



Food Processing

NABARD's Vision

Development Bank of the Nation for fostering rural prosperity

NABARD's Mission

Promote sustainable and equitable agriculture and rural development through participative financial and non-financial interventions, innovations, technology and institutional development for securing prosperity

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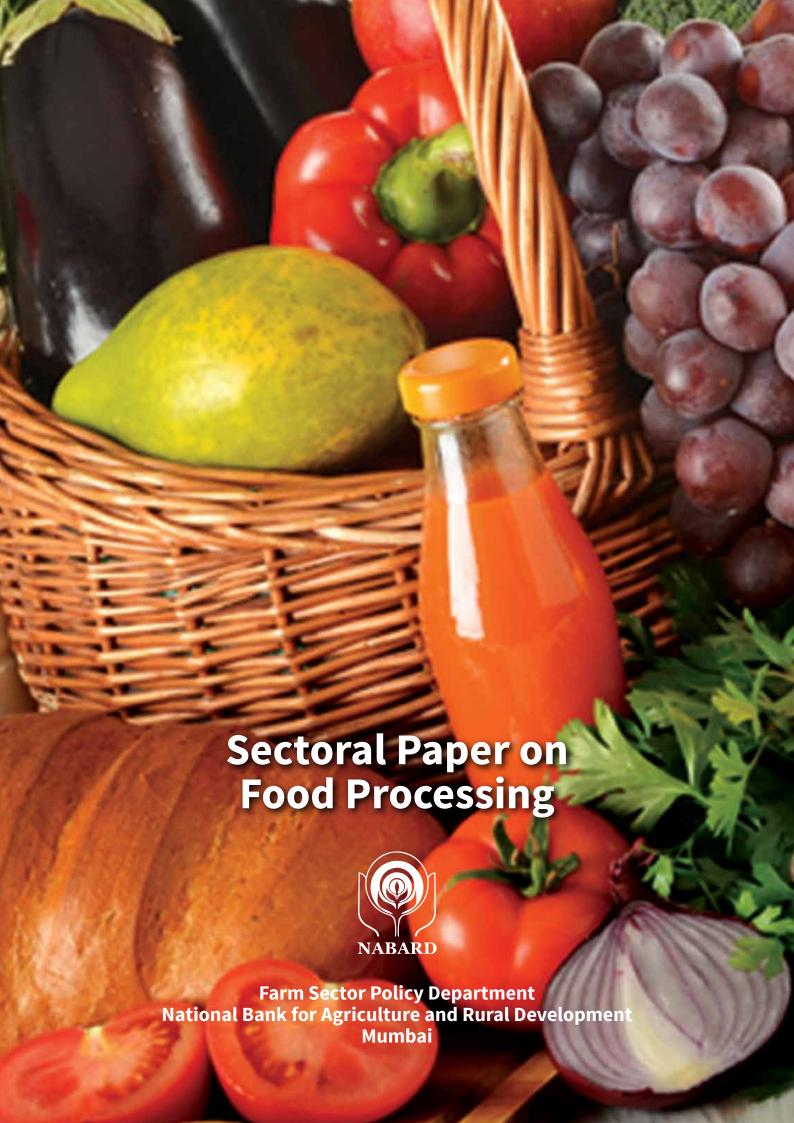
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Foreword

Food processing industry has been accorded high priority by Government of India (GoI) and NABARD. It is in this context, Government of India (GOI) has approved a new Central Sector Scheme − Pradhan Mantri Kisan SAMPADA Yojana (Scheme for Agro-Marine Processing and Development of Agro-Processing Clusters) with an allocation of ₹ 6,000 crores for the period 2016-20 coterminous with the 14th Finance Commission cycle. The scheme envisages creation of mega food parks, agro processing clusters, integrated cold chain infrastructure and expansion of food processing capacity in the country. The scheme is poised to reduce wastage of perishable produce, create gainful employment and also ensure food security of growing population. There are 42 mega food parks located in 24 States sanctioned by Ministry of Food Processing Industry, GoI, which are in different stages of implementation. The GoI has also approved 238 cold chain projects, of which 120 are completed. There are number of fiscal incentives offered to investors under food processing sector including permission for 100 per cent Foreign Direct Investment (FDI) through automated route. Various State Governments have their own food processing policies and offer various incentives to this sector.

In order to provide affordable credit to the Designated Food Parks including Mega Food Parks and establishment of food processing units therein, a food processing fund was created by GoI in NABARD during 2014-15, involving an initial corpus of ₹ 2000 crore. NABARD has sanctioned 16 projects in 13 States with a fund commitment of ₹ 602.43 crore and disbursed ₹ 275.28 crore which when becomes operational would improve the common processing infrastructure and reduce the post-harvest losses. NABARD also supports the sector under Rural Infrastructure Development Fund (RIDF), National Infrastructure Development Fund (NIDA) and Warehouse Infrastructure Fund (WIF). All these initiatives of GoI and NABARD are likely to create significant impact in the food processing sector.

Indian food processing industry is one of the largest and ranks 5th in terms of production, consumption and export. The industry provides employment to large number of people and also helps in containing inflation. The country has a huge domestic market for food products and potential for export to various countries. There is good potential to further this growth, if some of the bottlenecks are removed by following effective strategies. This document prepared by NABARD is an attempt to collate available information on the sector into a status paper on food processing.

I, personally, congratulate Central Technical Advisory Group (CTAG) team, NABARD for bringing out this document on Food Processing Sector covering programme and policies of Government of India, roles of various stakeholders, problems and constraints faced by the sector and strategies to promote food processing industries. I hope readers will make best use of this document and get inclined towards this sector.

