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FOOD PROCESSING IN INDIA

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FOOD PROCESSING IN INDIA

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India is the world's second largest producer of food next to China, and has the potential of being the biggest in the food and agricultural sector. The food processing industry is one of the largest industries in India-it is ranked fifth in terms of production, consumption, export and expected growth.

Performance of this sector has improved significantly in the recent years. Manufacturing sector was generally growing at a higher rate than FPI till 2009-10. Performance of FPI improved substantially in 2010-11; almost at par with manufacturing sector. In 2011-12, as per the Index of Industrial Production (IIP), FPI has out-performed manufacturing; while FPI grew at 15.1 per cent, manufacturing growth was close to 3.0 per cent.

This sector has a total of 35,838 registered units with an invested capital of nearly Rs. 2.5 lakh crore producing an output of around Rs. 5.8 lakh crore in value terms. Major industries contributing to this sector are grain mills, sugar, edible oils, beverages and dairy products. As can be seen from the table, total number of factories in FP Sector [constituting both Food Products: Division-10 & Beverages: Division-11] in 2010-11 is 35,838. This is 30.4 per cent higher as compared to 2009-10. The sector has generated employment to the tune of 16.75 lakh persons which is higher by 4.3 per cent as compared to the previous year. Similarly, Capital invested in FP sector has also increased significantly by 28.6 per cent.

Further Food processing sector is highly labour absorptive and less capital intensive in nature. As per ASI:2010-11, among all industries 'Food products' generated the highest employment (12.2%), followed by 'Textiles' (11.5%), 'Basic metals' (8%), 'Other non-metallic products' (7.3%) and 'Wearing apparel' (6.9%). In terms of capital requirement, capital to output co-efficient Food Products is 0.19 implying food products requires less capital for producing one unit of output, in value term, as compared to other labour intensive industries.

In terms of emoluments or compensation to employees, 'Basic Metal' has the highest share (11.2%) followed by 'Machinery and equipments' (8.3%), 'Motor vehicles, trailers and semi-trailers' (8%). However, among labour intensive industries, 'Food products' (7.7%) has the highest share of employment followed by 'Textiles' (7.6%). Similarly, fixed capital per employee is very favourable at Rs. 6.54 lakh per employee in "Food Product" industry as compared to Rs. 7.45 lakh in "Textiles" and overall industry average of Rs. 12.64 lakh.

In an emerging country like India, where growth with equity is a primary policy thrust, the optimum development of the food processing sector will contribute significantly in tackling several developmental concerns such as disguised unemployment in agriculture, rural poverty, food security, food inflation, improved nutrition, prevention of wastage of food, etc. By serving as a bridge between agriculture and manufacturing and by dealing with the basic needs of all Indian citizens – the assured supply of healthy and affordable food at all locations in the country, this sector has the potential to be a major driver in India's growth in the coming years.

MAJOR SUB SECTORS

Food processing is a large sector that covers activities such as agriculture, horticulture, plantation, animal husbandry and fisheries. It also includes other industries that use agricultural inputs for manufacturing of edible products.

a) Fruits & Vegetable Processing:

- India produces the widest range of fruits and vegetables in the world.
- It is the second largest vegetable (100 million tonnes) and fruit (50 million tonnes)

producer accounting for 8.4 per cent of the world's fruit and vegetable production.

- The share of organized sector in fruit processing is estimated to be nearly 50 per cent.
- Fruit production in India registered a growth of 3.9 percent over the years whereas the fruit processing sector grew several times faster at 20 per cent over the same period.
- The total area under fruit cultivation is estimated at 4.18 million hectares and 7.59 million hectares under vegetable cultivation.
- However less than 2 per cent of the total vegetables produced in the country are commercially processed, as compared to nearly 70 per cent in Brazil and 65 per cent in USA.
- India's installed capacity for fruits and vegetable processing increased from 1.1 million tonnes in 1993 to 2.77 million tonnes in 2007.
- About 20 per cent of processed fruits and vegetables are exported.
- Major products exported include fruit pulps, pickles, chutneys, canned foods, concentrated pulps and juices and vegetables.
- Fruit exports registered a growth of 16 per cent in volume and 21 per cent in value terms in 2006-07.
- Mango and mango based products alone constitute 50 per cent of the exports.

b) Milk Processing:

- Indian stands first in the world in terms of milk production.
- The current size of the Indian dairy sector is Rs.3133.5 billion and has been growing at 5 per cent a year.
- The dairy sector ranks first in terms of processed foods with 37 per cent of the produce being processed.
- The organized sector processes an estimated 20 percent of the total milk output in India.
- There are 676 dairy plants registered with Government of India, which come under the organized sector.
- The cooperative sector dominates the milk industry with over 70,000 village level dairy federations at the state level.
- Gujarat Cooperative Milk Marketing Federation (GCMMF or AMUL) is the most successful player in the evolution of the Indian Dairy Industry.
- Milk and milk products contribute to a significant 17 per cent of the country's total expenditure on food.
- The market for dairy products is expected to grow at 15-20 per cent.

c) Fish Processing:

- India has large marine product and processing potential with varied fish resources along the 8,041 km coastline, 28,000 km of rivers and millions of hectares of reservoirs and brackish water.
- India is the third largest fish producer in the world and second in in-land fish production.
- The Fisheries sector in India has been classified into marine, inland and aquaculture.
- The fisheries sector contributes nearly 1 per cent to the country's GDP. This segment also provides employment to 11 million people engaged fully, partially or in subsidiary activities pertaining to the sector.
- India's fish production stood at a level of 6.4 million tonnes. Of this, about 60 per cent (3.9 million tons) came from marine resources.
- Fish processing is mostly targeted for export markets. Processed fish product exports include conventional block frozen products, individual quick frozen products and minced fish products like fish sausage, cakes, cutlets, pastes, etc.

d) Meat and Poultry Processing:

- India has the largest number of livestock population in the world accounting for 50 per cent of buffaloes and 16 per cent of the goat population.
- Meat production is Rs.625 million and Meat export is Rs.5.2 million.

- Most of the animals in India are not bred for meat. Animals generally used for production of meat are cattle, buffaloes, goats, sheep, pigs and poultry.
- Only 11 per cent of the buffalo population, 6 per cent of the cattle, 33 per cent of the sheep and 38 per cent of the goat population is culled for meat.
- In the case of poultry, export from India is mostly to Maldives and Oman. Other markets such as Japan, Malaysia, Indonesia and Singapore are being explored.
- The growing number of fast food outlets in the country has had a significant impact on the meat processing industry in India. As per capita incomes rise and urban families live in smaller units, the demand for processed meat products, which can be quickly cooked, has been rising. Most of the production of meat and meat products continues to be in the unorganized sector.

e) Consumer food industry

Consumer food industry includes packaged foods, aerated soft drinks, packaged drinking water and alcoholic beverages.

Packaged or Convenience Foods

- This segment comprises bakery products, ready-to-eat snacks, chips, namkeens (salted snacks and savouries) and other processed foods/ snack foods.
- The market size of confectioneries is estimated at US$ 484.3 million growing at the rate of 5.7 per cent per annum. Biscuits have a market of US$ 373.4 million, growing at 7.5 per cent per annum.
- Other products like bread, chocolates are also growing at a significant rate. There is a demand for Indian snack food (Ready-To-eat) in overseas markets. The exports market is estimated at US$ 33.4 million and is growing at around 20 per cent annually.
- The packaged food industry has around over 60,000 bakeries, 20,000 traditional food units and several pasta food units. In the past decade several new biscuits & confectionery units, soya processing units and starch/glucose/sorbitol producing units have come up. Multinational Companies are coming up in confectionery and cocoa based products areas.

Aerated Soft Drinks

- The aerated soft drinks industry in India comprises hundreds of plants across all States. It provides direct and indirect employment to over 125,000 employees. It has attracted one of the highest foreign direct investments in the country, amounting to around US$ 1049 million. Two of the biggest global brands in this segment are well established in India.
- Soft drinks constitute the third largest packaged foods segment, after packed tea and packed biscuits. Total export earnings of the industry are over US$ 156 million per annum.

Packaged Drinking Water

- The market size for packaged drinking water in India has been estimated at around US$ 223 million. The industry comprises 215 companies which have been granted license for manufacturing packaged drinking water and 3 for manufacturing packaged natural mineral water. Trends such as shortage of drinking water in the large metropolitan cities, changes in consumer lifestyles leading to demand for convenience and availability of various packaged sizes to suit different needs have led to a spurt in growth over the last 3-4 years and these trends are expected to continue to fuel demand in this sector.

Alcoholic Beverages

- India is the third largest market for alcoholic beverages in the world. The demand for spirits and beer is estimated to be around 373 million cases per annum. There are 12 joint venture companies producing grain based alcoholic beverages that have a combined licensed capacity of 33.9 million litres per annum. 56 units are engaged in manufacturing beer under license from the Government of India. The demand per annum for wine in the domestic market is estimated to be around 6 million bottles (750 ml), while the domestic production of wine is over 2.4 million bottles.

