Chapter No. 01:

**Introduction.**

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Introduction:

‘Poverty’ and ‘unemployment’ in the rural areas are the two most important challenges. In spite of all the industrial development in the country, agriculture still maintains about 70 percent of the population of the country. It is in the rural areas again where 75 percent of the population of the country lives and they will continue to constitute at least two-thirds of labor force. It is imperative therefore that the rural economy is improved, so the burden of poverty can be lessened and the working population overflowing from the villages can be absorbed in off-farm activities. The rural economy cannot be developed fully by improving only the productivity of agriculture, although this will go a long way in improving the rural economy; however, rural industries, subsidiary activity and food processing industry in particular, are of great importance for a rapid transformation of the rural economy, in India. Nearly 25 percent of the rural labor force is employed in non-agricultural activity. The economic status of this population can also be improved by increasing non-farm activities, particularly rural food processing industries.¹

Rural food processing industries are beneficial to relieve pressure on land, establish linkages between agriculture and industry, increase employment opportunities, improve the economic well-being of rural people by increasing their income, and to prevent migration of rural population to cities, which increases slums. Some of these arguments have also been found acceptable to the policymakers of the country during various planning periods; however, in spite of this intention by the Government, the growth of food processing industries has not been
encouraging. Food processing is where business meets agriculture. This is an area that offers excellent opportunities for entrepreneurs, corporate and modern farmers to set up agri-business and agro-industry. Food processing industry is of enormous significance for India’s development because of the vital linkages and synergies that it promotes between the two pillars of the economy; namely, ‘industry’ and ‘agriculture’. India is the second largest producer of food in the world and has the potential to become a leading producer of food.

Employment generation potential is much higher in the food processing sector than any other sector, i.e., 54,000 persons get direct employment per Rs.100 million of investment in the food sector in comparison to 48,000 in textiles and 25,000 in paper industry. There is also scope for four-fold generation of indirect employment in the ancillary and downstream activity on account of investment in the food sector. Furthermore, 60 percent of the employment generation is in small towns and rural areas. Fast growth in the food processing sector and progressive improvement in value addition is also of great significance for achieving favorable terms of trade for Indian agriculture both in the domestic and overseas markets.

India is the second largest producer of food in the world. Whether it is canned food, processed food, food grains, dairy products, frozen food, fish, meat, poultry, the Indian agro industry has a huge potential, the significance and growth of which will never cease. It ranked second position in the production of fruits and vegetables in the world. India has been recognized as the land
of spices contributing to about 25 percent of the world production. Likewise India is number one milk producing country in the world with an estimated production of 105 million tones in comparison to world production of 693 million tones. About 35 percent milk produced in India is processed.³

**Agro Processing Industry:**

Agro processing could be defined as set of techno-economic activities carried out for conservation and handling of agricultural produce and to make it usable as food, feed, fiber, fuel or industrial raw material. Hence, the scope of the agro-processing industry encompasses all operations from the stage of harvest till the material reaches the end users in the desired form, packaging, quantity, quality and price. Ancient Indian scriptures contain vivid account of the post harvest and processing practices for preservation and processing of agricultural produce for food and medicinal uses. Inadequate attention to the agro-processing sector in the past put both the producer and the consumer at a disadvantage and it also hurt the economy of the Country.

Agro-processing is now regarded as the sunrise sector of the Indian economy in view of its large potential for growth and likely socio-economic impact specifically on employment and income generation. Some estimates suggest that in developed countries, up to 14 per cent of the total work force is engaged in agro-processing sector directly or indirectly. However, in India, only about 3 per cent of the work force finds employment in this sector revealing its underdeveloped state and vast untapped potential for employment. Properly developed, agro-processing sector can make India a major
player at the global level for marketing and supply of processed food, feed and a wide range of other plant and animal products.4

The agro-processing industry in India plays a vital role in the national economic development and has potential to meet the local needs and export requirements. The supporting infrastructure for this industry in terms of electricity supply, through the government funded rural electrification programme, and road and telecommunication network, is well established. There are also well established skills training programmes in manufacturing for rural artisans and users. However, the sector currently faces many challenges emanating from the poor performance of the national economy, uncertainties that exist over access to both local and foreign finances, limited research, limited technical advice, limited marketing information and lack of reliable markets.