Harsh Kumar Bhanwala

Chairman National Bank for Agriculture and Rural Development Mumbai August 2018



Message

Food processing industry forms an important segment of the Indian economy in terms of contribution to GDP, employment and investment, and is a major driver in the country's growth in the near future. Food processing operations includes many methods that are used to add value to the raw food materials (including marine products, poultry and meat) which can be consumed by human beings or animals. Raw food materials are transformed into edible products by processing and value addition. The operations involved in food processing are mainly classified into two groups, viz., primary processing and secondary processing. This provides employments to rural people including women and prevents capital drain from rural to urban areas and thereby helps in narrowing down the economic disparity between rural & urban population. This is also one of the focus sectors under Make in India initiative of Hon'ble Prime Minister of India. Indian Food Processing Sector has already emerged prominently on the global manufacturing map. There has been a constant inflow of new technologies and investments into the sector. As per CII estimates, the sector has the potential to attract USD 33 billion Foreign Direct Investment (FDI) in the next 10 years. The Food Processing Sector has witnessed the growth rate of nearly 20% in the past few years.

To meet the current demand of food materials, the industrial food processing sector has emerged. The food processing sector in the country is mainly handled by the unorganized sectors. About, 42% of the output comes from the unorganized sector which is dominated by small scale industries, 25% comes from the organized sector and the rest of it comes from the small scale players. The small-scale food processing sector is a major source of employment and adds value to crops by processing. It is a major source of food in the human diet.

The small-scale food processing sector is, however, under increasing threat and competition from the large manufacturers who, through economies of scale and better presentation and marketing. Good packaging lies at the very heart of presentation and thus customer appeal. It is an area of vital importance for small and medium food manufacturers if they are going to continue to compete and expand. With food processing, it is possible to maintain a nutritious and safe food supply for the millions of people that inhabit both urban and rural areas. Improvement in processing efficiency, by increased yield of usable product, is a tangible means of reducing food loss and increasing food supply. Demand for increased convenience of food preparation in the home, institution and restaurant has created a need from processing industries for food ingredients as well as new food forms.

NABARD, being an apex development bank of our country, has extended financial support to eligible financing institutions for various agro and food activities and also administering Food Processing Fund (FPF) to provide affordable credit for designated food parks and processing units therein. The sectoral paper has also brought out various issues that needs to be addressed to realise the full potential of the agro and food processing sector.

H.R. Dave

Deputy Managing Director National Bank for Agriculture and Rural Development Mumbai August 2018



Contents

1	Introduction	01
2	Overall Industry Status	03
3	Sub-sector Analysis	05
4	Govt. Policy	14
5	Agencies involved in Food Processing / Export / R&D	16
6	Credit to Food Processing Industries	18
7	Technological Development and Investment Opportunities	21
8	Major Gol Schemes and Initiatives	23
9	Quality Control & Regulatory Environment	27
10	SWOT Analysis of Food–Processing Industry	30
11	Issues and Challenges	32
12	Policy Interventions / Suggested Action Plan	34
13	Financial support from NABARD	36











The Indian food industry is poised for huge growth, increasing its contribution to world food trade every year. In India, the food sector has emerged as a high-growth and high-profit sector due to its immense potential for value addition, particularly within the food processing industry.

According to the data provided by the Department of Industrial Policies and Promotion (DIPP), the food processing sector in India has received around USD 7.47 billion worth of foreign direct investments (FDIs) during the period April 2000 -December 2016. The sector has the potential to $attract\,even\,a\,higher\,number\,of\,FDIs\,in\,the\,coming$ years. India is the second largest producer of food in the world after China. It has the potential to become food basket for world, considering the scope and increasing demand for food processing.

The organised food processing sector employs more than 17.74 lakh people (2013-14). As per NSSO 67th round, unorganised food processing sector provides employment to 47.9 lakh people. Therefore, the sector as a whole provides employment opportunities to more than 65 lakh people, which is likely to reach 9 million by 2024. The unorganised sector accounts for 42% of India's Food Processing Industry. The strength of the sector lies in the fact that India is the leading producer in a number of commodities like cereals, banana, mango, chillies, ginger, milk, meat, etc. The country is also the second largest producer of fruits & vegetables after China, third largest in marine landing and fifth in poultry production in the world. However, the major cause of concern always lies in poor post-harvest management infrastructure facilities. The post-harvest wastage has been estimated to the tune of ₹92,651 crore per annum.

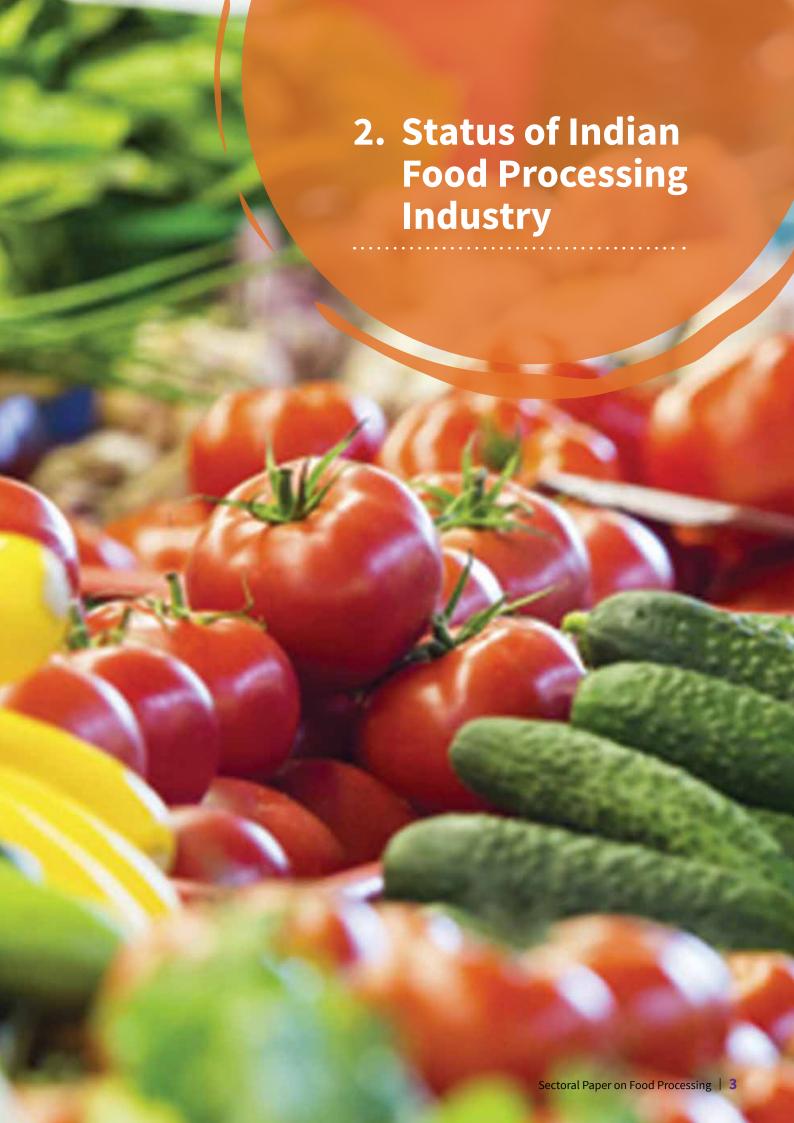
Accounting for about 32% of the country's total food market, the Government of India has been instrumental in the growth and development of the food processing industry. The government, through the Ministry of Food Processing Industries (MoFPI), is making all efforts to encourage investments in the food business. It has approved proposals for joint ventures, foreign collaborations, industrial licenses, and 100% export oriented units. Also, the allocation to food processing ministry has been doubled to ₹ 1400 crore during 2018-19.