INDIA'S STRENGTH IN FOOD PROCESSING

The various competitive advantages in the food processing sector that India enjoys over other nations are:

1. India's comparatively cheaper workforce can be effectively utilized to setup large low cost production bases for domestic and export markets. Cost of production in India is lower by about 40 per cent over a comparable location in EU and 10-15 per cent over a location in UK.
2. Due to its diverse agro-climatic conditions, it has a wide-ranging and large raw material base suitable for food processing industries.
3. India ranks No. 1 in the world in production of Milk (Fresh & whole of Buffalo and Goat), Cashew Nuts Shelled, Ginger, Chick Peas, Bananas, Guavas, Papayas, Mangoes and Indigenous Buffalo Meat. Further, India ranks No. 2 in the world in production of Rice, Wheat, Potatoes, Garlic, Cashew Nuts, Groundnuts, Dry Onion, Green Peas, Pumpkins, Gourds, Cauliflowers, Cow Milk and Sugarcane.
4. India has the largest irrigated land in the world. It is also world's largest producer of milk, tea and pulses. India has large marine product and processing potential with varied fish resources along the 8,041 km coastline, 28,000 km of rivers and millions of hectares of reservoirs and brackish water. India also possesses the largest livestock population in the world with 50 per cent of world's buffaloes and 20 per cent of cattle.
5. Investments in food industry are increasing, not only by domestic firms and Indian government, but also foreign direct investment.
6. The Indian food processing industry has significant support from the well developed R&D and technical capabilities of Indian firms. India has a large number of research institutions like Central Food Technological Research Institute, Central Institute of Fisheries Technology, National Dairy Research Institute, National Research and Development Centre etc. to support the technology and development in the food processing sector in India.
7. India's large market size, relatively young population, growing middle class and changing life styles also creates incredible market opportunities for food producers, food processors, machinery makers, food technology and service providers in this sector.
8. Urbanization, growth of nuclear families, increasing proportion of working women, changing taste for global and non-traditional cuisine, increasing preference for health foods, growth and penetration of retail chains etc. also act as drivers to give this industry a boost.For instance, According to report of ICRA the proportionate expenditure on staples like cereals, grams and pulses declined from 45 per cent to 44 per cent in rural India while the figure settled at 32 per cent of the total expenditure on food in urban India.

   A large part of this shift in consumption is driven by the processed food market, which accounts for 32 per cent of the total food market. It accounts for US$ 29.4 billion, in a total estimated market of US$ 91.66 billion. The food processing industry is one of the largest industries in India -- it is ranked fifth in terms of production, consumption, export and expected growth. According to the Confederation of Indian Industry (CII) the food-processing sector has the potential of attracting US$ 33 billion of investment in 10 years and generate employment of 9 million person-days.

SIGNIFICANCE OF FOOD PROCESSING INDUSTRY IN INDIA

To the economy:

- The sector contributes as much as 9.0 to 10.0 percent of GDP.
- During the last 5 years ending 2011, FPI sector has been growing at an Average Annual Growth Rate (AAGR) of around 6

per cent as compared to around 4 per cent in Agriculture and 9 per cent in Manufacturing.

- In terms of investments, food processing sector has registered a positive growth in terms of Capital Invested (fixed capital and physical working capital). The invested capital in industry growing at an Average Annual Growth Rate of 22.17 per cent.
- FDI is permissible for all the processed food products up to 100 per cent on automatic route except for items reserved for Micro and Small Enterprises. FDI attracted in 2012-13 (April-August) was 336.10 crores.

To the social development:

- The food processing sector will provide better market access to farmers. A developed food processing industry will reduce wastages, ensure value addition, generate additional employment opportunities as well as export earnings and thus lead to better socio-economic conditions of millions of farm families.
- The sector can create jobs for rural poor, and thus reduce the burden on agricultural sector for creation of their livelihood.
- According to the Annual Survey of Industries for 2010-11, Food Processing Industry provides employment to 16.75 lakh persons in registered industry.
- During the last five years, employment in registered food processing sector has been increasing at an Annual Average Growth Rate of 3.8 per cent. Unregistered food industry sector support employment to 47.9 lakh workers. (NSSO).
- Share of employment in registered food processing industry has increased from 18 per cent in 2005-06 to 25.9 per cent in 2010-11.

To food security:

It has been noticed that the wastage in huge amounts occur in fruits and vegetables, pulses and cereals. Thus food processing industry provides a suitable supply chain which reduces the wastages and ensure grater supply to the consumer to meet their daily needs. This also controls food inflation.

MAJOR LOCATIONS OF FOOD PROCESSING INDUSTRY IN INDIA

As the food processing sector is growing, several states in India are focusing on developing the sector and attracting investments in it. Some States are at an advantageous position with respect to others due to favourable raw material presence, market demand and other institutional factors. Some locations of food processing industries are discussed below:

- ***Andhra Pradesh***

Andhra Pradesh is a key state that contributes significantly to the food and food processing sector in India. The state ranks first in the country in area and production of mango,oil palm, chillies and turmeric, second in citrus and coriander,third in cashew, fourth in flowers and fifth in grapes, banana,ginger and guava based on area and production. It accounts for a sizable share of country's aggregate production of rice. It also contributes 25-30 per cent to the total sea food exports of the country.

The food processing industry contributes 19.36 per cent to total industrial production in the state. It ranks second in the production of value-added products and beverages with a 10 per cent contribution to the exports of the country.

The state is also well endowed with human resources with the right skill sets. It is estimated that the agro-based industry in the state employs 65 per cent of its total population.

The government of the State is also providing better incentives to the companies such as:

1. Additional 10 per cent of the subsidy assistance to the agro food processing units.
2. Government extending electricity tariff at a concessional rate.
3. A refund of 50 per cent of Stamp Duty Land Registration and Documentation Duty paid by the unit.
4. A subsidy of 50 per cent for buying equipment per beneficiary on primary processing activities, like grading, sorting, packaging, washing at the farm gate.

5. The Government will assist establishment of futures markets for products being used by the food processing industries and promote micro irrigation systems and contract farming for which a separate policy and package will be prepared by the Horticulture Department
6. The Government will develop and promote electronic trade exchanges for processed food products

India get its first mega food park, Srini mega food park at Chittoor in Andhra Pradesh, aimed to facilitate end-to-end food processing with beneficial forward and backward linkages.

From seed to shelf, Srini Food Park will facilitate end-to-end food processing with beneficial forward and backward linkages. On par with software parks, this new-age facility is equipped with Central Processing Centre and Primary Processing Centres. It aims at becoming a pioneering infrastructure enabler and facilitator for the Food Processing Industry.

As a model `Mega Food Park` it provides state-of-the-art food processing infrastructure designed as per global standards and develops a veritable market place with common facilities on the lines of a software park or a textile park. Food Park provides world-class facilities for pulping, IQF, bottling, tetra packing, modular cold storage, warehousing and advanced testing lab. It enables basic and supply chain infrastructure, cluster farming and is ably backed by field collection centers, self help groups and individual farmers. It will empower food industry with state-of-the-art infrastructure and quality raw material sourcing.

With the highest growth in the fruits and vegetables sector (20%) and with Chittoor being the largest fruits and vegetables cluster in India, this Mega Food Park becomes an ideal destination for food processing units.

Mega Food Park is promoted by experienced professionals and supported by the government (the Ministry of Food Processing Industries and the Andhra Pradesh Infrastructure Investment Corporation) and is intended to benefit all components of the value chain.

7. The Government will assist marketing capabilities of food processing units to face not only WTO challenges but also undertake exports.
8. All the Food Processing units will be given clearances under the Single Window Act,. etc.

These incentives help in attracting food processing based industries and also help in creating integrated backward and forward linkage.

- ***Madhya Pradesh***

Madhya Pradesh is the fourth largest producer of agri-produce in India with lowest consumption of fertilizer per hectare. The state ranks first in the production of soyabean, gram, oilseeds, pulses, and linseeds, maize. It ranks second in the production of lentils and niger.

Agriculture contributes almost one-third of the Gross State Domestic Product (GSDP) and is the main source of employment for over 70 per cent population. It constitutes about 60 to 75 per cent rural income. The performance of the agriculture sector in the state has been impressive.

The government of the State is also providing better incentives to the companies such as:

1. Food processing industries having a fixed capital investment of US$ 110,840 and above are given a special subsidy at the rate of 25 per cent of fixed capital investment (in backward areas) up to a ceiling of US$ 55,420.
2. No Mandi fee is charged on agricultural produce, purchased from outside the state for food processing industries to be used as raw material.
3. Expenditure incurred in obtaining necessary National/ International Quality Certification such as FPO, Agmark, BIS, Euro Standard etc. by the food processing industry are reimbursed.
4. In order to give encouragement for Research and Development in food processing industries, 10 per cent of actual expenditure incurred for its subject are reimbursed as a subsidy.