Historical Perspective:

Around 500,000 BC Neanderthals discovered fire and noticed that cooked and smoked meat lasted longer than raw meat. French chef Nicolas Apert canned foods in the early 1800s. The United States patented the process in 1815 and began mass-producing tin cans in 1847. In 1861, Louis Pasteur discovered that heating foods before sealing them destroyed harmful microorganisms; this was the process became known as ‘pasteurization’. Freeze-drying techniques were used in the early 1900s in France, followed by the 1920 invention of a deep-freezing method by an American, Clarence Birdseye.5 The mass production of foods through modern processing methods evolved from industrialization, which led to factories and refined machinery, and
breakthrough scientific discoveries in biotechnology. Mass transportation and the invention of refrigeration made it possible to deliver processed foods across continents.

By the middle of the nineteenth century, common agro processing industries included hand pounding units for rice, water power driven flour mills, bullock driven oil ghanies, bullock operated sugarcane crushers, paper making units, spinning wheels and handloom units for weaving. In British India, during the year 1863, a note was written by the Governor of Madras state, Sir William Denison to the government of Madras state for laying greater stress on agriculture and agro processing (Royal Commission, 1928). Based on this, a set of improved machinery was brought from England for demonstration and adoption. It included threshing machines, winnowers, chaff cutters, besides steam ploughs, steam harrows, cultivators, seed drills and horse hoes. The demonstration continued at Saidapet near Madras till 1871 with little outcome.6

Importance of agro-processing sector was first realized and documented after the disastrous famine of Bengal during 1870’s. Report of the Famine Commission, set up by the British Government, in its report submitted in 1880, clearly stated the need for agricultural improvement and improved post harvest infrastructural development specifically, rail network. Need was also felt for incorporating chemical interventions in the agricultural sector and precision farming through agricultural mechanization manned by engineers. The Royal Commission on Agriculture setup by the British Government conducted a detailed study. In its report
published during the year 1928, it called for scientific approach to the sector and stressed for developing rural industries and cooperatives.  

Realizing the importance of the agro-processing sector for rural development as a tool for Poorn Swaraj, Mahatma Gandhi during 1930’s promoted Charkha and balanced nutrition by setting example and writing articles in his famous magazine ‘Harijan’. They promoted self-dependence through Khadi and village industries. The R&D institutions developed by the British for taking care of agricultural and rural industries included: The Imperial Agricultural Research Institute, Pusa; Indian Veterinary Research Institute, Mukteshwar; Dairy Research Institute at Bangalore; Poona Agriculture College; Public Agriculture College, Saidapet (Madras); Sibpur Engineering College (Bengal) etc. Horticultural Research Station was created at Chaubatia (U.P.) in Kumaon Hills for horticultural research including packaging and transportation improvements.

Post independence era in India witnessed rapid growth in agro processing sector specifically during 1980s. It followed the first phase of the Green Revolution that had resulted in increased agricultural production and the need for its post harvest management. The importance of the sector was realized by the business community leading to diversification from grain trading to processing. Lead was given by the rice processing industry, followed closely by wheat milling, paper and pulp industry, milk processing sector, jute industry, sugarcane processing and oils extraction through solvent plants. In some areas like the solvent
extraction industry, the growth in installed processing capacity has been far higher than the supply of the raw materials. However, in other areas like fruits and vegetable processing, the growth has not been encouraging on account of poor demand for processed products by the consumers. In such cases, the industry has also not been able to develop the demand adequately.

**Rural Industries:**

Rural industries comprise all industrial activities that are carried out in the villages. These enterprises can be divided into two categories, namely:

1. **Rural handicraft production and traditional industries:** These have often existed in the villages, and involved household industrial activities that focused on traditional production methods. The tasks were usually accomplished with the use of hands and the application of customary production techniques. Among the type of industries that are more prevalent in the rural areas are gelim (rug) making, carpet weaving, pottery, giveh (light cotton summer shoes/ espadrille) weaving, cloth weaving, mat weaving, blacksmith industries, etc.

2. **Rural manufacturing industries:** These are often set up in areas that have easy access to sources of mineral or agricultural raw materials. The industries are normally engaged in the processing and conversion of such resources into industrial products that can meet the villages'
requirements, and which can also be marketed in nearby regions and urban markets.

The rural workshops and manual industries have not been transformed and have not adopted mechanized operations. What has survived in the villages as industrial activity is the traditional and labor-intensive mode of production, which has had little impact on industrial transformation. Minimal investment has been made for the establishment of manufacturing industries in recent years, and what has been discussed as rural industry refers to these long-standing and customary activities that have appeared naturally and spontaneously. Although the countryside industries have not been integrated in the mainstream manufacturing concerns and have not had a considerable role in revolutionizing the industrial sector, yet, owing to widespread productive endeavors in the villages, such as carpet weaving, these rural operations have contributed greatly to industrial employment.