In spite of huge success that India has achieved in agricultural production, the post-production wastage levels are unduly high, resulting in wastage of about of ₹ 440 billion worth of fruits, vegetables and grains every year. According to ICAR-CIPHET study on post-harvest losses of major agricultural and horticultural crops as well as livestock products, the losses in selected fruits were found to be in the range of 6.70% -15.88%, the losses in vegetables varied from 4.58%-12.44%, losses in inland and marine fisheries were estimated to be 5.23% and 10.52% respectively. The assessed loss in milk sector was only 0.92%, whereas the losses in meat and poultry sectors were 2.71% and 6.74% respectively. India has a strong raw material base but it has been unable to tap the real potential for processing (overall processing level of perishables is only 8%). This paper is an attempt to take stock of the situation and identify the areas of concerns, possible investment opportunities and possible suggestions for future. The status of agriculture production and post-harvest losses is given in the Table 1.

Table 1: Production and post-harvest losses in major sub-sectors of agriculture

Sub-Sector	Export of quantity (₹ In crore)	Production (2016-17)	Level of Processing (% of production)	Post-harvest Losses (%)
Food Grains	19783.60	275.11 MT	NA	4.65-5.99
Fruits & Vegetables	9410.81	287 MT	2.20	Fruits – 6.70-15.88 Vegetables – 4.58-12.44
Milk	1196.19	165.4 MT	35.00	0.92
Meat	29813.00	7.4 MT	21.00	2.71
Poultry	60.00	Meat – 3.46 MT, Eggs – 88.14 billion no.	6.00	Meat - 6.74 Egg - 7.19
Fish	37870.00	11.40 MT	8.00	Marine - 10.52 Inland – 5.23

(Source – Department of Agriculture Cooperation and Farmers Welfare & APEDA – 2017-18)



The Indian food and grocery market is the world's sixth largest, with retail contributing 70% of the sales. It accounts for 32% of the country's total food market, one of the largest industries in India and is ranked fifth in terms of production, consumption, export and expected growth. It contributes around 8.80 and 8.39% of Gross Value Added (GVA) in manufacturing and agriculture respectively, 13% of India's exports and 6% of total industrial investment. The Indian gourmet food market is currently valued at US\$ 1.3 billion and is growing at a compounded annual growth rate (CAGR) of 20%. India's organic food market is expected to increase by three times by 2020.











Food processing is a link between agriculture and manufacturing sector. Therefore, it helps in assured supply of safe and healthy food at affordable prices across the population. Food processing industry in India comprises of different sub-sectors, such as food grain processing, fruit and vegetable products, milk and milk products, meat and poultry products, etc. A brief status of these sub-sectors is discussed below.

3.1 Grain Processing

After independence, the country has not only been able to reach self-sufficiency in food production but also been able to produce surplus food. The production of food grains has increased from 213.2 MT in 2003-04 to 275.11 MT in 2016-17. All food grains need one or other form of processing before consumption. Therefore, food processing industry plays a critical role in making food edible.

The 2nd advance estimates for production of major crops for 2017-18 of Gol suggest record aggregate food grains production in 2017-18 (Table 2). The record highs are on account of near normal rainfall during monsoon 2017 and various policy initiatives of the Government.

Amongst the food grains, crops like rice, coarse cereals, maize, pulses, green gram and black gram is expected to witness record high production level in 2017-18.

Total oilseeds production in the country during 2017-18 is estimated at 29.88 MT, which is lower by 1.39 MT than the production of 31.28 MT during 2016-17. However, the production of oilseeds during 2017-18 is marginally higher by 0.34 MT than the average oilseeds production.

Each type of cereal requires a specific postharvest treatment, however, there are certain general principles that apply to most of them. Cereals undergo a number of processing stages between harvest and consumption. This chain of processes is often referred to as the total post-harvest system. The post-harvest system can be split into three distinct areas. The first is the preparation of harvested grain for storage. The second, which is referred to as primary processing, involves further treatment of the grain to clean it, remove the husk or reduce the size. The products from primary processing are still not consumable. The third stage (secondary processing) transforms the grains into edible products. Primary processing involves several different processes, designed to clean, sort and remove the inedible fractions from the grains. Primary processing of cereals includes cleaning, grading, hulling, milling, pounding, grinding, tempering, parboiling, soaking, drying, sieving. Secondary processing of cereals (or 'adding value' to cereals) is the utilisation of the primary products (whole grains, flakes or flour) to make more interesting products and add variety to the diet. Secondary processing of cereals includes processes like fermentation, baking, puffing, flaking, frying, extrusion, etc.

