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## A STUDY ON CHAIN MANAGEMENT EXAMINING MARKET CHAIN WITHIN THE FOOD PRODUCT TRADE IN ASIA

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### Abstract

India is considered as a country of geographic diversities due to its wide-range of habitats, soil-types, Vegetations and different climates. India is the second largest country in producing food supplies like spices, rice, wheat, milk, fruits and vegetables. This food industry plays a major role in Indian economy. It contributes nearly 30% Gross Domestic products (GDP) of India. It also provides employment for nearly 65% of the Indian population. India has lot of natural resources, arable land, fresh water reservoirs, large livestock's and various agro-climatic conditions which makes it a suitable place for the growth of food industry.

Food industry contribution to the Indian economy is increasing every year. However this food industry is facing humongous losses (i.e., post harvesting losses) due to insufficient infrastructure in the cold chain and frozen food sector. The present situation shows that there is enormous scope for the development in frozen or cold chain facilities. This study attempts to present the existing challenges and its potential in cold food chain industry in India.

### Introduction

In the last decade, the Food sector in Republic of India has attracted attention of the whole world to make use of the tremendous potential the geographic, climate and soil offers. Though, a number one producer of food within the world, it's not known for the exports of food product. The poor export figures are due to the inadequacies in infrastructure for supporting the provision chains of food product within country especially the cold chain. Due to this insufficient infrastructure in cold chain, huge losses are faced in biodegradable food sector.

The large wastage of putrefiable food occur as a result of factors like lack of pre-cooling and storage facilities, lack of cold carriers, fragmented carrier chains, poor scarce use of latest tools and technologies and poor product information. The collaboration among stakeholders like government bodies, personal firms, cooperatives, farmers and federations is imperative however the buildup part continues to be within the emerging stage. Even though the production of food is high, the demand for food remains extremely unsuccessful in India and other countries. Republic of India contributes only about 1.5 percent to the global food trade.

This is often primarily attributed to extremely inefficient, inadequate and weak supply firms for food that needs temperature controlled conditions to retain quality, safety and restraint the decay method – the cold chain. Thus, the food retail supply chain is significant.

## **Cold Chain**

Cold chain may be a temperature controlled distribution chain and therefore the term is specifically employed in context of food (vegetable, fruits, meat, fish, milk and milk product, frozen dessert etc.) and pharmaceutical industries. It is a distribution chain for food product that ensures that there are very less temperature fluctuations for merchandise in transit from place of production to the place of consumption.

The temperature needed in cold chain storage depends on the types of product (foodstuffs like fish, dairy farm product, butter, meat and meat product) beneath transit. Cold chain management refers to maintaining the correct temperature of the products through all the hand offs within the cold chain till it reaches the end user. Freeze foods can preserve them in a very good shape, as acceptable to the client because the contemporary product, for long periods by conserving the wholeness and quality. It restrains microorganism and slows down the biological reaction that deteriorates the food.

Developing countries acutely need establishments; infrastructure and human capital in situ to boost efficiency in cold chains and additionally to use the competitive advantage that these countries (like China, India) might possess by virtue of atmospheric condition, immense spans of cultivable land or different factors. Increasing efforts are created by developed countries to assist countries staying behind to attenuate product losses and increase gain. With technological advancement and improved equipments in addition as continuous improvement of cold chain management, the provision of moving food product round the world is greatly increased.

## **Objectives of the Study**

- i) To identify the challenges in the existing cold chain systems for frozen food in Indian retail sector.
- ii) To delve into various factors affecting the effectiveness of Cold Chains.
- iii) To determine the factors that affect the shelf life of frozen food products.

## **Review of Literature**

**A. Evolution** According to Ferine and Sparks [2]. Cold chains are evolving since Eighties. Earlier, cold chains simply meant storing at a selected temperature in warehouses and cold vehicles. There was no awareness of group action the availability chain links and as a result billions' of greenbacks value of losses occurred per annum.

**B. Storage Facilities** Warehouses are an important part within the Cold Chain supplying. Duiven and Binard [3] describe cold stores or cold warehouses as facilities for handling and storing food product beneath controlled temperatures so as to keep up product quality.

**C. Food Packaging** Packaging may be a necessary part as a result of which using the correct insulation materials will keep the temperature of the product as a cushion when they are within the weak links of the distribution chain.

**D. Distribution: Challenges** Apart from food production, distribution of food may be a huge business [4]. Transport is a crucial link in the cold chain as temperature maintenance and safety enhance time period of perishable food. The quantities for distribution are high in food, pharmaceutical, and chemical cold chains sectors.

## **Factors hampering Efficiency of Cold Chain**

India has a great chance to become a number one world food provider if it has the proper promoting strategies which are agile, adaptive and economical distribution chain. In spite of high production of food, the demand for food remains extremely unsuccessful inside the country and outdoors. Viswanadham [8] has pointed out the subsequent constituents of a cold supply Chain:

The huge wastage of destructible food occur because of factors like: lack of pre-cooling and storage facilities, dearth of cold carriers, fragmented distribution chains, poor scarce application of latest tools and technologies, poor product information and lack of professional advisors. There is also necessary to improve the efficiency in existing cold chain networks.