**Obstacles to the Development of Rural Industries:**

1. Lack of accurate definition of and consensus about rural industries. There are often various concepts and ideas as to what specifically are rural industries, as they comprise a wide spectrum of artistic, hand-made, traditional and small-scale industrial operations.

2. Lack of necessary infrastructure for industrial development in the countryside, such as electricity, water, roads, economic infrastructure and telecommunication facilities.
3. Shortage of private savings in the rural sector and consequently, a dearth of industrial investment resources in the villages.
4. Wide dispersal of villages at provincial and, generally, at national levels.
5. Insufficiency of skilled and literate manpower in the villages.
6. Slow pace of economic development in many provinces, and, consequently, there is a lack of essential support for industrial development of villages in these provinces.
7. Absence of executive agencies that can properly handle the implementation of investment projects at the provincial and village levels.

**Indian Food Processing Industry:**

The Indian food processing sector acts as a valuable link between two core sectors of the economy - *agriculture* and *industry*. Processing gives long shelf life and greater availability to farm produce. Processing also successfully breaks the seasonal cycle of farming by enabling the end-users to have the product round the year whenever and wherever they require with long shelf life. Food processing is considered as a sunrise industry in India with great scope for major growth as a lot of potential is left untapped. Only 2 per cent fruits and vegetables, 35 per cent milk, 21 per cent of meat and 6 per cent of poultry products are only being processed at present. The Indian processed food market is estimated at Rs 4,50,000 crore. The government's Vision 2015 for the food processing industry aims at 10-15 per cent of processing of the farm produce from the present 3 per cent. Imagine the size of the food processing industry if we are able to achieve that growth rate!
Almost 30-35 per cent fruits and vegetables go waste, amounting to more than Rs 50,000 crore, due to lack of post-harvest storage facilities and other infrastructure. The changing lifestyle and food habits driven by fast increasing nucleus families coupled with a hectic working schedule have created a new domestic demand for processed foods. Globalization of the economy together with government incentives has created new opportunities in the export market as well.

Yet India's share in the global food trade is just around 1.5 percent. What are the key constraints that are slowing the growth of the sector and how are they being addressed? What are the various opportunities that the Indian Food Processing Industry provides? What are the trends in the food trade? How are the consumer food habits changing and how does it affect the industry? What are the support initiatives taken by the government and what opportunities do they provide in the value chain beyond just Processing? What is the industry expecting from the government to further the growth? What further can be done to help India reach the very deserving lead position in the global trade?

Food processing industry is of enormous significance for India's development because of the vital linkages and synergies it promotes between the two pillars of our economy, industry and agriculture. Fast growth in the food processing sector and simultaneous improvement in the development of value chain are also of great importance to achieve favorable terms of trade for Indian agriculture both in the domestic and the international markets. The sector however has to go a long way. Even important
is the crucial contribution that an efficient food processing industry could make in the nation's food security for instance the post-harvest losses of selected Fruits and Vegetables are about 25 per cent to 30 per cent in our country. Even marginal reductions in these losses are bound to give us better returns and thereby improve the income level of the farmers. During the last one decade, India moved from a position of scarcity to surplus in Food.

The Food Processing Industry in India is on an assured track of growth and profitability. It is expected to attract phenomenal investment in capital, human, technological and financial areas. The total food production of India is estimated to double in the next ten years. Hence there is an opportunity for large investments in food and food processing technologies, skills and equipment. The major interventions in this context are, for example, Canning, Dairy and Food Processing, Specialty Processing, Packaging, Frozen Food / Refrigeration and Thermo Processing.

Fruits and Vegetables, Fisheries, Milk and Milk Products, Meat and Poultry, Packaged / Convenience Foods, Alcoholic Beverages and Soft Drinks and Grains. Health food and health food supplements are other rapidly rising segments of this industry. The Food Processing Industry sector in India has been accorded high priority by the Government of India, with a number of fiscal relief and incentives, to encourage commercialization and value addition. As per a study conducted by McKinsey and Confederation of Indian Industry, the turnover of the total food market is approximately Rs.2.5 Lakh crores out of which value-added food products comprise Rs.80,000 crores. Since the liberalization, 2000 projects
of over Rs. 53,800 crores have been proposed in various segments of the food and agro-processing industry. Besides this, the Government has also approved proposals for joint ventures, foreign collaboration, industrial licenses and 100 per cent export oriented units envisaging an investment of Rs.19,100 crores during the same period. Out of this, foreign investment is over Rs. 9,100 crores.12