Table 2. Production of food grains and oilseeds during 2017-18 (2nd Advance **Estimates**)

Particulars	Estimated Production 2017-18 (m tonnes)	Production in 2016-17 (m tonnes)	Average Production in last 5 years (m tonnes)	% yoy increase / decrease
Food grains	277.49	275.11	260.18	0.9%
Rice	111.01	109.7	106.29	1.2%
Wheat	97.11	98.51	93.34	-1.4%
Coarse Cereals	45.42	43.77	41.7	3.8%
Pulses	23.95	23.13	18.85	3.5%
Oilseeds	29.88	31.28	29.54	-4.5%

(Source - Department of Agriculture Cooperation and Farmers Welfare)



Puffing: Puffed grains are often used as breakfast cereals or as snack food. During puffing, grains are exposed to a very high steam pressure which causes the grain to burst open. The puffed grains can be further processed by toasting, coating or mixing with other ingredients.

Flaking: Flaked cereals are partially cooked and can be used as quick-cooking or ready to eat foods. The grains are softened by partially cooking in steam. They are then pressed or rolled into flakes which are dried. The flakes are eaten crisp and should have a moisture content of below 7%.

Fermentation: Doughs made from cereal flour can be fermented to make a range of products.

Baking: Doughs and batters made from cereal flours are baked to produce a range of goods.

Extrusion: Extrusion involves heating and forcing food (usually a dough) through a small hole to make strands or other shapes. The extruded shapes then undergo further processing such as frying, boiling or drying. Extruded products include pastas, noodles, snack foods and breakfast cereals.

3.2 Horticultural products

Over the last decade, the area under horticulture grew by about 3% per annum and annual production increased by 5.4%. The record horticulture production during 2017-18 outstripped even the food grains production (estimated at 276 MT in 2016-17). As per MoFPI, 76% of fruits and vegetables fresh in India and only 2% of fruits and 4% of vegetables are processed. The remaining 20 to 22% go as postharvest wastage between farms to fork.

Vegetables are less acidic than fruits and food poisoning bacteria are able to grow in many vegetable products. Some types of bacteria produce poisons in the food without signs of spoilage and consumers may be unaware of the contamination and eat the poisoned food. It is, therefore, especially important that vegetable processors carefully follow the correct processing methods and pay strict attention to hygiene and sanitation to reduce the risk of harming their customers.





Because fresh fruits and vegetables are both bulky and spoil rapidly, it is better to locate a processing unit in the area where they are grown. This reduces transport costs and also reduces the amount of handling Too much handling bruises them and they will spoil quickly. Processed fruit and vegetable products are likely to be sold in different markets and there is less reason to locate the unit near to customers (in contrast to bakeries for example). An ideal site is close to a fruit and vegetable growing area and near to a main road leading to an urban centre.

After harvesting, fruits and vegetables still undergo active biological processes, such as respiration, ripening (fruits) and senescence. In some fruits and vegetables, these activities cause significant changes in the quality so the post-harvest storage conditions and processing steps need to be carefully conducted to prevent these changes. For example, the level of sugar in potatoes increases up to 5-10 times the original sugar concentration at harvest if they are stored below 10 °C after harvesting. The high sugar content in these potatoes can cause Maillard browning reactions during further processing steps, especially during drying and frying. In ripe sweet corn, the opposite reaction is of concern. During storage, the level of sugars decreases and starch is produced, causing losses in flavour and texture.

Minimal processing: Many fresh fruits and vegetables are minimally processed to keep them fresh, prevent quality loss, and prolong shelf life. The shelf life of minimally processed fruits and vegetables is at least 4-7 days at 5 °C. Commercial minimally processed products are ready-to-eat, pre-peeled, sliced, grated, or shredded fruits and vegetables, such as pre-cut lettuce, grated carrot, shredded Chinese cabbage for salad mixes, etc. Minimal processing of fresh fruits and vegetables includes strict hygiene and good manufacturing practices, careful cleaning and washing before and after peeling, mild

additives in washing, gentle peeling, cutting, slicing, or shredding, and a low temperature (usually below 5 °C) during processing. In the production of minimally processed fruits and vegetables, packaging is an important factor that helps prolong their shelf life. Modifiedatmosphere packaging is one of the packaging methods used to reduce the respiration activity of the produce since it balances the levels of CO₂ and concentration of O₂ (generally at 2–5% for both gases) inside the package by using appropriate permeable packaging materials and/or a specific gas mixture in the package.

Products that have high demand

Fried Products: Starchy fruits such as banana can be fried and eaten as snack foods. Heat destroys enzymes and micro-organisms and moisture is removed which prevents re-contamination. When products are packed in moisture-proof, light-proof and air-tight containers, they can have a shelf life of several weeks or months. The main cause of spoilage is rancidity of frying oil that remains on the product.

Dried fruits and vegetables: Dried fruits, vegetables, herbs and spices are low-volume, high-value foods that can be profitable for small-scale processors, if there is sufficient demand. Drying preserves fruits and vegetables because it removes most of the water needed by enzymes and micro-organisms to spoil them. However, drying can also cause unacceptable changes to the colour, flavour and texture if the drying conditions are not properly controlled.

Juices, squashes, cordials and wines: Juice can be extracted from fruits in a number of ways, depending on the hardness of the raw material. Soft fruits such as berries or tomatoes can be pressed in a fruit press, or pulped using a juicer attachment to a food processor Preservation is





The quality criteria for jams and marmalades are decisively determined by the flavour, colour and consistency as well as state of preservation and distribution of fruits. These properties depend to a high degree on the raw materials used, with special importance given to the proper selection of suitable fruits. 3.3 Milk and milk products India continues to be the largest producer of

due to pasteurisation and the natural acidity of the juice. Some types of juice (e.g. melon juice) have low levels of acid and this can be increased by adding citric acid to give a pH below 3.5-4.0. Although some producers add a preservative, such as sodium benzoate, to ensure a long shelf life, this is not necessary if juice is properly processed. Unopened bottles should have a shelf life of 3-9 months, depending on the storage conditions and quality of the package. Juice production can be spread over a larger part of the year by processing a sequence of fruits or by part-processing pulps and storing them in 1000-2000 ppm sodium meta-bisulphite solution. The sulphur dioxide is driven off during pasteurisation. Squashes are made from fruit juice mixed with sugar syrup. Cordials are crystal-clear squashes. The process involves producing juice, which is then filtered through fine cloth, or special juice filters to make it crystal-clear for cordials. A 50-60% solution of filtered sugar syrup is heated to 90 °C and mixed in the correct proportion with the juice. Adding hot sugar syrup to juice reduces the time that the juice is heated and the colour and flavour are better preserved.