5. In food parks common facilities like cold storage, warehouse, etc., are being established.
6. Land has been allotted at concessional rates to attract entrepreneurs in food parks set up in specific locations
7. The Agriculture and Horticulture Department took initiative to promote contract farming around the Food Park as per the demand of industries established at foodparks.

- ***Uttar Pradesh***

Uttar Pradesh dominates India's agricultural production, accounting for 34 per cent of the total groundnut, 17.5 per cent of the total rapeseed, 8 per cent of the fruits and 14 per cent of the vegetables produced in the country. It has the largest livestock population in the country and tops the milk production. It is the largest producer of sugarcane and ranks second in the manufacture of sugar.

The state has 2659 food product manufacturing units, which is the highest in a single sector in the state (19.5 per cent of total manufacturing units in the state). The state with its prosperity has enabled the growth of allied industries like ware-housing, cold storages and flourmills.

However, despite the inherent potential, the food processing sector has so far been largely untapped only around 2 per cent of the production is commercially processed. Key issues faced in this area relate to post harvest management, which includes grading, sorting, packaging, processing, transportation and marketing. It is envisaged that agriculture in the state can turn into a lucrative venture, if there is a proper linkage from end to end among various components of agri-business, i.e. from the stage of sowing to final sale and consumption, which can develop synergy and dynamic efficiency in the system.

- ***Karnataka***

About 70 per cent of Karnataka's population lives in villages and 71 per cent of the total work force is engaged in agriculture. The state is the leading coffee producer in India, accounting for nearly 70 per cent of the country's coffee cultivation. Horticulture contributes to nearly 17 per cent of the state's GSDP.

Karnataka offers several green-field opportunities for setting up agro-based industrial activities including preservation, processing and packaging of food. Several MNCs have established a footprint in the state, Britannia, ITC, Nestle, and Unilever being the most prominent.

The government of the State is also providing better incentives to the companies such as:

- Agro Food Processing Industries has been declared as "Seasonal Industry" for the purpose of Labour Act. These industries will also be exempt from payment of minimum demand charges to the KPTCL, during closure period of more than 190 days at a time.
- 100 per cent exemption from payment of Electricity Tax and levy of concessional ST of 4 per cent on liquid fuel used for Captive Power Generation.
- All Agro Food Processing Industries which purchase fruits and vegetables directly from the farmers on contract farming basis exempted from payment of Market Fee/ Cess under the APMC Act
- Reimbursement of technology transfer fee, consultancy fee/contract research fee, if the technology is transferred through R & D Institutions like Central Food Technological Research Institute, Defense Food Research Laboratory etc.
- The Government assistance will be in the form of providing financial assistance for creation of basic infrastructure facilities.
- Government adopted the "Mega Food Park" concept formulated by Ministry of Food Processing, Govt. of India, for Implementation in select Districts by providing infrastructure, forward and backward linkages.

UPSTREAM AND DOWNSTREAM IN FOOD PROCESSING INDUSTRY

Food Processing Industry is divided as: Upstream, Midstream and Downstream.

The ***upstream stage*** of the production process involves searching for and extracting

raw materials. In the food processing industry, upstream involves farming of raw material such as fruits, vegetables, livestock rearing, grain, etc. The upstream stage in the production process may also manifest itself as a supplier providing raw materials to manufacturers or other businesses that ultimately process the materials to its finished form.

The ***midstream stage*** involves the transportation (by rail, ship or truck), storage, and wholesale marketing of raw materials produced by the farmers.

The ***downstream stage*** in the production process involves processing the materials collected during the upstream stage into a finished product. The downstream stage further includes the actual sale of that product to other businesses, governments or private individuals. The type of end user will vary depending on the finished product. The downstream process has direct contact with customers through the finished product.

Upstream Stage: Brief description

Upstream stage of the production process involves growing raw materials for the food processing industry.

As the food processing industry is growing at high speed in India, the demand for raw materials are increasing tremendously. Thus farmers are switching to new and advanced practices for farming raw materials at high scale. Industrial agriculture treats the farm as a factory, with "inputs" (pesticides, fertilizers) and "outputs" (crops). The end-objective is increasing yields while controlling costs — usually by exploiting economies of scale (i.e. making a lot of one thing, or "monocropping"), and by replacing solar energy and manual labour with machines and petro-chemicals like pesticides and fertilizers.

But the drawbacks of this are:

- **Soil & Water:** We are exhausting and polluting our soil and water. Industrial agriculture uses 70% of the planet's fresh water. According to EPA, U.S. agriculture contributes to nearly 75% of all water-quality problems in the nation's rivers and streams.
- **Resilience & Food Security:** Our food supply is more susceptible to shocks than ever before because we have disassembled our grain reserves, let bankers into the business of betting on commodity crops and put small-scale farmers around the world out of business.
- **Climate Change:** The current food system is responsible for 1/3 of global greenhouse gas emissions; it is also fully dependent on oil both for transport and because pesticides and fertilizers are petro-chemically derived.
- **Bees & Biodiversity:** Industrial agriculture is the largest single threat to biodiversity, and 7 in 10 biologists believe that today's biodiversity collapse poses an even greater threat to humanity than climate change. Bees, bats, amphibians and other beneficial species are dying off, and their declines are linked to pesticide exposure.
- **Human Health:** While farmworkers and their families, rural communities and children are on the "frontlines" of industrial agriculture, they all carry pesticides in our bodies. Pesticide exposure undermines public health by increasing risks of cancer, autoimmune disease (e.g. diabetes, lupus, asthma), non-Hodgkin's lymphoma, Parkinson's disease and more.

Further in the case of agricultural marketing in India, also known as 'distributive handling' of agricultural produce - there are number of intermediaries who are involved in marketing the agricultural produce. Intermediaries often flout market norms and their pricing lacks transparency. The presence of intermediaries reduces the returns of farmers substantially. Wholesale regulated markets, governed by State APMC Acts, have developed a monopolistic and non-transparent character. Indian farmers realize only 1/3rd of the total price paid by the final consumer, as against 2/3rd by farmers in nations with a higher share of organized retail.

Further there has been a lack of investment in the logistics of the retail chain, leading to an inefficient market mechanism in the economy. Though India is the second largest producer of fruits and vegetables (about 180 million MT/ annum), it has a very limited integrated cold-chain infrastructure. Further the chain is highly fragmented and hence, perishable horticultural

commodities find it difficult to link to distant markets, including overseas markets, round the year. Storage infrastructure is necessary for carrying over the agricultural produce from production periods to the rest of the year and to food processing industries.

To overcome these problems and to increase the supply of raw materials to the food processing industries, these days the trend has been towards integration and collaboration across players in the value chain, to garner mutual benefits. Such integration is initiated by manufacturers, who are looking to integrate backwards to establish linkages with farmers and logistics provider. This led to two new models emerging in the sector – Contract farming and Terminal markets.

Contract Farming:

Contract Farming is an agreement between the food processor (contractor) , who is typically a large organized player, and the farmer, whereby the latter is contracted to plant the contractor 's crop on his land. He also agrees to harvest and deliver to the contractor a quantum of produce, based upon anticipated yield and contracted acreage at a pre agreed price. The food processor provides inputs in terms of technology and training to the farmer, to improve the yield and quality of the produce.

This results in a win-win situation that generates a steady source of income for the farmer and eliminates supply shocks and assures good quality farm inputs which are crucial for the processor. The Government of India has been actively encouraging contract farming endeavours. The National Agricultural Policy envisages that 'private sector participation will be encouraged through contract farming and land leasing arrangements to allow accelerated technology transfer, capital inflow and assured market for crop production '.

Terminal Markets:

A Terminal market is a central site, often in a metropolitan area, that serves as an assembly and trading place for agricultural commodities. Here there are different options for disposing off the produce. It can either be sold to the end consumer, or to the processor, or packed for export, or even stored for disposal at a future date. It thus offers different options to farmers under a single roof. Typically, terminal markets operate on a hub and spoke model where the markets form the hubs, and are linked to different collection centres (spokes) that are located close to the production centres.

The Government of India is looking to promote terminal markets, as a means of integrating domestic produce with retail chains. There are plans to set up such markets in eight cities across five states, at a cost of US$ 131 million. The cities being considered are Mumbai, Nasik, Nagpur, Chandigarh, Raipur, Patna, Bhopal and Kolkata.

Further a new trend of global farms has come up in the recent past to increase the food productivity.