**Global Food Processing Industry:**

The size of global processed food industry is estimated to be valued around US $3.6 trillion and accounts for three-fourth of the global food sales. Despite its large size, only 6 per cent of processed foods are traded across borders compared to 16 per cent of major bulk agricultural commodities. Over 60 per cent of total retail processed food sales in the world are accounted by the U.S, EU and Japan taken together. Japan is the largest food processing market in the Asian region, though India and China are catching up fast and are likely to grow more rapidly.13 Leading meat-importing countries namely Japan and South Korea have a developed processed food industry. One of the most technically advanced food-processing industries globally is Australia as the products produced are of international standards and at comparatively lower prices. Countries in the Sub-Saharan African region, Latin America and parts of Asia continue to be on the lower-end of technology competence in food items. However, Europe, North America, and Japan are on the higher-end of technology, with a sharper shift towards convenience and diet foods.
Promotional Support:

India's strong agricultural base and accelerating economic growth holds a significant potential for the Food Processing Industry that provides a strong link between agriculture and consumers. Government also has accorded a high priority to the sector and has provided many fiscal incentives. An enviable share of the world's agri-produce and diverse agro-climatic regions coupled with changing demographic patterns, food habits and rise in income levels opens up numerous opportunities in the sector. India as a large consumer market and India as a potential sourcing hub to the world. Under the plan scheme for ‘Promotion of Food Processing Industries’, the Ministry provides assistance to Government Departments, Government Undertakings / Organizations, Non-Government Organizations and Industry Associations for organizing exhibitions, workshops, seminars, conferences, symposium with the objective of dissemination of information regarding food processing industries, familiarizing the existing and prospective entrepreneurs with modern techniques of production and packaging, development of market and popularization of products. It also provides assistance for undertaking studies and surveys for assessment of potential for food processing industries on sectoral and regional basis. The scheme also envisages financial assistance for Entrepreneurial Development Programmes.14

Potentials for Food Industry in India:

India accounts for less than 1.5 per cent of international food trade despite being one of the world’s major food producers, which indicates huge potential for both investors and exporters. With
rapid increase in the per capita income and purchasing power along with increased urbanization, improved standards of living, there lies a large untapped opportunity to cater to 1000 million domestic consumers. It is estimated that 300 million upper and middle class consume processed food. With the convenience needs of dual income families, 200 million more consumers are expected to move to processed food by 2015. The market size for the processed foods is thus bound to increase from US $102 billion currently to US $330 billion by 2014-15 assuming a growth of 10 per cent. The share of the value added products in processed foods would almost double from US $44 billion currently to US $88 billion during the same period, growing at the rate of 15 per cent. This presents enormous opportunities for investment in processed food sector.15

Several global food giants and leading Indian industrial enterprises are already making their presence felt in a big way in the sector. Some of them are Nestle India, Cadbury’s India, Kelloggs, Hindustan Unilever, ITC-Agro, Godrej Foods and MTR Foods. It is estimated that the food production in India is likely to grow two-fold in the next ten years. Thus, there is ample of opportunities for investments in food and food-processing technologies, equipments, especially in areas of canning, dairy & food-processing, specialty processing, packaging, frozen food and thermo processing, cold chains and in the area of food retail.

Ministry of food processing in its Vision 2015 document has estimated the size of processed food sector to treble, processing level of perishable to increase from 6 to 20 per cent, value addition to increase from 20 to 35 per cent and India’s share in global food
trade to increase from 1.5 to 3 per cent. The government’s focus towards food processing industry as a priority sector will ensure policies to support investment in this sector and attract more FDI. India with its vast pool of natural resources and growing technical knowledge base has strong comparative advantages over other nations. According to CII estimates, food-processing sector has the potential of attracting US $33 billion of investment in 10 years and generate employment of 9 million person-days. The food-processing sector in India is clearly an attractive sector for investment and offers significant growth potential to investors.  

**Segmentation of Food Processing Sector of India:**

India’s food-processing sector covers fruit and vegetables; meat and poultry; milk and milk products, alcoholic beverages, fisheries, plantation, grain processing and other consumer product groups like confectionery, chocolates and cocoa products, soya-based products, mineral water, high protein foods etc. The most promising sub-sectors includes- soft-drink bottling, confectionery manufacture, fishing, aquaculture, grain-milling and grain-based products, meat and poultry processing, alcoholic beverages, milk processing, tomato paste, fast food, ready-to-eat breakfast cereals, food additives, flavors etc. Health food and health food supplement is another rapidly rising segment of this industry, which is gaining vast popularity amongst the health conscious. The dairy sector has an estimated consumer demand for milk and milk products at Rs 1,400 billion, growing at about 8 per cent p.a. Poultry meat is estimated to have production of 1.8 million tones, growing at a CAGR of 11 per cent. Besides, ready-to-eat industry, still nascent in India, is estimated to be about Rs 5 billion growing at 30 per cent
p.a. and expected to cross Rs. 15 billion by 2015. The wine sector is growing at about 50 per cent p.a. is expected to have a market size of Rs 20 billion.17