Wines

Wines are produced by fermentation of fruit juice or pulp by varieties of the yeast Saccharomyces cerevisiae, named 'wine yeasts'. Sugars in the juice, together with added sugar, are converted into alcohol and carbon dioxide. During fermentation, it is important to keep air out of the vessel to enable the yeast to produce alcohol and to prevent contamination by bacteria and moulds. Wines are preserved by their natural acidity and raised levels of alcohol (8-13%).

Jam, Jellies and Marmalades

Cooking jams, jellies and marmalades using fruits, sugar, pectin and edible acids is one of the oldest food preserving processes known to mankind and presents a way of making food stable by increasing the content in soluble solids.

milk in the world. The total milk production was 165.4 MT during 2016-17, with per capita availability of 355 grams per day. Among milk products, ice cream is one of the major processed products with an estimated market size of ₹ 4000 crore growing at 15% year on year growth. The packaged milk market in India is to the tune of 450 LLPD, which is worth ₹ 55000 crore per annum. Milk powder, flavoured milk, curd, butter, cheese, etc. are other potential milk products manufactured in India.





Recent trends in Milk Processing: Freshly drawn raw milk has its own anti-microbial defence mechanism. i.e. lactoferrin. lactoperoxidase, lysozyme, and possibly N-acetyl-ß-D-glucosaminidase (NAGase). But this anti-microbial defence mechanism of milk is temporary, which with time gets weaker, making milk prone to microbial spoilages. Conventionally, milk processing is done by heating of the milk to certain temperature for fixed duration of time, which causes significant reduction in microbial population. Various levels of thermal treatments are practiced for processing milk based on the thermal harshness of treatments, i.e. thermization, pasteurization and sterilization. Thermal processing has been widely adopted as the treated product is recognized safe for consumption with longer storage life. But with advancement of understanding, particularly in the domain "Dairy Science", some undesirable changes are reported during heating of milk, such as, browning, development of a cooked flavour, loss of nutrients, inactivation of bacterial inhibitors and impairment of rennet ability, etc. Therefore, the need of non-thermal processing was realized and its practical applicability in milk processing was considered as an alternative to conventional heat treatment. The term non-thermal processing is a novel concept of processing which is limited not only to milk but also to other food products. Non-thermal food processing targets elimination of microorganisms or any other biological entities without causing significant rise in temperature, which prevents chain of undesirable reactions in foods.

Some widely acceptable non-thermal processes and their applications in milk processing are discussed in brief below.

High pressure processing (HPP): HPP is the method of deactivating microorganisms by the application of high pressure for milk preservation. Generally, HPP for food processing refers to the application of pressure range between 100 and 1200 mega Pascal (MPa).

Pulsed electric field (PEF): This non-thermal method of processing involves flowing of short pulses of high electric field through fluid or semi-fluid foods, which causes break down of microbial cell membrane, causing cell rupture and eventual microbial cell death.



Microfiltration (MF): The MF may be used to reduce the microbial load in liquid milk and increase the shelf life without any changes in its composition and sensorial qualities. Using modified membrane structures, microbial load can be reduced significantly without affecting the milk composition.

Ultraviolet light (UV): The UV light radiation used for food processing has wavelength varying from 100 to 400 nm. Raw milk has UV radiation absorption coefficient of 290 cm-1 at 253.7 nm wave length of UV radiation.

Cold plasma: This is an emerging technology which was earlier used in the field of biomedical devices, textiles and water sterilization. Recently this cold plasma technology is finding its applicability in food preservation due to its capacity of decontaminating microorganisms. Plasma is defined as 4th stage of matter, which is in electrically charged or ionised form, but without any fixed shape or volume.

3.4 Meat and poultry products

The livestock sector of India is one of the largest in the world and accounts for 11.6% of the global livestock population and stands second in cattle & goat population and third in sheep world over. Animal Husbandry, Dairy and Fisheries sector is the key driver of economy in terms of contribution to GDP and employment. Total meat production stood at 7.4 MT in 2016-17. Meat processing capacity in India is estimated at 1 million tonne per annum, of which only 40-50% is utilised. Meat is one of the major products exported from the country and 70% of buffalo meat is exported from the country. Poultry is a key contributor to India's livestock sector and the industry accounts for around 3.5% of agriculture GDP, growing at 8-10% per annum. India produces 88.14 billion eggs and 3.46 MT of broiler meat annually. Therefore,





there is good potential for this sector to grow. Frozen meat and poultry products are gaining popularity due to their hygienic nature.

Meat consumption in developing countries has been continuously increasing from a modest average annual per capita consumption of 10 kg in the 1960s to 26 kg in 2000 and will reach 37 kg around the year 2030, according to FAO projections. This forecast suggests that in a few decades, developing countries' consumption of meat will move towards that of developed countries where meat consumption remains stagnant at a high level.

The rising demand for meat in developing countries is mainly a consequence of the fast progression of urbanization and the tendency among city dwellers to spend more on food than the lower income earning rural population. It is generally accepted that balanced diets of meat and plant food are most effective for human nutrition.

The greater demand for meat output will be met by a further shift away from pastoral systems to intensive livestock production systems. As these systems cannot be expanded indefinitely due to limited feed availability and for environmental reasons, other measures must be taken to meet growing meat demand. The only possible alternatives are making better use of the meat resources available and reducing waste of edible livestock parts to a minimum. This is where meat processing plays a prominent role. It fully utilizes meat resources, including nearly all edible livestock parts for human food consumption. Meat processing, also known as further processing of meat, is the manufacture of meat products from muscle meat, animal fat and certain non-meat additives. Additives are used to enhance product flavour and appearance. They can also be used to increase product volume. For specific meat preparations, animal by-products such as internal organs, skin or blood, are also well suited for meat processing.

Meat processing can create different types of product composition that maximizes the use of edible livestock parts and are tasty, attractive and nourishing.