Food shortage and reducing level of arable land is encouraging countries to approach other territory for farm land. Chinese government wants its agricultural firms to buy or lease farm lands in Africa or South America to bolster food security in their country. China has 40% of farmers across the globe but only 9% of agricultural land. More than 40% of arable land of Brazil is unused and China would like to take up this land for soyabean production. Similarly Libya is negotiating with Ukraine for growing wheat and Saudi Arabia too is looking for green pastures for steady supply of food & live stocks.

Downstream Stage: Brief Introduction

The size of the Indian urban food market is estimated at Rs 350,000 crore. The domestic market for processed food is huge and fast growing.

The key drivers for increased demand in value-added processed food products are: a) growth in consumer class; b) change in lifestyle characterized by expanding urban population, increased number of nuclear and dual-income families; c) change in attitudes and tastes with increasing modernization and to a lesser extent westernization of tastes, particularly, of the youth; d) low penetration rates; and e) ability to offset seasonal supply-and-demand effects in fresh products.

Thus to tap the huge market for processed foods, an efficient marketing system is

necessary to bring about demand-driven production.

Some steps that need to be taken are:

- Special attention is to be laid towards setting up regulated markets with the primary objective to improve market efficiency and achieve equitable distribution of benefits between producers, traders and consumers. This will be possible by evolving strategies to strengthen regulated market yields and equipping them with grading, cleaning and packaging facilities, along with market information systems.
- Efforts are to be made to develop packaging technologies for individual products to increase their shelf life and improve consumer acceptance, both in the domestic and international markets.
- Efforts are to be made to harmonise food laws to encourage production of high quality products with minimum intervention from regulatory authorities. The complexity of multiple administering authorities for food processing enterprises is also required to be simplified by developing an integrated and unified system.
- At present, there are 7,521 regulated markets. Most of these lack critical infrastructure. Therefore, massive investment is needed to provide critical agricultural marketing infrastructure. It is estimated that at least Rs 12,234 crore is needed for the regulated markets. Initiative has to be taken to promote public-private partnerships as they ensure efficient resource utilisation and better management practices. There are many examples of successful public-private partnerships. Safal market in Karnataka is an instance of the modernisation of wholesale markets. ITC's e-Chaupal, Haryali Kisan Bazaar, Mahindra Shubhlabh, Cargil Farmgate Business and Tata Kisan Sansar are all initiatives of marketing distribution in the PPP format. Besides, commodity exchanges and futures markets have come up in the form of National Commodity and Derivative Exchange Ltd (NCDEX) and Multi-Commodity Exchange Limited (MCX).

To encourage the private sector to make investments in marketing infrastructure on the required scale, a favourable regulatory environment needs to be created so as to attract large corporates. This would include: a) liberalised credit norms to entrepreneurs for agricultural marketing activities; b) changes in the market regulatory framework to allow private entrepreneurs establish market yards and other regulatory facilities; c) changes in the co-operative laws to allow farmers' co-operatives to work along corporate lines and compete with private trade; d) review of several legal instruments to facilitate the entry of entrepreneurs in marketing activities; and e) provisions to allow private entrepreneurs to cover price and yield risks for farmers.

SUPPLY CHAIN MANAGEMENT IN FOOD INDUSTRY

Modern consumers nowadays demand a variety of both local staple foods and exotic foods; and they expect products from either category to always be of the highest quality, affordability and safety. In response to this ever-growing demand, the 'farm to fork' food supply chain concept has grown and now involves many types of organizations, some directly involved in producing food (eg farms) and others less directly (eg food processing equipment manufacturers). And as the food industry sector is vast and diversified, categorized by different segments such as fresh food industry, organic food industry, processed food industry and livestock food industry. Each segment needs different supply chain strategies such as procurement and sourcing, inventory management, warehouse management, packaging and labeling system, and distribution management.

Thus Food supply chain performance management is key to meeting the growing consumer demand for products that are safe, of high quality, sustainably produced, and of assured provenance. A well-managed supply chain has social, environmental and economic benefits.

There are various reasons for rising interest in Supply Chain Management in agribusiness industry.

The reasons at suppliers' level include:

- Greater differentiation of food products.
- The competition for consumer expenditure.
- Changes in the operating environment.
- Improvement of product quality.
- Ability to ship products in cost-effective ways provides consumers with flexibility from which to choose.

The reasons at consumers' level include:

- Consumers' sensitivity to quality, safety, health and nutritional factors of food products.
- Interest in place of origin and means of production, including non-food values such as environmental sustainability and animal welfare.

Farm to Fork Concept:

Farm-to-fork refers to the stages of the production of food: harvesting, storage, processing, packaging, sales, and consumption. It also refers to a movement concerned with producing food locally and delivering that food to local consumers. It may also be associated with organic farming initiatives, sustainable agriculture, and community-supported agriculture.

Example of making banana chips:

This may involve many manufacturers - One company might dry the bananas into chips and then sell them to the muesli producers who then add them as a component to the finished breakfast product. The manufacturing can be done close to where the commodity crop is grown or it can be moved elsewhere for this, even exported to another country. Then there is the packaging company who manufacture the packaging material to protect the product. Along the way distributors and transporters move the foods by road, rail, air or sea.

Once the product arrives at the destination, it goes into the shops or marketplace for selling. The shop can be a huge multi-national supermarket or a small outlet. The retailers promote the product to make consumers want to buy it through advertising and marketing strategies at both the point of sale and through advertising media, like newspapers and television channels. Finally, the customer buys the product, takes it home and consumes it. The supply chain is now completed.

However, this is not necessarily the final step in the life of the product - the post-consumer stage of waste disposal and management for all the food that goes uneaten.

Direct Contributors to supply chain: primary producers, ingredient suppliers, food manufacturers, packaging suppliers, transport and storage providers, wholesalers, brokers and agents, retailers and catering outlets including commercial (restaurants) and non-commercial (private catering).

Indirect Contributors to supply chain: such as service providers (water, waste disposal), equipment manufacturers (process equipment and vending machines), biochemical manufacturers (additives, vitamins, pesticides, drugs, fertilisers, and cleaning agents) and animal feed producers.

Elements of the supply chain

The stages of the supply chain are now briefly outlined below:

- ***Food Ingredients and raw materials***

The supply chain in the food industry starts with ingredients or raw materials. Selection of the appropriate raw materials is needed to achieve the desired end product. Suppliers are contracted to supply materials that meet the requirements outlined on the raw material specification sheet. There may be a number of concurrent suppliers of the same ingredient to ensure availability is always guaranteed, especially for high volume businesses, such as in fast food restaurants.

A traceability system allows manufacturers to trace the source and path of each ingredient or raw material throughout the production process. This is very important if any incidence of contamination or allergens come to light after a product has been placed in the market. Having

such safeguards in place can prevent or minimize any widespread risks to consumers.

- ***Transport and storage***

All the food we consume has undergone some forms of transport. In the simplest case, fresh vegetables may be taken to a local market. Consumers then buy produce and drive, walk or cycle it home. This first step may be eliminated if the produce is bought at the farm-gate, such as in the case of strawberries in the summer time, but then it is still transported home by the customer. A product may be a key ingredient for another product and thus is transported to a manufacturing site elsewhere by road, rail, sea or air. This procedure can be repeated before it is finally sold as a finished product, which again requires transport to get it to the point of sale. Transportation of foods results in what is termed "food miles" .

Commodity products, such as grains, can be bulk or container shipped around the world in huge transporter ships. In bulk shipping the grain goes straight into the hold of the ship instead of being transported in containers on board the ship. Some countries are major commodity exporters to other parts of the world, such as Australia and Canada for wheat export and pulses.

The storage, packaging and transport steps of the supply chain can involve many technologies, needed to maintain product quality. Chilled or frozen distribution ("cold-chain") and modified atmosphere environments are used for many products.

Foods can be stored and packed in modified or controlled atmospheres. Controlled atmospheres are useful for crops that ripen after harvest or deteriorate quickly even when stored optimally. The gas composition is carefully monitored and a proportion of the store atmosphere is re-circulated to control the carbon dioxide concentration. In modified atmospheres however the product is held in an airtight environment and the atmosphere is changed by respiratory activity of the fresh foods. Carbon dioxide levels can be higher than 20% and oxygen levels can be as low as 0%. High CO_2 levels are important for controlling insects and mould growth for example in grain storage.