Table No. 1.01:
Major Segments in the Food Processing Industry

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Segment</th>
<th>% share</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Good Grain Milling</td>
<td>34</td>
</tr>
<tr>
<td>2</td>
<td>Bread and Bakery</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Dairy Products</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>Meat &amp; Poultry Processing</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>Aerated water / soft drink</td>
<td>9</td>
</tr>
<tr>
<td>6</td>
<td>Fish Processing</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Fruit and vegetable processing</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Alcoholic beverages</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total %</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Annual Survey of Industry (ASI), 2012.

Graph No. 1.01:
Major Segments in the Food Processing Industry

% share

- Good Grain Milling
- Bread and Backery
- Dairy Products
- Meat & Poultry Processing
- Aerated water / soft drink
- Fish Processing
- Fruit and vegetable processing

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The major segments in the Food Processing sector comprise of Fruits and Vegetables, Dairy, Edible Oils, Meat and Poultry, Non-alcoholic beverages, Grain-based products, Marine products, Sugar and sugar-based products, Alcoholic beverages, Pulses, Aerated beverages, Malted beverages, Spices, and Salt. Out of these segments, Dairy (16%), Grain-based Products (34%), Baker-based products (20%), and fish and meat products (14%) contribute to a major portion of industry revenues, apart from the manufacture of beverages.

Category of Food Processing Sector in India:

1. **Fruits and Vegetables:** Horticultural crops in India are currently grown on 12 million hectares representing 7 per cent of the country’s total cropped area. Annual horticultural production is estimated at 100 million metric tonnes, which is over 18 per cent of India’s gross agricultural output. India is the third largest producer of fruits after Brazil and the United States, while its vegetable production is exceeded only by China. Mango, Banana, Citrus fruits, Guava and Apple account for 75–80 per cent of fruit production. Vegetable production was 65 m tonnes in the same period. India’s share of world trade in this sector is still around one per cent. India’s major exports are fruit pulp, pickles, chutneys, canned fruits and vegetables, concentrated pulps and juices, dehydrated vegetables and frozen fruits and vegetables.

2. **Meat and Poultry:** India has the world’s largest livestock population, accounting for 50 per cent of buffaloes and 1/6th of the goat population. Such a large population represents a
challenge to retain existing productivity traits by application of modern science and technology. Rigorous efforts are being made to improve the condition of livestock by providing basic infrastructure and latest technology. Meat processing is the new thrust sector for Indian industry with many processing centers being set up with advanced technology. Animals render extremely useful service in out-transport system and agriculture. India needs technical cooperation to build up organized facilities for rearing meat producing animals, proper storage and refrigerated transport system. India ranks fifth in the world in egg production with a yield of 1.61 million tonnes a year. Yet the per capita availability is low. Now, with changing food habits and increasing availability of eggs, the demand is increasing and growing at 10 per cent a year. Egg production has grown during the last 30 years at an annual average of 16 per cent, while that of broilers, by 27 per cent. During this period, Indian poultry industry made spectacular progress transforming itself from backyard farming to a dynamic and sophisticated agri-based industry.

3. *Milk and Milk Products:* India has the largest livestock population with milch cows and buffaloes being its main constituent. India is the world’s largest milk producer (72 million tonnes annually) and the dairy industry has been recognized the world over as its most successful development programme. While world milk production fell by 2 per cent in the last three years, the Indian production galloped by 4 per cent. While consumption of liquid milk accounts for 46 per cent of the total production, the rest is converted into milk products. Of this, the
share of the organized sector is less than 10 per cent. The products manufactured by the organized sector are ghee, butter, cheese, ice creams, milk powders, malted milk food, condensed milk, infant foods, etc. The products also include casein, lactose and dairy whiteners.