The advantage of meat processing is the integration of certain animal tissues (muscle trimmings, bone scraps, skin parts or certain internal organs which are usually not sold in fresh meat marketing) into the food chain as valuable protein-rich ingredients. Animal blood, for instance, is unfortunately often wasted in developing countries largely due to the absence of hygienic collection and processing methods and also because of socio-cultural restrictions that do not allow consumption of products made of blood. While half of the blood volume of a slaughtered animal remains in the carcass tissues and is eaten with the meat and internal organs, the other half recovered from bleeding represents 5-8% of the protein yield of a slaughter animal. In the future, we cannot afford to waste such large amounts of animal protein. Meat processing offers a suitable way to integrate whole blood or separated blood fractions (known as blood plasma) into human diets.

Meat processing technology

Meat processing technologies were developed particularly in Europe and Asia. The European technologies obviously were more successful, as they were disseminated and adopted to a considerable extent in other regions of the world - by way of their main creations of burger patties, frankfurter-type sausages and cooked ham. The traditional Asian products, many of them of the fermented type, are still popular in their countries of origin. But Western-style products have gained the upper hand and achieved a higher market share than those traditional products. In Asia and Africa, there are a number of countries where meat is very popular but the majority of consumers reject processed meat products. This is not because they dislike them but because of socio-cultural reasons that prohibit the consumption of certain livestock species, either pork or beef, depending on the region. Because processed products are mostly composed of finely comminute meat which makes identifying the animal species rather difficult, or are frequently produced from mixes of meat from different animals, consumers stay away from those products to avoid eating the wrong thing. But, when the demand for meat increases and a regular and cost-effective supply can only be achieved by fully using all edible livestock parts, consumers will need to adjust to processed meat products, at least to those where the animal source can be identified. Younger people already like to eat fast-food products such as beef burgers or beef frankfurters. Outlet chains for such products and other processed meat products will follow when the demand increases.

3.5 Marine Products

Indian fisheries and aquaculture is an important sector of food production, providing nutritional security to the food basket, contributing to the agricultural exports and engaging about 14 million people in different activities. With diverse resources ranging from deep seas to lakes in the mountains and more than 10% of the global biodiversity in terms of fish and shellfish species, the country has shown continuous and sustained increments in fish production since independence. India has the largest coastline with good potential for marine products. India produces 11.40 MT of fish. Riding on a robust demand for its frozen shrimp and frozen fish in international markets, India exported 11.35 lakh MT of seafood worth an all-time high of US\$ 5.78 billion (₹ 37, 870 crore) in 2016-17 with USA and South East Asia continuing to be the major importers while the demand from the European Union grew substantially during the period. Frozen shrimp maintained its position as the top item of export, accounting for 38.28% in quantity and 64.50% of the total earnings in dollar terms. Shrimp exports increased by 16.21% in terms of quantity and 20.33% in dollar terms. Frozen fish was the second largest export item, accounting for a share of 26.15% in quantity and 11.64% in dollar earnings, registering a growth of 26.92% in terms of value.



3.6 Consumer food products (RTE, packaged foods, packaged drinking water, alcoholic and nonalcoholic beverages)

The combined food and beverages service market is worth ₹ 2.04 lakh crore, growing at CAGR of 23-24%. The fastest growing consumer foods include packaged foods, aerated soft drinks, packaged drinking water and alcoholic beverages. According to CRISIL Research estimates, the market size of the consumer foods industry in India is ₹ 780 billion in 2012-13. It is believed that this industry will continue to grow at a healthy pace over the medium term, driven by a number of macroeconomic, demographic and social factors.

Quick Service Restaurants (QSR) and casual dining are the two most popular formats that form 45% and 32% of the overall market, respectively. Brands/ chains of both Indian and MNC brands are still less penetrated and there exists a large opportunity in this space to create bigger restaurant chains. People in the young category are the most likely to eat out around 58% of the people eating out are in the age group of 18-30 years. This is the segment with the maximum disposable income and in the demographic pyramid, the largest segment within India.

Growth in investments in the Food and Beverages services sector: A large number of foreign brands have entered India over the last 15 years - with McDonald's, Pizza Hut, Dominos, Subway, KFC, Starbucks, Dunkin Donuts among the successful ones. In the initial stages, foreign brands were more concerned about Master Franchise concepts and were not







open to investment exposure in the country. With the success of many restaurant chains and the Indian entrepreneurs wanting to balance risks, newer investment led models have been explored including complete ownership and JVs. Foreign brand owners are now exploring how they can be part of the investments in India and reap a better return on investment in the bargain. A case in point has been the success of Dominos in India as a franchise unit and its valuation which at one point was much higher than that of the foreign brand owner. Besides direct investments by foreign brands, there will also be large scale investments in the value chain - from kitchen equipment, cold chain, to development of a vibrant processed foods market in India

Success story: Dominos India:

Jubilant Food Works Limited is a Jubilant Bhartia Group company. It was incorporated in 1995 and initiated operations in 1996. The company got listed on the Indian bourses in February 2010. The company and its subsidiary operate Dominos Pizza brand with the exclusive rights for India, Nepal, Bangladesh and Sri Lanka. The company is the market leader in the organised pizza market in India with a 67% market share. Domino's Pizza India operates 772 restaurants located in 28 states and Union Territories, covering 158 cities across the country.

The challenge: In 2005, Dominos was facing huge losses financially. Business was highly cost focused, key divisions like quality and HR were operating as one or two men teams and focus on supply chain and operations was lacking. They had also opened as many as 40 new stores at a frenzied pace and lacked the capability to run them effectively and efficiently.

The solution: They started by incentivising employees by offering them employee stock ownership plans (ESOPs). They also made major changes to their entire supply chain and logistics network. They launched an IPO in 2011 which was oversubscribed by 311%. Dominos also altered its products to suit Indian tastes with the introduction of localised toppings like "Peppy Paneer" and "Chicken Chettinad," and it was also one of the first fast food chains in India to spread its wings into the mini-metros and tier II & III locations. What works for the company is that it has been successful in establishing a strong brand recall with the "30 minutes" delivery proposition.