There is a high value of wastage for the businesses if there are no efficient cold chain distribution networks. The cold chain network's efficiency can be improved by the development of basic available infrastructure. The initiative would result in improvement of roads, railways, ports, airports and power. Developing countries acutely need establishments, infrastructure and human capital in situ to boost potency in cold chains and conjointly to take advantage of the competitive advantage that these counties (like China, India) may possess by virtue of atmospheric condition, broad spans of cultivatable land or different factors. With technological advancement and improved instrumentation, moreover as continuous improvement of cold chain management, the provision of moving foodstuff round the world are greatly increased [9]. The study would help a company or firm to venture into the food business in a huge manner.

## **Current State of Indian Agricultural Industry**

Agriculture is the major contributor of Indian economy

Contribution ~ 13.9% to the GDP (2011-12)

Employment ~ 52% of the work force

Exports ~ contributes around 10.2% (2008-09)

- Annual production

Food grains = 259.32 million tons (2011-12)

Fruits = 75.30 million tons (2011-12)

Vegetables = 150.60 million tons (2011-12)

- Largest producer of milk, livestock, sugar, tea etc.
- Second largest producer of rice, wheat, fruit, vegetables and tobacco
- Maize production, 6th in global rank, 2.4% of World production, used for food.

## **Cold Chain Maintenance: Packaging**

Packaging has become the competitive tool to achieve the patron and also the task assumes increasing responsibility since lot of competitive and substitute products being introduced. This has opened the arena for introduction of recent technology for process and packaging, also entry of host of recent organizations from all sectors of the economy each domestic and overseas.

**A. Standardization** Standardization may be a powerful tool for improving distribution chain efficiency. There are 2 forms of standards within the food distribution chain. The primary one is that the food customary that issues itself concerning the content and producing method, packaging etc. There are many such standards for dairy farm, poultry etc. The second customary issues supply and IT systems like standardization of cartons, pallets and IT software system so seamless transfer of products and data is feasible.

**B. Food Safety and hygiene** Food safety may be a growing concern across the planet. There's increasing necessity to give larger assurance concerning the security and quality of food to shoppers.

**C. Training** The food distribution chain goes through an amount of nice amendment and wishes to be supported through new structure forms manned by specialists. Training, coaching, message and mentoring have to be extended to any or all the parties within the distribution chain.

**D. Government Policies** Food and Agriculture are necessary national activities and have an effect on the well being of the population of every country. In formulating the policies of farming, production, processing, distribution, merchandising and financing of those activities, the Governments plays a number one role.

**E. Increasing Awareness** In Asian countries about 30% of the fruits and vegetables produced get wasted annually because of lack of awareness about correct handling and storage necessities moreover as poor infrastructure, depleted cold storage capacity, inconvenience of cold storages in near proximity to farms, poor transportation infrastructure, etc.

### **Importance**

The temperature controlled firms occupy a major proportion of the retail food market in India. The market shares of quick foods, prepared meals and frozen merchandise have hyperbolic in recent years. There are different food temperature levels to suit several kinds of merchandise. Cooling has been successfully used for the long-run preservation of the many foods, providing a considerably extended period. The intense cold merely retards the expansion of microorganisms and slows down the chemical changes that have an effect on quality or cause food to spoil [10].

Competitor with new technologies of minimal processes of foods, industrial cooling is that the most satisfactory methodology for protective quality during long storage periods [11]. With the growing demands to stay and distribute temperature sensitive merchandise in potent condition, organizations are hoping for more efficient solutions to take care of and monitor cold chain. The success of implementing cold chain management involves continual monitoring of product temperature throughout distribution and having applicable corrective action plans in situ.

An efficient, well maintained cold chain helps to:

- Reduce prices
- Improve product integrity
- Increase client satisfaction
- Reduce wastage and returns of terminated stock

## Major Developments and Initiatives in Indian Cold Chain Sector

In past 2 years variety of personal entrepreneurs have endowed in cold chain infrastructure.

1. A crucial development is that the movement of cold wagons through Railway network beneath Public personal Partnership model.
2. Growth of Organized retail network which includes ready cash operations by International retail chains is driving demand for worth more perishable food product

### Suggestions

By designing an effective and economical distribution chain using available modern tools and techniques it's potential to serve the population with worth additional food whereas at the same time making certain remunerative costs to the farmers. The excess of cereals, fruits, vegetables, milk, fish, meat and poultry will be processed as value additional food merchandise and marketed sharply each regionally and internationally.

Investments in cold chain infrastructure, applied analysis in post harvest technologies, installation of food process plants in varied sectors and development of food marketing sector are necessary for achieving gains in this sector. Strategic growth plans for achieving each national and international competition of the food business are essential. However, lack of electricity, power failures and alternative supporting infrastructure are an enormous deterrent in setting up such facilities. The economic impact of cold chains is going to be felt within the villages. Farmers can reclaim realization for their manufacture as a result of improved quality and period.

### Conclusion

The business system depends on food habits i.e., cooking at home and convenience of rural and urban people of the previous generation. Factors like progress within the economy, the technological innovations in home appliances like refrigerators microwave ovens, rise of families with more than one income and therefore the ever-changing food habits of the population all purpose to the increasing would like for healthy processed food.

The protection and organic process quality of frozen merchandise is to be stressed solely when prime quality raw materials are going to be used, sensible producing practices to be used within the preservation method, and therefore the merchandise unbroken in accordance with such that temperatures. The frozen foods market is one among the biggest and most dynamic sectors of the food business.

In spite of considerable competitiveness between the frozen foods business and alternative sectors, in depth quantities of frozen foods are being consumed everywhere in the planet. The food distribution chain desires the eye of the academicians, the business and therefore the Government for its further development.

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