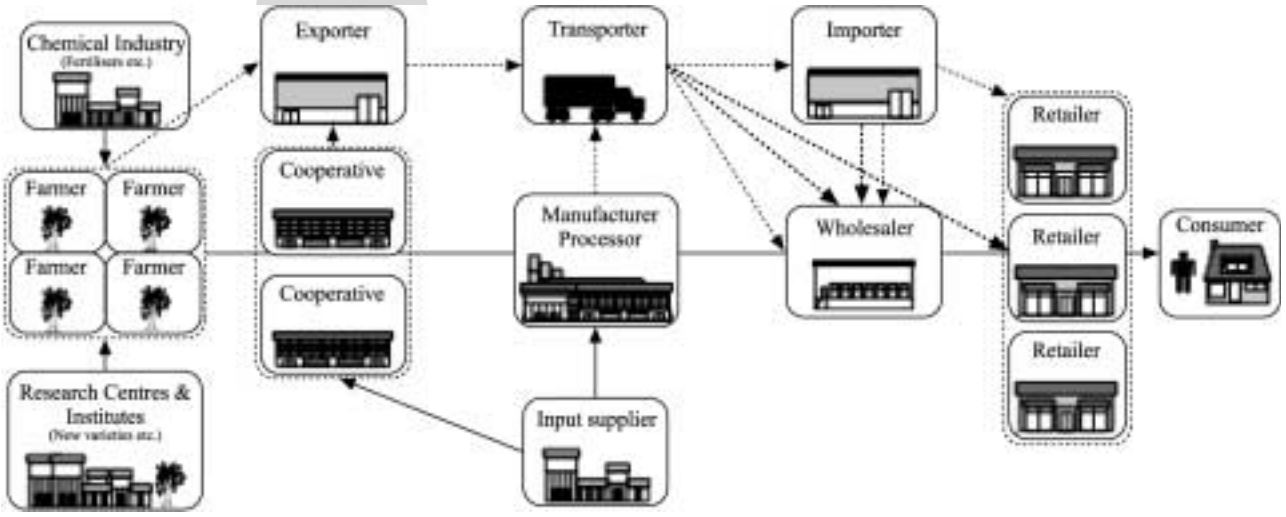
- ***Food Production***

Ingredients are combined or transformed in some way during the manufacturing stage to produce the final food product. Commercial food products can have multiple ingredients or components, which themselves may have undergone transformations, making them quite complex final products. Production can take many forms – it can be batch or continuous, on a mass-scale, or more limited in output - and can use many specialized techniques and equipment.

Packaging is added to the finished product. Packaging protects the food and provides the appropriate barrier to maintain product safety, amongst other important roles. Individual packaged products are then combined into larger consignments ready for distribution to sales points.

- ***Marketing***

Marketing involves providing sales platform for the food products. Sometimes it is done by



the producer himself. Government creates a market through setting up APMC Depots, online websites and also through trade exhibitions.

- ***Market***

Finally, the chain gets completed when the crop reaches the market for consumption and the farmers as well as the processing units get the money out of it.

Safety in the supply chain

Safety is vitally important in food production. The result of a supply chain should be a product that should be safe to eat. Manufacturers are forced by law to make sure of this. Risk assessment and hazard analysis schemes are used in industry to assess potential problems before they arise.

How food gets contaminated in supply chain?

Examples of Contamination at Production stage:

- If a hen's reproductive organs are infected, the yolk of an egg can be contaminated in the hen before it is even laid.
- If the fields are sprayed with contaminated water for irrigation, fruits and vegetables can be contaminated before harvest.
- Fish in some tropical reefs may acquire a toxin from the smaller sea creatures they eat.

Examples of Contamination in Processing

- If contaminated water or ice is used to wash, pack, or chill fruits or vegetables, the contamination can spread to those items.
- Peanut butter can become contaminated if roasted peanuts are stored in unclean conditions or come into contact with contaminated raw peanuts.
- During the slaughter process, pathogens on an animal's hide that came from the intestines can get into the final meat product.

Examples of Contamination in Distribution

- If refrigerated food is left on a loading dock for long time in warm weather, it could reach temperatures that allow bacteria to grow.
- Fresh produce can be contaminated if it is loaded into a truck that was not cleaned after transporting animals or animal products.
- The contents of a glass jar that breaks in transport can contaminate nearby foods.

Examples of Contamination in Preparation

- If a food worker stays on the job while he or she is sick and does not wash his or her hands carefully after using the toilet, he or she can spread pathogens by touching food.
- If a cook uses a cutting board or knife to cut raw chicken and then uses the same knife or cutting board without washing it to slice tomatoes for a salad, the tomatoes can be contaminated by pathogens from the chicken.
- Contamination can occur in a refrigerator if meat juices get on other items that will be eaten raw.

Thus Hazard Analysis and Critical Control Points – HACCP method is used for maintaining food safety.

There are three types of hazards defined in food production:

- **Biological:** such as food poisoning due to bacterial contamination (e.g. salmonella), mould growth and viral infections.
- **Chemical:** such as that from cleaning fluids, fertilizers or paints.
- **Physical:** such as stones, hair, fingernails, rings and bits of machinery.

In order to make a HACCP plan, each stage of the production system is first described. Any risks associated with each stage are then identified with an explanation of why this particular problem poses a risk. The control check is then worked out to stop the hazard or reduce the likelihood of it happening. Finally an action plan is outlined to state what action is to be taken if the control check shows the hazard has happened. On top of this, it is essential that effective record keeping is maintained to document everything.

The HACCP team should include people from across multidisciplinary competencies, including food technologists, microbiologists, packaging technologists, etc.

Good Agricultural Practices proposed by FAO for proper food supply chain:

Sharing the responsibility for providing safe food among all players in the food and agriculture sector - from food producers and processors to retailers and households - is mirrored by an approach in which developed countries offer developing ones the resources and experience to build their capacity to ensure their food chains are safe. FAO's approach includes the adoption of Good Agricultural Practices (GAP) which establish basic principles for farming, including soil and water management, crop and animal production, storage, processing and waste disposal. The aim of the food chain approach, which incorporates these improved farming practices, is to ensure that the food chain becomes more transparent so national and global food crises can be prevented rather than treated.

Contemporary issues in supply chain management in food industry in India:

The global business environment including agribusiness is in a state of transition, being influenced by globalization, strategic alliances, merger and acquisition, business process and re-engineering. These strategic approaches are altering the focus of overall management of businesses and influencing the ultimate goal – reaching the end-users by shifting from mass-marketing to customized marketing and emphasizing relationship-based marketing in all fields. The rapid advancement of information technology is also having its affect on businesses and their management. The widespread success of any business depends on the efficient utilization of its supply chain, which links all the participants and players of that particular business. The chain usually starts from the gathering of raw materials or goods and finishes when the good is supplied to the ultimate end-users, the customers. The effective and efficient management of supply chains is challenging, and requires clear understanding of the components of supply chain management (SCM). The agribusiness sector,as a whole,needs to apply SCM efficiently to be competitive in the changing global picture.

However, the food supply chain in India have following shortcomings:

- ***Poor Infrastructure***

India has the second longest Road Network in the world. But less than 2% of the entire road length is covered by National Highways. This 2% of the road handles 40% of the Cargo. Normal distance travelled by an Indian Truck is 250-300 km / day as against an International norm of 600-800 km / day. Also most of the roads in India can support only 16.2 tons as against an International norm of 36 tons.

Many of the Indian cities have brought in 'Truck Curfews' by blocking the trucks during day time. If the curfew is missed, the trucks have to be parked outside the city and there is a long delay. This type of delay becomes a problem in case of Perishable goods. For instance, it is said that 20% of the Tomatoes get rotten during Transit.

Railway network is not very suitable for transit of Food items as it does not provide end to end delivery in many cases. Port Infrastructure is very important for importing Food Items and the delay caused in the ports can have adverse effect. High dependence on manual labour and low technological presence impacts the supply chain lead time. The cost of an Import Container box in India is USD 500 as against USD 300-350 in foreign ports.

- ***Underexposure of Organized Logistics***

In India, only 6% of the logistics is organized. The absence of organized logistics paves way for delay in Transportation of food produces from the farm to the end consumer. There are lot of middlemen involved and the time taken for the produce to reach the end consumer results in Food Wastage and price hike.

- ***Absence of Adequate Warehouses***

Two types of Warehousing are required for Food Products. One is a sheltered Warehouse to store Food Grains like Rice, wheat and Cereals. The other one is Cold Storage Facility to store Fruits and Vegetables.

Sheltered Warehouse

Many of the warehouses have inadequate

capacity. The crop production has gone up significantly over the years, but the warehouses have not increased. In 2010-2011, the Food Grain produced was 233 Million Metric Tons. The storage capacity owned by the Government was 91 Million Metric Tons. As a result, many crops are stored in the Open Space and if it rains unexpectedly, then the food grains are damaged. Also due to the absence of Pest Control Mechanisms, 20% of the food grains are eaten by rodents each year.

Cold Storage Facility

Cold Storage Facility is important for storing Fruits, Vegetables and Milk. The existing Cold Storage Facilities can store 21.7 mn tons food produce, but the requirement is more than 31 mn tons. This means that one third of the food produce goes waste each year due to the absence of Storage Facilties.

The absence of Private Players in Warehousing is also a main concern. Most of the warehouses are controlled by Government and they are not able to expand as per the demand. Government Storage Facilities are poorly maintained and it also contributes to loss of Food Produce.