4. **Consumer Products:** This comprises product groups like confectionery, chocolates, cocoa products, soya-based products, ready-to-eat foods, mineral water, high protein foods etc. Soft drinks enjoy the biggest share in this. The Indian soft drinks’ market is worth Rs.22,000 million a year. Cola, orange and lemon are some of the accepted tastes in India. It is estimated that 65 per cent prefer non-carbonated drinks. Lemon drinks continue to be very popular in the country. India produces a large range of cocoa and non-cocoa based confectionery items, besides other cocoa-based products. The production of confectioneries, except chocolates, is reserved for the small-scale sector. However, there are several large companies with an established market presence and brands in cocoa and non-cocoa confectionery markets. Confectionery output grew at a compound rate of 6 to 7 per cent in recent years. Chocolate production is growing at the rate of 10 to 15 per cent a year. Among the ready-to-eat products, the installed capacity in the organised sector is 33,400 tonnes for manufacture of pasta products like noodles, macaroni, vermicelli, etc. Besides, there are 10 units with an annual capacity of 9,340 tonnes for corn flakes, oat flakes and pearl barley.
5. **Alcoholic Beverages:** Liquor made in India is categorized as beer, country liquor and Indian Made Foreign Liquor. Country liquor is made from a variety of raw materials and has different names in different parts of the country. IMFL production comprises wine, vodka, whisky, gin, rum, brandy, etc. Pre-mixed drinks like gin and lime, rum and cola are being introduced in India now. Draught beer is another recent introduction and has done well where introduced. Canned beer is also a recent introduction. There are 36 breweries with a licensed capacity of 160 million liters per annum. Current production is over 300 million liters. In all, Rs. 11,000 million including Rs. 7,000 million of foreign investment, has been made in this sector in the last six years.

6. **Fisheries and Sea Food:** India boasts of the seventh largest marine landing base in the world with an extensive 7,500 km coastline and an Exclusive Economic Zone (EEZ) of 2 million sq km, largely untapped, and a 29,000 km stretch of rivers and canals, 145 million hectares of reservoirs and 0.75 million hectares of tanks and ponds. Though India’s fish potential from the EEZ has been estimated at 3.9 million tonnes, the harvest is only of 2.87 million tonnes. This can be increased to 3.37 million tonnes by intense tapping in offshore and deep-sea grounds using modern technology. There is also a good scope to improve fish harvest from inland waters which, at present is 2.7 million tonnes. Besides, the fish potential in aquaculture and shrimp farming has also largely remained untapped. Though, traditionally, only local fishermen have tapped the vast marine and inland water resources to meet domestic demand, the
organized corporate sector has become involved in preservation and export of coastal fish since the last decade. Marine fish found in India include prawns, shrimps, tuna, cuttlefish, squids, octopus, red snappers, ribbon fish, mackerel, lobsters, cat fish and countless other varieties.

7. **Grain Processing:** The country’s current food grain production (*including rice, jowar, bajra, maize, ragi, wheat, barley, gram and pulses*) has been put at 225 million tonnes a year. Food processing industries play a crucial role in reducing post-harvest losses. Since most operations of this industry are rural based, it has the potential to generate high employment at low investment. Promotion of food processing also helps in energy conservation by reducing energy wastages in home cooking. Grain processing, with a share of 40 per cent, is the biggest component of the food sector. Its basic feature is predominance of the primary processing sector, sharing 96 per cent of the total value, with the secondary and tertiary sectors adding about 4 per cent. This area needs to be viewed as a high growth potential area. Indian Basmati rice commands a premium in the international market. The export of Basmati and non-Basmati rice has been steadily increasing.

8. **Plantation:** Tea, coffee, cashew, cocoa, etc. are the country’s major plantation crops, which are grown in different parts for they require specific agro-climatic conditions. India’s principal plantation crops account for around 5 to 6 per cent of the country’s aggregate export earnings. Production and domestic consumption of major plantation crops have increased
considerably during the last three decades. India continues to be the world’s largest producer, consumer and exporter of black tea. Cashew is also an important crop and earns foreign exchange worth Rs.16,000 million. India is the world’s leading producer and exporter of cashew kernels (75,000 tonnes annually) and shares 31 per cent of the world’s production of raw cashew and nearly 48 per cent of the world’s cashew kernel export. Coffee is the oldest plantation crop of India.

The kind of units, which have included:

- **Fruit and Vegetable** – Beverages, Juices, Concentrates, Pulps, Slices, Frozen & Dehydrated products, Wine, Potato wafers/chips etc.
- **Fisheries** – Frozen and canned products mainly in fresh form
- **Meat and Poultry** – Frozen and packed mainly in fresh form, egg powder.
- **Milk and Dairy** – Whole milk powder, Skimmed milk powder, Condensed milk, Ice cream, Butter and Ghee.
- **Grain and Cereals** – Flour, Bakeries, Biscuits, Starch, Glucose, Cornflakes, Malted foods, Vermicelli, Pasta foods, Beer and Malt extracts, Grain-based Alcohol.
- **Consumer Industry** – Chocolates, Confectionary, Soft/Aerated Beverages.