Result: The company is the market leader in the organised pizza market with a 67% share in the pizza home delivery segment in India. In 2011, Jubilant was valued at par with the US brand owner, Dominos. Dominos India is the second largest member firm of the chain after Dominos USA.







- 100% FDI is permitted under the automatic route in food processing industries
- 100% FDI is allowed through Government Approval route for trading (including e-commerce) in respect of food products manufactured in India
- 100% FDI is allowed for companies undertaking Single Brand Retail Trading in India (49% under Automatic route and approval route for beyond 49%)
- Up to 51% FDI is permitted under approval route for Multi Brand Retail Trading with a condition that the minimum amount to be brought-in as FDI would be USD 100 million and 50% of this amount to be invested in back-end infrastructure.
- The foreign capital invested in India is generally allowed to be repatriated after payment of taxes due, except in cases where the sectoral or other conditions specifically mentions non-repatriation. The repatriation is governed by the Foreign Exchange Management (Current Account Transaction) Rules, 2000, as amended from time to time.

4.2 Other enabling support for investment

- Government of India facilitates the investment in the food processing sector through a number of incentives announced from time to time. The major incentives are as under: Income tax relief under sections 80 IB. 35 AD and 10 AA of Income Tax Act.1961
- Exemption of Goods and Services Tax for 45 categories of food products and a lower rate of 5% for 49 categories of food products
- GST for food processing machinery ranges from 5% (machines for cleaning, sorting or grading, seed, grain or dried leguminous vegetables; machinery used in milling industry or for the working of cereals or dried leguminous vegetables other than farm type machinery and parts thereof), 12% (dairy machinery, milking machines), 18% (machinery for the industrial preparation or manufacture of food or drink, other than machinery for the extraction or preparation of animal or fixed vegetable fats or oils) to 28% (freezers and refrigerating equipment, etc.)



4.3 National Food Processing Policy

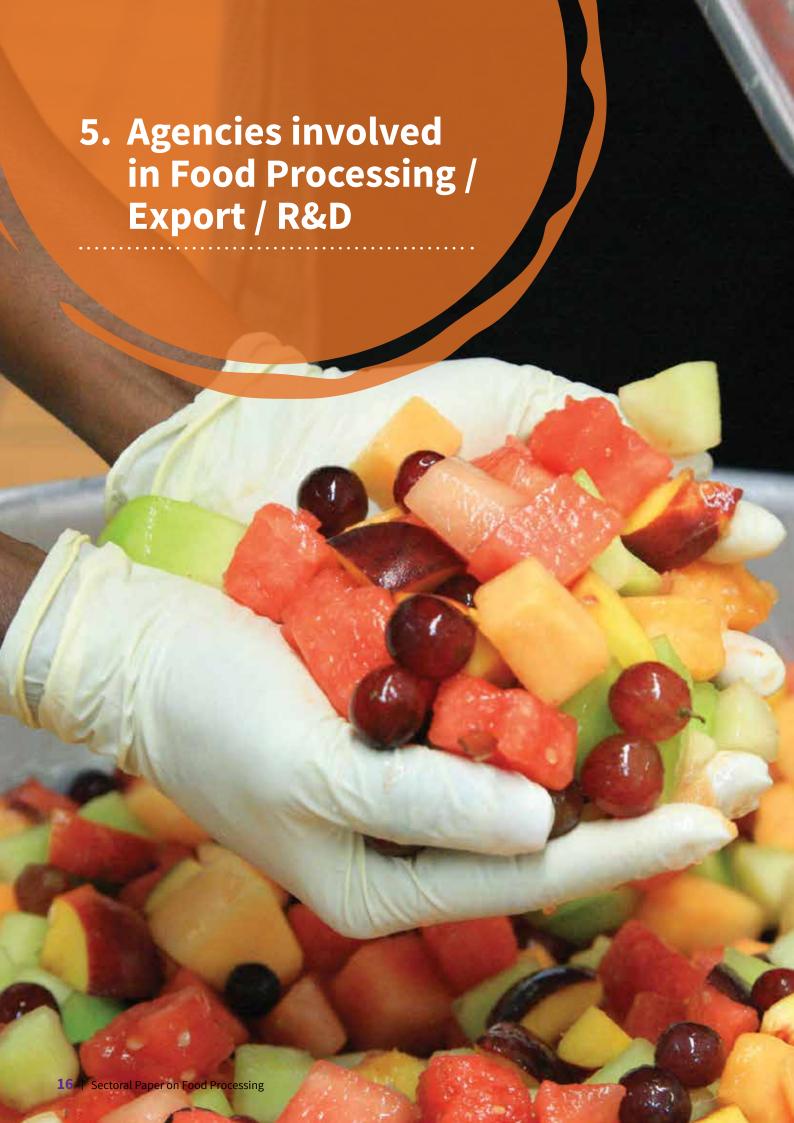
The objective of policy is to reduce wastage, increase value addition, ensure better prices of farmers while ensuring availability and quality produce to consumers. The major highlights of policy is given below:

- Single window clearance system
- Promote fruit processing clusters
- Strengthen agriculture marketing infrastructure
- Facilitation of land allotment
- Promote mage food parks/food parks
- Support development logistic infrastructure
- Compliance with food safety regulatory requirements
- Support to business units having established backward integration

4.4 Role of mega Food Park and their linkages with FPOs in promotion of food processing sector

To successful deal with a range of challenges that confront farmers today, especially the constraint imposed by the small size of holdings of small and marginal farmers, member based Farmers Producers Organisations (FPOs) offer a pathway to access financial and non-financial inputs and services and appropriate technologies, reduce transaction so as cost, tap high value markets and enter into partnerships with private entities or more equitable terms.

The scheme of mega food park aim to create modern infrastructure of food processing and to provide a mechanism to bring together farmers, processors and retailers and link agriculture production to the market so as to ensure maximising value addition, minimising wastage, increasing farmers' income and creating employment opportunity especially rural areas. Government has operationalized 42 mega food parks for setting up in the country.