Steps needed to overcome the problems:

- ***Encouraging 3PL (Third Party Logistics) Players***

3PL are Service Providers who take care of End to End Delivery. The concept of single Logistics Service Provider (LSP) is at an infant level. Government must encourage 3PL players by easing the norms. A single logistics service means that there will be no loss of Food produces in between due to the presence of various players.

- ***Warehousing with Private-Public Partnership***

Government must encourage Private firms to set up Warehouses. The Government has already shown interest in this scheme, though Private Players are not very interested. There have been few cases of Private Public Partnership in this sector.

Adani Agri Logistics has a tie up with Food Corporation of India (FCI) and has set up State of the Art Warehouses at seven places in the country. It has currently capacity of 0.6 mn Tons and is planning to increase the capacity to 2 mn Tons. Fully Integrated, IT enabled Operations makes sure that there is no loss in both Quality and Quantity of the Food Grains. These type of Firms must be encouraged by the Government.

- ***Steps taken by government to improve cold storage facilities:***

Department of Agriculture and Cooperation is providing incentives through following schemes for setting up of cold and dry warehouses in the country:

1. National Horticulture Mission (NHM)

Under NHM scheme financial assistance is provided for taking up various activities related to horticulture such as development including setting up of cold storages for which credit linked back ended subsidy @ 40% (for general areas) and 55% (for hilly and tribal areas) of capital cost of the project up to 5000 MT capacity with maximum of Rs.6000/MT to all states except North Eastern and Himalayan States.

2. Horticulture Mission for North Eastern & Himalayan States (HMNEH)

Under HMNEH scheme financial assistance is provided for taking up various activities including setting up of cold storages for which credit linked back ended subsidy 55% of capital cost of the project up to 5000 MT capacity with maximum of Rs.6000/MT to North Eastern and Himalayan States.

3. National Horticulture Board (NHB)

National Horticulture Board (NHB) provides back-ended capital investment subsidy to the eligible organizations for creation / modernization/expansion of cold storage/ Controlled Atmosphere Storage @ 40% of the project cost in general areas and 55% in case of hilly and scheduled areas up to 5000 MT capacity with maximum of Rs.6000/MT. The scheme is demand driven and is being implemented across the country.

4. Rural Godown Scheme

Under Rural Godown Scheme, subsidy is available for construction of Rural Godowns @ 25% for all categories of farmers, Agriculture graduates, cooperatives. All other categories of individuals companies and corporations are

being given subsidy @ 15% of the project cost. The subsidy is 33.33% in case of North Eastern (NE) States/hilly areas, SC/ST entrepreneurs & their cooperatives and women farmers. The scheme has been recently revised for making it more attractive by enhancing the maximum capacity to 30,000 MT with maximum ceiling on subsidy of Rs.3.00 crore for other than NE States and by enhancing the maximum capacity to 25,000 MT with maximum ceiling on subsidy of Rs.3.333 crores in respect of North Eastern/ Hilly States.

5. *Scheme for Development and strengthening of Agricultural Marketing Infrastructure, Grading and Standardization*

Under the Scheme for Development and strengthening of Agricultural Marketing Infrastructure, Grading and Standardization, subsidy @ 25% of the capital cost of the project with a ceiling of Rs. 50.00 lakh per project is available. In respect of North-Eastern States and Hilly and Tribal areas and entrepreneurs belonging to SC/ST and their cooperatives subsidy of 33.33% is provided with a ceiling of Rs.60.00 lakh per project.

How FDI in Retail can improve supply chain of food processing sector?

FDI in retail is expected to bring the investment and expertise necessary to modernize and develop the farm and manufacturing sector. Analysts estimate that the retail market in India, currently worth $500 billion, will grow to $1.3 trillion by 2020. Organized retail is expected to reach 20-25% of total retail by 2020 (from a current 5-6%). The prospect of higher growth in the food and grocery category is particularly attractive because over fifty percent of India's workforce is employed in the farm sector. Therefore, advocates see a significant role for FDI for the economic development of the country as a whole.

FDI proponents also point to the employment potential of the food retail sector, specifically in aggregators and low-level processors. They project that such investment would create new off-farm jobs for 50-60 million low-skilled workers, enough to absorb new entrants to the work force as well as those potentially displaced by the market efficiencies introduced by FDI (projected to be a segment of small farmers). FDI would also bring investment in post-harvest infrastructure that would increase the shelf-life of produce and minimize food wastage (now as high as 20-30%). Moreover, new investment would result in other positive externalities such as better seeds and stricter standards that would increase quality and productivity while lowering costs. FDI in retail should also be cross-cutting and modernize not only retail and agriculture, but also manufacturing.

Further the entry of players in the organized retail will tend to make the supply chain more effective and efficient by:

Sourcing directly from the farmers or atleast closer to the farm gate and eliminating the unnecessary intermediaries. This in turn results in better price realization to the farmers.

Overall, farmers are bound to gain from the advent of the organized food retailers under a proper regulatory environment promoting direct procurement on one hand and machinery to prevent the exploitation of farmers on the other hand.

OVERALL BOTTLENECKS IN FOOD PROCESSING INDUSTRY IN INDIA

a) *Inadequate Infrastructure Facilities:*

Even though India ranks second in production of fruits and vegetables, nearly 20 to 25 per cent of this production is lost in spoilage in various stages of harvesting. This clearly shows the problem of inadequate infrastructure, which is the biggest bottleneck in expanding the food processing sector, in terms of both investment and exports. It includes: long and fragmented supply chain,inadequate cold storage and warehousing facilities,road, rail and port infrastructure. Also, lack of modern logistics infrastructure such as logistics parks, integrated cold chain solutions, last mile connectivity, dependence on road over rail, customized transportation, technology adoption (barcoding, RFIDs) and government support via incentivizing private public partnerships are some of the lacunae that exist in supply chain & logistics sector in India.

b) Traditional Processing Technology:

Currently most of the processing in India is manual. There is limited use of technology like pre-cooling facilities for vegetables, controlled atmospheric storage and irradiation facilities. This technology is important for extended storage of fruits and vegetables in making them beneficial for further processing. In case of meat processing, even with the the level of technology used in most of them is limited, resulting in low exploitation of animal population. Introduction of modern technology is necessary to increase process efficiencies as well as quality of the end product.

c) Food Safety Laws & Inconsistency in State and Central policies:

The Indian food regulations comprise various food policies that have been enacted at different points of time, and are under the ambit of various ministries of Government of India (GOI). Historically they were introduced to complement and supplement each other in achieving total food sufficiency, safety and quality. The result is that the food sector in India is governed by a number of different statutes rather than a single comprehensive enactment. This incremental approach has led to incoherence and inconsistency in the food sector regulatory scenario. In addition the multiplicity of ministries and administering authorities at both the central and state level has resulted in a complex regulatory system that is not well integrated adding an additional burden on the food industry.

d) Low Level of Government Outlay for Development of Food Processing Industries

During 11th Plan an Outlay of Rs. 4031.00 crores was envisaged but in last 4 years only Rs. 1132.00 crores have been spent. The vision 2015 envisaged public expenditure of Rs. 10,000 cores by 2015 but the trend so far, is much below the desired level.

e) APMC Act:

While 25 states/UTs have amended their APMC acts; it still discourages direct marketing arrangement between farmer and processer. The processor is required to obtain license from the respective state govt. as well as liable to pay market fees without even using mandi infrastructure.

In addition, some of the states have amended APMC Act but it has not clearly outlined policies on contract farming/direct marketing. Thus, APMC Acts of different states have become a stumbling block for markets seeking to scale up operations.

f) Essential Commodities Act, Stock Order, etc.

The Essential Commodities Act (ECA) 1955 was put in place after independence to control production, supply and distribution of essential agricultural commodities and was put in place to ensure availability of food products. In the current context of liberalizations, controlling the movement of products by licensing of dealers, limits on stocks and control on movements only hamper the growth of the agricultural sector and promotion of food processing industries.

g) Taxes on processed food items

Incidence of taxation in processed agricultural products not only acts as a disincentive for investment in the sector but also affects the competitiveness of the food products in the country. Though primary agricultural commodities including fruits and vegetables are mostly exempted from tax, processed food commodities are subject to variety of taxes. In most of the states, low value added food products are exempted from VAT. However, certain high value added food products like biscuit, confectionery, snack items are levied VAT at the rate of 12.5% in many states.