Food Safety:

One of the most important reasons for analyzing foods from both the consumers and the manufacturers' standpoint is to ensure that they are safe. It would be economically disastrous, as well as
being rather unpleasant to consumers, if a food manufacturer sold a product that was harmful or toxic. A food may be considered to be unsafe because it contains harmful micro-organisms, toxic chemicals or extraneous matter. It is therefore important that food manufacturers do everything they can to ensure that these harmful substances are not present, or that they are effectively eliminated before the food is consumed. This can be achieved by good manufacturing practice, regulations specified by the government for specific food products and by having analytical techniques that are capable of detecting harmful substances. In many situations it is important to use analytical techniques that have a high sensitivity, i.e., that can reliably detect low levels of harmful material. Food manufacturers and government laboratories routinely analyze food products to ensure that they do not contain harmful substances and that the food production facility is operating correctly.

**Agro-based Industries in Maharashtra:**

There are many agro-based industries in the Maharashtra. Sugarcane, cotton, tobacco and oilseeds are important. The state of Maharashtra is highly industrialized; still agriculture continues to be the main occupation of the rural people. The major crops grown in the state include rice, Jowar, Bajra, wheat, pulses, cotton, sugarcane, several oil seeds including sunflower, groundnut and soybean, turmeric, onions and other vegetables. Maharashtra is also famous for its fruit production. The major fruits produced in the state are: mangoes, bananas, grapes and oranges. Nagpur and Nashik are the major producers of fruits. Sugarcane, Cotton, Chillies, Tobacco, Banana are cash crops in Maharashtra. The
Sugar industry in Maharashtra is widely popular in the cooperative sector since farmers possess a share in the sugar factories. Maharashtra has witnessed an outstanding growth in its sugar industry. Sugarcane is one of the chief crops among all other crops manufactured in Maharashtra.¹⁸

**Challenges for the Indian Food Processing Industry:**

Food-processing industry is facing constraints like non-availability of adequate infrastructural facilities, lack of adequate quality control & testing infrastructure, inefficient supply chain, seasonality of raw material, high inventory carrying cost, high taxation, high packaging cost, affordability and cultural preference of fresh food. Unprocessed foods are prone to spoilage by biochemical processes, microbial attack and infestation. Good processing techniques, packaging, transportation and storage can play an important role in reducing spoilage and extending shelf life. The challenge is to retain the nutritional value, aroma, flavour and texture of foods, and presenting them in near natural form with added conveniences. Processed foods need to be offered to the consumer in hygienic and attractive packaging, and at low incremental costs. Major Challenges for the Indian Food Processing Industry are:¹⁹

- **Inadequate Infrastructure Facilities:** The inadequate support infrastructure which is the biggest bottleneck in expanding the food processing sector, in terms of both investment and exports 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 and government support via incentivizing private public partnerships are some of the lacunae that exist in supply chain and logistics sector in India.

- **Absence of Comprehensive national level policy on food processing sector:** The food processing sector is governed by statues rather than a single comprehensive policy on food processing. India urgently needs a national food processing policy which incorporates tax breaks for the sector. The policy to be effective will have to be comprehensive and adopt a number of legislative, administrative and promotional measures. The policy should evolve through detailed discussions between all the stakeholders.

- **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. 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 lead 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.

- **Lack of adequate trained manpower:** Many positive developments in the food processing sector have also resulted in the apprehension about the emerging skill shortages due to mismatch between the demand for specific skills and available supply. In fact, of late, shortage of skilled, semi-skilled and unskilled workers has emerged as a critical factor impacting the competitiveness of Indian food industry.

Indian food industry is gradually making an important mark in the global food arena as a large producer and exporter of agro food products. At present small players dominate the Indian food processing industry. The other challenges are-

- Consumer education on nutritional facts of processed foods.
- Low price-elasticity for processed food products.
- Need for distribution network and cold chain.
- Backward-forward integration from farm to consumers.
- Development of marketing channels.
- Development of linkages between industry, government and institutions.
- Taxation in line with other nations.
- Streamlining of food laws.

