiency in the sector. For example, Centre for Development of Advanced Computing (CDAC) & Department of Food Processing Industries and Horticulture, West Bengal has jointly submitted a project, "IT-based Horticultural Extension Education for Agri-business in North Bengal" to the Ministry of Communications and Information Technology, Government of India. The project will be taken up on a pilot basis and will assist the pineapple growers in receiving timely and relevant information. The infrastructure would include VSAT, Interactive Voice Response

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Service and AgriInformation portal anchored in local language. CDAC would act as the executing agency and would maintain an interactive multimedia-based educational material for this proposed information dissemination-cum-learning services. Space Application Centre, Ahmedabad has agreed to provide free transponder for this scheme.

Private sector initiatives

There are several private sector initiatives in the food processing and service sector. A number of companies are actively working on integrating the agriculture supply chain. Here we mention a few of them. These show the feasibility of operating efficient cold chains in the India scenario. They could be treated as pilots and other projects can be built emulating them. Here we consider the following cases

- McDonalds-India, a fast food service operator growing its own ingredients such as lettuce, potatoes, etc;
- Amul which is a highly successful cooperative dairy in Gujarat.
- E-choupal which is an ITC success story of procurement of produce from small farmers is an example of supply chain management Indian style.

There are other examples such as Bombay dabbawallahs which is an excellent example of sixsigma forward and reverse logistics delivery. Also, ITC, Mahindra and Rallis together are creating a network of service providers who offer information on weather and prices, credit, transport and assured demand.

According to Financial Express dated February 27, 2008 Indian IT major Infosys Technologies has developed an information and communication technology-enabled

application to help small farmers integrate their business with large retailers and improve efficiencies in agro supply chain. Infosys has developed the application in partnership with the US-based non-profit development organization ACDI/ VOCA that would help in cutting down farm-to-market losses by 30% to 40%, the company said here on Tuesday.

The application will minimize inventory requirements, reduce wastes and allow retailers and farmers to be better integrated. —Maintaining ontime, programmed delivery of fresh produce from a large and scattered production base is a complex and critical operation. This solution gives the organized retail sector access to a reliable smallholder production base. It thereby decreases farm-to-market losses, currently estimated at 30% to 40% on certain products,|| head of India business unit Binod H R said. The application tackles supply chain management from profiling of farmer clusters to crop planning, scheduling, tracking and forecasting and allows farmers to access technical information including database searches for data and images, access to region-specific weather updates and market information - daily sales volumes and average prices.

Scope of the Study

The proposed researched work is exploratory in nature using secondary sources. The data & information will be collected from various literature reviews, industry trends, newspapers, journals & websites.

Though India is the second highest fruit and vegetable producer in the world, cold storage facilities are available only for 10% of the produce. In spite of abundant agricultural produce, India ranks below 10 in the export of food products with processing levels in fruit and vegetable sectors at around 2% only.

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The food supply chain is complex with perishable goods and numerous small stakeholders. In India, infrastructure connecting numerous small stakeholders like farmers, wholesalers, food manufacturers, retailers is very weak. Farmers bring whatever they produced to the market without any knowledge about the demand in the market. Inadequate usage/improper management of cold chains are leading to loss in quality of the vegetables and fruits which in turn is leading to loss of profits and business opportunity. Lot of investments need to be made in cold chains in India. Weak alignment of supply chain strategy with business strategy is also another major problem with the Indian vegetable and fruit sector. Rapid entry of corporates into vegetables and fruit sectors is helping farmers as many corporates are going for direct tie-ups with farmers eliminating the middle men. The current challenge is to adopt best practices in supply chain like collaborative forecasting, data integration, increased usage of IT, demand-based production, incorporating a pull system for fruit and vegetable production rather than a push system sharing risk and rewards by the supply chain partners, etc. In India, major partners still operate in silos which unnecessarily lead to information distortion and supply chain inefficiencies.

Another challenge is to keep abreast of globalization by constantly upgrading competencies which will ultimately lead to better supply chain practices in Indian food industry. When compared to China or Philippines, India lags far behind in terms of exporting food items. Similarly, many Asian countries like China have better storage capacities and well-coordinated supply chains in the food sector.

The main aim is to understand Supply Chain Management for perishable goods especially fruits and vegetables and explore the various challenges and opportunities

evolving day by day. Though rapid entry of corporate into vegetables and fruit sectors is helping farmers as they are going for direct tie-ups with farmers eliminating the middle men still the challenge is to adopt best practices in supply chain like collaborative forecasting, data integration, increased usage of IT, demand-based production, incorporating a pull system for fruit and vegetable production rather than a push system sharing risk and rewards by the supply chain partners, etc. What should firms from established and mature economies be increasingly expanding into emerging markets. As Indian economy is still based on agrarian economy proper supply chain management of perishable goods like foods, vegetables, fish, milk will play a crucial role in developing the economy & help India to emerge as a global leader in Food Sector. Having a galore of opportunities & resources the hindrance/gap between rural & urban market of India should be collaborated through proper vendor management, warehousing & logistics management.

Although various models are emerging in supply chain management of fruits and vegetables, but still there are gaps in decision areas, strategic factors etc. There is a requirement for a model that will bridge the gaps between rural & urban market will be able to create win-win situation for both.

Objective of Study

- To analyze the current scenario of Indian Supply Chain & Logistics Models of fruits and vegetables
- To analyze the effectiveness of different Supply Chain & Logistics Models of fruits and vegetables.
- To analyze the Challenges & Opportunities in Supply Chain Management to bridge the gaps between Rural & Urban Market.

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III. CONCLUSION

Development of agriculture in India needs some critical management inputs particularly that of supply chain management-collaboration among various stake-holders along with efficient vertical and horizontal integration. The food and agriculture sector in particular has to prioritize development of research in the issues of genetics, biotechnology, integrated and sustainable production systems, post harvest handling, storage, marketing and consumer education. Government should create a policy environment that will ensure a mutually beneficial relationship between farmers and organized sector.

Along with investment in infrastructure, development of extension activities and linkages with farmers is also important areas where government can play influential roles.

Lactobacillus rhamnosus sp. nov., comb. nov. *Int J Syst Bacteriol*, 39, 105-108.

- [5] Eggertsson, P. (1990). Economic behavior and institutions: Principles of Neoinstitutional Economics. Cambridge University Press.
- [6] Hobbs, J. E., & Young, L. M. (2000). Closer vertical co-ordination in agri-food supply chains: A conceptual framework and some preliminary evidence. *Supply Chain Management: An International Journal*, 5(3), 131-143.

REFERENCES

- [1] Annamalai, K., & Rao, S. (2003). What works: ITC's e-Choupal and profitable rural transformation: Web-based information and procurement tools for Indian farmers. World Resources Institute.
- [2] Bhardwaj, S. & Palaparthi, I. (2008). Factors Influencing Indian Supply Chains of fruits and Vegetables: A Literature Review. *The Icfai University Journal of Supply Chain Management*, 5(3), 59-68.
- [3] Bendat, J. S. (1990). Nonlinear system analysis and identification from random data. WileyInterscience.
- [4] Collins, M. D., Phillips, B. A., & Zaroni, P. (1989). Deoxyribonucleic acid homology studies of *Lactobacillus casei*, *Lactobacillus paracasei* sp. nov., subsp. *paracasei* and subsp. *tolerans*, and