Apart from VAT, other taxes such as purchase tax, entry tax, octroi, etc are also levied on food products.

h) Lack of Diversification of Product Portfolio and Commercialization

R&D in the food processing sector in the country is largely governed by universities and institutions with very little involvement of industry. The research is also on traditional lines with less emphasis to market preferences. There is a need to involve industry for product development setting up of food development

centers/incubation centers on a regional basis/ in various prominent agro-climatic zones. The current Indian crop production system largely continues to be traditional and subsistence agriculture. As a result crops varieties being grown are not in tune with market and processing requirements.

i) Lack of Quality Standards:

The current legislative requirements have put tremendous emphasis on food hygiene, GMP, HACCP and nutritional labeling in the entire food chain. However, most of the unorganized players in food processing industry do not adhere to quality standards resulting in minimal share in world trade because of the tightening of restrictions and the introduction of the Sanitary and Phytosanitary Agreement by global industry bodies.

j) Lack of Skilled Manpower

At the current levels of operations itself, there is shortage of skilled manpower at various levels. A survey by FICCI on estimating the skill shortage in Indian Industry, estimates that shortage of refrigeration mechanics, electricians and fitters exists to the tune of 65%.In addition, shortage of agricultural scientists exists to the tune of 60% and shortage of food safety professionals exists to the tune of 70%7. There are no specialized institutes for R&D and for imparting specialized skills in bakery and confectionery. Besides CFTRI, there are very few institutions, which provide qualified manpower for food processing sector. There is a pressing need to address the skill gaps.

k) High cost of transportation

The non-availability of climate controlled or reefer containers coupled with the high costs (in most of the cases both side fares are computed due to non-availability of return cargo), temperature abuse in transit capacity issues in terms of handling and distribution of produce, high costs of packaging (the protocol of usage of plastic bins for distribution with cost efficacy is yet to be developed), etc. negate the advantage of low production cost.

STEPS TAKEN BY THE GOVERNMENT TO IMPROVE FOOD PROCESSING INDUSTRY

1. Scheme for Infrastructure Development:

To fulfil the need for creation of integrated and holistic infrastructure for food processing sector, Ministry of Food Processing Industries (MOFPI) had launched new Schemes in 11th FYP with strong focus on creation of modern enabling infrastructure to facilitate growth of food processing and creation of an integrated cold chain mechanism for handling perishable produce.

a) Mega Food Parks Scheme:

The scheme aims to accelerate the growth of food processing industry in the country through facilitating establishment of strong food processing infrastructure backed by an efficient supplychain.

The Mega Food Parks Scheme provides for a capital grant of 50 percent of the project cost in difficult and ITDP notified areas(with a ceiling of Rs 50 crores). The grant shall be utilized towards creation of common infrastructure in CPC and PPCs in the park. Such facilities are expected to complement the processing activities of the units proposed to be set up at the CPC in the Park. Each Mega Food Park may take about 30-36 months to be completed.

Out of 30 Mega Food Parks proposed during the 11th five year plan, the Ministry has taken up 15 projects under the Scheme so far. Of this, Final approval has been accorded to 8 Mega Food Parks in the States of Andhra Pradesh, Punjab, Jharkhand, Assam, West Bengal, Uttarakhand, Tamil Nadu and Karnataka. The cumulative project cost of these 8 Parks is Rs. 930 crore which includes total grant assistance of Rs.500 crore under the Scheme. In-principle approval has been accorded to remaining 7 projects. In addition to these, 15 new Mega Food Parks are in the process of Government approval.

During the 12th Plan following changes have been proposed:

- Considering the size of investments required in a Mega Food Park project, it is considered

A mega food park provides various facilities to food processors, farmers, retailers and exporters, thus help in fast growth of food processing industries. The key benefits to these stake-holders are:

Food Processors	**Farmers**
• Developed plot in the Mega Food Park on lease with Power, Water, and ETP facilities	• Sell produce to collection centres
• Cutting edge processing facilities in CPC	• Benefit from higher pricing
• Reap benefits of power cost, common facilities, testing, government support	• Avail of information regarding seed and other best practices
• Avail of backward and forward linkage benefits	• Improve product quality
• Increase profitability	• Reduce losses through best practices in handling and packing
	• Avail of primary processing facilities, Cold Storages, Ripening Chambers, and Ware houses
Retail Chains	**MNC Exporters**
• Avail of good quality produce	• Avail good quality product from producers
• Avail standardized products	• Be sure of product quality through food chain
• Benefit from quality assurance from testing labs	• Quality assurance provided
• Benefit from good transportation facilities viz reefer trucks and vans	
• Avail of labeling, packing facilities at mega park	
• Satisfy your customer through good product	

essential that promoters of such projects have not only sufficient experience but also requisite financial resources. This is also critical due to nature of investments, as like in any infrastructure project, these projects have a long gestation period with slow returns. Further many projects under implementation have suffered due to lack of trust and coordination among various equity holders. In some cases, such conflicts have even endangered the projects, as various entities seek to have control over the Board of Directors of SPVs. Thus it has been proposed that a business entity may be eligible to promote a SPV for setting up a Mega Food Park project.

- Acquisition of suitable land for the project along with change in land use has been found another major reason for delay thus working group recommended to give larger preference to those proposals which already possess the required land along with necessary permission to use it for a MFP at the time of submission of Expression of Interest itself.
- Further to interact with the principle of "Decentralisation" proposed during the 12th Plan of the Ministry , it is being proposed to provide for greater role of the state governments in both selection and implementation of the Mega Food Park projects.

b) Scheme for Cold Chain, Value Addition and Preservation Infrastructure

The Task Force on Cold Chain set up by the Ministry of Agriculture has identified a huge gap of 9 to 10 million tonnes of cold storage capacity in the country. Ministry of Food Processing Industries through its Scheme for Cold Chain,

Value Addition and Preservation Infrastructure has been successfully addressing the above issue. The Scheme was approved in 2008 with an objective to provide integrated and complete cold chain, value addition and preservation infrastructure facilities without any break, for perishables from the farm gate to the consumer. The assistance under the Scheme includes financial assistance (grant-in-aid) of 50% of the total cost of plant and machinery and technical civil works in General areas and 75% for NE region and difficult areas subject to a maximum of Rs 10 crore.

During the 12th Plan following changes have been proposed:

- The level of assistance would be reviewed to bring parity with the schemes of Department of Agriculture & Cooperation, to the extent feasible. In case required, competitive bidding with standardized projects would be taken up to bring about greater objectivity in the selection process. In addition, the Scheme may make requisite linkages to value addition/processing, as the mandatory requirement under the Scheme, so as to clearly differentiate such projects from those assisted by NHB/NHM.
- The state-wise selection and financial bidding process would also necessitate preparation of Model Projects for various States, along with requisite technical parameters. There would also be involvement of state governments along with agencies such as NHB, NHM and NCDC in the selection and implementation of projects.

c) Scheme for Modernization of Abattoirs

The rise in per capita income in the country has witnessed an increased demand for meat products in recent years. It is to be noted that meat consumption remains a "luxury" for majority of non-vegetarian population in India. However, as the purchasing power of the people rise, there has been a perceptible shift towards meat and poultry consumption.

Unfortunately, the meat sector remains unorganized except buffalo meat processing for export market. This has led to not only continuous upward pressure on meat prices, but also increasing concerns regarding hygiene standards of meat products. Quality and hygiene levels in the meat market continue to be major issues due to unscientific breeding, primitive and crude slaughtering and de-feathering techniques, lack of basic infrastructure facilities including facilities for handling carcass/flaying, cross–contamination in slaughter and improper handling during carriage and transportation. These issues lead to high wastages of meat, contamination and deterioration in quality and also avoidable cruelty to animals during whole process.

Thus during 11th Plan, the Ministry had launched a comprehensive Scheme for Modernization of Abattoirs across the country. The Scheme is mainly aimed at promoting scientific and hygienic slaughtering of animals, by-product utilization and value addition, provision of chilling facility to prevent microbial activity in slaughtered animals and better forward linkage facilities for finished meat and meat products.

The Scheme is to be implemented with the involvement of local bodies (Panchayats and Municipal Corporations) and also has the flexibility for facilitating involvement of private investors through competitive bidding. Professional agencies are also being involved by the Ministry for project appraisals, implementation and monitoring of projects.