**Food Processing Industry – Sunrise Sector in India:**

The liberalization of the Indian economy and world trade and rising consumer prosperity has thrown up new opportunities for diversification in the food-processing sector and opened new vistas
for growth. Food processing industry in India is increasingly seen as a potential source for driving the rural economy as it brings about synergy between the consumer, industry and agriculture. A well developed food processing industry is expected to increase farm gate prices, reduce wastages, ensure value addition, promote crop diversification, generate employment opportunities as well as export earnings. This sector is also capable of addressing critical issues of food security and providing wholesome, nutritious food to our people. Food Processing has emerged as the sunrise sector in India, having huge growth potential and opportunities that are still untapped. In order to facilitate and exploit the growth potential of the sector, the government on its part has initiated extensive reforms. Some of the key measures undertaken by the Government include: amendment of the Agriculture Produce Marketing Committee Act, rationalization of food laws, implementation of the National Horticulture mission etc.²⁰

This industry ranks fifth in the country and employs 16 lakh workers, comprising 19 per cent of the country’s industrial labour force. It accounts for 14 per cent of the total industry output with 5.5 per cent of the GDP. Its turnover is estimated at Rs.1,44,000 crore, of which Rs.1,11,200 crore is in the unorganized sector.²¹ The industry has started producing many new items like ready-to-eat food, beverages, processed and frozen fruit and vegetable products, marine and meat products, IQF products, etc. The Indian consumer is being fast introduced to newer high quality food products made by using the latest state-of-the-art technology that is also giving the industry a competitive edge. The government has also outlined a plan to address the low scale of processing activity in the country by
setting up the mega food parks, with integrated facilities for procurement, processing, storage and transport. The recent budget has announced several policy measures, especially for the cold chain infrastructure, to encourage private sector activity across the entire value chain.

Table No. 1.02:
Status of Food Processing Industry in India.

<table>
<thead>
<tr>
<th>Sr.</th>
<th>Particulars</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rank of Industry</td>
<td>5th</td>
</tr>
<tr>
<td>2</td>
<td>Employment in Lakh</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>% of Total industrial labour force</td>
<td>19</td>
</tr>
<tr>
<td>4</td>
<td>Total industrial output in %</td>
<td>14</td>
</tr>
<tr>
<td>5</td>
<td>Output as % of GDP</td>
<td>5.5</td>
</tr>
<tr>
<td>6</td>
<td>Estimated Turnover</td>
<td>1,44,000 (Crores)</td>
</tr>
<tr>
<td>7</td>
<td>Unorganized Sector</td>
<td>1,11,200 (Crores)</td>
</tr>
</tbody>
</table>


Chart No. 1.01: Scope for Food Processing Sector in India:
Research and Development:

In recent years, there have been significant changes in the preferences of consumers for foods that are healthier, higher quality, lower cost and more exotic. Individual food manufacturers must respond rapidly to these changes in order to remain competitive within the food industry. To meet these demands food manufacturers often employ a number of scientists whose primary objective is to carry out research that will lead to the development of new products, the improvement of existing products and the reduction of manufacturing costs. Many scientists working in research laboratories and large food companies carry out basic research. Experiments are designed to provide information that leads to a better understanding of the role that different ingredients and processing operations play in determining the overall properties of foods. Research is mainly directed towards investigating the structure and interaction of food ingredients, and how they are affected by changes in environment, such as temperature, pressure and mechanical agitation. Basic research tends to be carried out on simple model systems with well-defined compositions and properties, rather than real foods with complex compositions and structures, so that the researchers can focus on particular aspects of the system.

Scientists working for food companies or ingredient suppliers usually carry out product development. Food Scientists working in this area use their knowledge of food ingredients and processing operations to improve the properties of existing products or to develop new products. In practice, there is a great deal of overlap between basic research and product development, with the basic
researchers providing information that can be used by the product
developers to rationally optimize food composition and properties.
In both fundamental research and product development analytical
techniques are needed to characterize the overall properties of
foods to ascertain the role that each ingredient plays in determining
the overall properties of foods, and to determine how the properties
of foods are affected by various processing conditions e.g., storage,
heating, mixing, freezing.

Entrepreneurship Development in Food Processing Industries:

Economic growth is largely the outcome of entrepreneurial
initiative. Entrepreneurs exploit opportunities, convert ideas into
viable business proposition, provide new products and services to
the society by bringing together and combining various factors of
production, and help alter life style of the people. Entrepreneurs
are seen as creators of businesses, which in turn, produce income
and output and generate employment. As Adam Smith wrote in his
Theory of Moral Sentiments, it is the urge of an entrepreneur to
make profit and accumulate capital, which “first prompted men to
cultivate the ground, to build houses, to found cities and
commonwealths and to invent all the sciences and arts which
ennoble and embellish human life”. In India the small enterprises
occupy a particularly significant position in the country’s socio-
economic space. They have significant contribution to the gross
turn-over of the manufacturing sector, and high potential for
exports. Small enterprises in India account for around 95 per cent
of manufacturing units, nearly 40 per cent of industrial production
and 40 per cent of exports. On account of their high labour
intensity, these entities have positive income distribution implications. The sector provides employment to around 60 million persons, making it the second largest avenue of employment after agriculture.

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