2. Schemes for Quality Assurance, Codex, R&D & promotional activities

a) Scheme for Setting up/Upgradation of Quality Control/Food Testing Laboratory

This is aimed at encouraging setting up of modern food testing laboratories in the country, both in public and private sectors. Under this Scheme, Central/State Government organizations and Universities (including deemed Universities) are eligible for grant support limited to the entire cost of capital equipments required for setting up/modernization of laboratories. All other implementing agencies are eligible for grant limited to 50% / 70% of the cost of capital equipment required for setting up/upgradation of such laboratories in general areas/difficult areas.

b) Scheme for Implementation of HACCP, ISO 14000, ISO 22000, GMP and GHP

This is to promote adoption of quality and safety standards by food processing units which would help them in reaching a larger domestic

and international market. Further, this also encourages other implementing agencies to adopt quality management systems. Under this Scheme, grant assistance is provided to Central / State Government Organizations / IITs, Universities and private sector to the extent of 50% / 75% of project cost in general areas / difficult areas with a maximum assistance of Rs. 15 lakh and Rs. 20 lakh respectively.

c) Scheme for Research and Development

This Scheme is aimed at encouraging R&D initiatives in industry in the field of preservation, processing, packaging, storage, etc. Such R&D efforts are expected to lead to product and process development which would make the industry more efficient and commercially sustainable. Under this Scheme, grant assistance is provided to all Universities, IITs, Central / State Government Organizations, R&D Laboratories and CSIR recognized R&D units in private sector. For the Government Organizations, grant support is available to the tune of 100% of the capital cost. For all other implementing agencies, the grant support is available up to 50% / 70% of the capital cost for general areas / difficult areas.

d) Scheme for Promotional Activities

The details of the Scheme for Promotional activities are also provided in the section of this Report dealing with proposed National Mission. This Scheme is to support organizing of industry specific seminars and workshops as also exhibitions and trade fairs. Further this provides support for conducting studies and surveys which would be helpful for the sector. There is no limit envisaged for financial assistance if Ministry is directly engaged as a sponsor / co-sponsor for such activities. However, if other implementing agencies are to take up these activities, the Scheme provides for grant support up to 50% of the cost, with a maximum limit of Rs. 3 lakh in case of seminars / workshops and studies / surveys.

During the 12th Plan following changes have been proposed:

As the Food Safety and Standards Act, 2006 became effective from August, 2011, the need for setting up of adequate food testing labs has increased manifold. It is therefore proposed to create a network of 108 food testing labs in the country which may be of minimum specified standards, though customized to the needs of the local region / industry. The Government agencies / departments setting up / modernizing labs are already provided up to 100% assistance for purchase of requisite equipment. It is now proposed to provide these agencies capital grant support up to 70% / 90% of cost of technical civil work in general areas / difficult areas. Further, for encouraging private sector enterprises also to set up / modernize food labs, it is proposed to increase the quantum of grant assistance up to 70% / 80% of the lab equipment in general areas / difficult areas.

For encouraging adoption of quality and safety standards (HACCP, ISO 22000), the Ministry proposes to make the package of incentives more attractive and in line with increased compliance cost. It is proposed to cover at least 100 units during the 12th Plan under quality and safety standards. To achieve this, it is proposed to increase grant assistance to 60% / 75% of total cost, subject to a maximum of Rs. 25 lakh / Rs. 30 lakh for both Government and private agencies.

A Scheme for Setting up / Strengthening of Codex Cell will be launched during 12th plan. This is aimed at strengthening / setting up of codex cell in the Ministry as well as at the level of stakeholders such as industry associations, national research institutions. This is to enable larger participation in codex deliberations and adequate projection of national view point in codex system. This would include computerization, compilation and maintenance of codex documents, study / survey for scientific data generation, engagement of consultants for preparing discussion / position papers, code of practices, etc.

3. Schemes for Human Resource Development

The Food Processing Industry is critical to India's development as it establishes a vital linkage and synergy between the two pillars of the economy –Industry and Agriculture. Demand for trained manpower, including entrepreneurs, managers, technologists, skilled workers to cater to the growing needs of the food processing industry is increasing day-by-day. Besides latest technology & diversification and

new ways of managing and marketing is required by the existing food processing industry to face global competition. The following scheme has been launched by the government:

a) Creation of Infrastructure Facilities for Running Degree/ Diploma/Certificate Courses in Food Processing Technology

This is to encourage introduction of specialized courses in food processing technology in recognized Colleges/Educational Institutions. Apart from Degree/Diploma courses, certain short duration Certificate courses may also be considered under the Scheme. These courses may be of duration of 3–6 months and initiated preferably through Industrial Training Institutes/Polytechnics. The level of assistance available for creation of requisite infrastructure is proposed to be enhanced from existing Rs. 75 lakh to Rs. 1 crore for each proposal.

b) Entrepreneurship Development Programme (EDP)

This is to promote entrepreneurship in food processing sector. Eligible institutions may be provided assistance of Rs. 2 lakh per EDP during 12th Plan. The Curriculums for such programmes may be standardized with the assistance of NIFTEM to keep them abreast of developments in the food processing industry and till such time the existing curriculum would be continued.

c) Food Processing Training Centre (FPTC)

These Centres are basically meant for development of rural entrepreneurship and transfer of technology for processing of food products by utilising locally grown raw material and providing hands-on experience at such production–cum-training centres. Thus, these Centres would be helpful in promoting entrepreneurship/skill development as well as transfer of technology. The entire outlay for HRD activities during the 12th Plan would now be implemented under NFPM though the Ministry would be directly releasing remaining assistance for projects sanctioned during 11th Plan, for which Rs. 6 crore each for next two years has been provided.

NATIONAL MISSION ON FOOD PROCESSING

Government of India has proposed to launch a National Mission on Food Processing (NMFP) during 12th Plan.

Objectives of the Mission are:

a. To spread the message of significance of food processing for enhancing agricultural productivity and farmers income in the country.

b. To assist the state governments in creating requisite synergy between their agricultural plans and development of food processing sector.

c. To assist the state governments in addressing both institutional and infrastructural gaps along the Value Chains and thus create efficient Supply Chains for agricultural produces.

d. To promote initiatives for skill development, training and entrepreneurship which would meet needs of both post-harvest management and food processing industry.

e. To assist MSMEs in setting up/ modernization of food processing units by providing need based support in terms of capital/technology/skill etc.

f. To assist food processing industry to meet requisite standards in terms of food safety laws and market demand, both domestic and international.

Structure of the Mission

The proposed structure would be a three-tier structure at National, State and District levels.

a) National Level

At the apex level, there would be a Mission Directorate in the Ministry of Food Processing Industries with a Governing Council and an Executive Committee.

A Governing Council would be constituted under the Chairmanship of the Minister of Food Processing Industries and may comprise of Ministers and senior officials from relevant Ministries/Institutions, Industry associations and representatives of select state governments. The Council would be responsible for laying down

priorities of the Mission and making its operational guidelines. It would also have periodical review of progress of the Mission and give its suitable recommendations.

An Executive Committee, on the other hand, would be constituted under the Chairmanship of Secretary of the Ministry, with a Joint Secretary of the Ministry as Member Secretary, and would have representatives from relevant Ministries / Institutions, Industry associations and select state governments to oversee the activities of the Mission and approve State Action Plans. The Committee would ensure smooth functional linkages among various levels and would be the link between Ministry and various state governments.

The Mission Directorate, with a Joint Secretary as Mission Director, would be provided with adequate resources, including manpower, to carry out its responsibilities.

b) State Level

At the State level, too, a similar structure would be provided. Thus, there would be a State Food Processing Mission, which may be guided by a General Body headed by Chief Minister / concerned Minister and comprise of Ministers from relevant Departments / Institutions, Industry Associations, Experts etc. An Executive Committee under Chief Secretary / Development Commissioner / Principal Secretary / Agriculture Production Commissioner / Secretary (Industries) may be set up which would be responsible for implementing the Schemes / programmes of the Mission.

A senior officer, at the level of Director, may be designated as the Mission Director at State level who would be overall responsible for all activities under the Mission. The State level Mission may be required to have dedicated professionals and domain experts who would be supported by NMFP on need basis. Each State would be encouraged to set up a State Vision / Plan Document for the food processing sector.

c) District Level

At the District level, District Industries Centres may be nodal body for planning, implementation and monitoring of various programmes of Mission. In case of the States, with food processing under independent department / directorate, a nodal office may be set up at major food processing clusters to undertake this responsibility. Also, in case of food processing being attached with Department of Agriculture, a suitable agency may be identified at the District level. A district level committee can be formed by the State Government whenever considered necessary. Some mechanism for coordination with other agencies / schemes at District / State level should also be developed.

Thus, all three tiers of the Food Processing Mission would work in close co-ordination with each other and would be guided by the common objective of promoting, processing and value addition to the sector. The requisite administrative and financial support for the above proposed structure may be provided by the Ministry.

The Major Programmes / Schemes to be covered under NMFP during 2012-13 are:

(i) Scheme for Technology Upgradation / Establishment / Modernization of Food Processing Industries.

(ii) Scheme for Cold Chain, Value Addition and Preservation Infrastructure for Non-Horticultural Products.

(iii) Scheme for Human Resource Development (HRD)

- Creation of Infrastructure Facilities for Running Degree / Diploma / Certificate Courses in Food Processing Technology.
- Entrepreneurship Development Programme (EDP)
- Food Processing Training Centre (FPTC)

(iv) Scheme for Promotional Activities

- Organizing Seminar / Workshops
- Conducting Studies / Surveys
- Support to Exhibitions / Fairs
- Advertisement & Publicity

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