There are a number of organisations working exclusively on food related aspects and a list of major organisations is given as under:

In addition, all State Agriculture Universities, private universities and private colleges also undertake R&D and offer courses / training under food processing, food science & technology and food engineering.



Policy Formulation

Ministry of Food Processing Industries MoFPI State Nodal Agencies

Food Safety

Food Safety and Standards Authority of India (FSSAI) Export Inspection Council

Promotion and Development

Agriculture and Processed Food Products Export Development Authority (APEDA)

Marine Products Export Development Authority (MPEDA) Commodity Boards under the Ministry of Commerce and the Ministry Agriculture/Food Processing; Coffee, Tea, Spice, Grape processing, Meat and poultry processing, dairy development, etc. Federation of Indian Chambers of Commerce and Industry (FICCI) / Confederation of Indian Industry (CII)

Teaching, Research **Extension & Consultancy** Central Food Technology Research Institute (CFTRI), Mysore, Karnataka

National Institute for Food Technology and Entrepreneurship Management (NIFTEM), Kundli, Haryana

Central Institute of Crop Processing Technology, Thanjavur, Tamilnadu

Division of Food Science and Technology, IARI, New Delhi Indian Veterinary Research Institute, Bareilly, UP

National Dairy Research Institute, Karnal, Haryana

Association of Industry And Food Scientists

All India Food Processors Association (AIFPA)

Association of Food Scientists and Technologist of India (AFSTI)







6.1 RBI Guidelines for Loans to **Food Industries**

RBI has included the loans for post-harvest management and food and agro processing industries under the priority sector lending with the details as under:

6.1.1 Agriculture

Farm Credit: Loans for pre-harvest and postharvest activities, viz. spraying, weeding, harvesting, sorting, grading and transporting of their own farm produce.

Agriculture Infrastructure: Loans for construction of storage facilities (warehouse, market yards, godowns and silos), including cold storage units / cold storage chains designed to store agricultural produce/products, irrespective of their location.

Ancillary Activities: Loans to food and agro processing up to an aggregate sanctioned limit of ₹ 100 crore per borrower from the banking system.

6.1.2 Micro, Small & Medium Enterprises (MSMEs)

Loans for food and agro processing are classified under Micro and Small Enterprises, provided the units satisfy investments criteria prescribed for Micro and Small Enterprises, as provided in MSMED Act, 2006.

6.1.3 Export Credit

Export credit, which includes pre-shipment and post-shipment credit, up to a specified limit as prescribed under the extant RBI guidelines on Priority Sector Lending (Targets & Classification) is covered under the Priority Sector Lending.

6.2 Credit Outstanding

RBI disseminate the data relating to sectoral deployment of credit on a monthly basis with the data collected from select 46 scheduled commercial banks and accounts for about 95% of the total non-food credit deployed by all scheduled commercial banks. The status of credit to food manufacturing and processing industries for the last five years is as under:

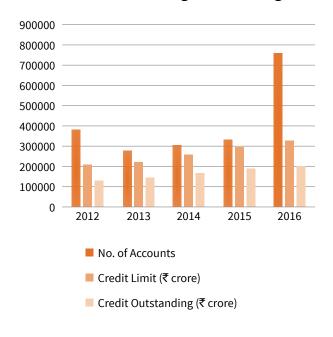
During the past five years from 2011 to 2016, the credit limit to the food processing Sector has grown at an average annual growth rate of 14.59%. With this growth rate, the projected credit limit for the year 2025 would be around ₹11.34 lakh crore.

Besides the credit offered by the banks in India, the food processing industry also benefits from the equity infusion through the Private Equity / Venture Capital investments. The total investments in the sector through PE / VC is steadily growing from USD 9500 million in 2012 to USD 17000 million in 2015 (MoFPI, CII & KPMG, 2017).

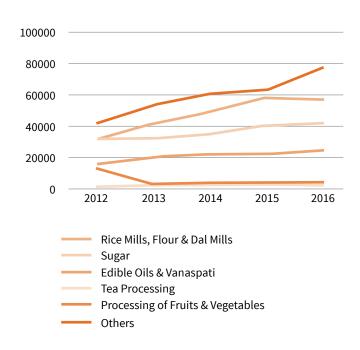
(₹ crore)

S. No	Year	Credit Outstanding
1	2012	135964
2	2013	151677
3	2014	173545
4	2015	191683
5	2016	209170

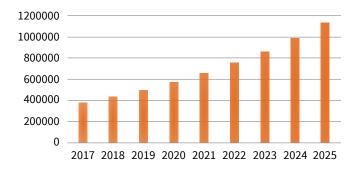
Food Manufacturing & Processing



Food Manufacturing & Processing-Credit Outstanding (₹ Crore)



Credit Limit Projection (₹ crore)





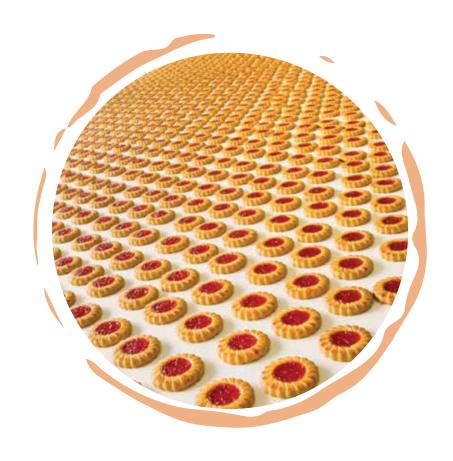


7.1 Established Activities

The following segments / areas of food processing industry are well established in India with number of registered and unregistered units. However, considering significantly high level of post-harvest losses of various agricultural produce, low level of value addition and processing and growing demand for the high value products, there is ample scope for investments in these areas.

7.2 Emerging technologies in **Food Processing / Food Preservation**

The following are the emerging technologies in food processing / preservation which have great scope for future commercial applications in the food processing industry. However, some of the technologies mentioned hereunder (e.g. individual quick freezing (IQF), aseptic packaging, canning, controlled atmosphere storages, ripening chambers, etc.) are already being established in India commercially and are gaining momentum as the modern technologies in food processing / preservation.



S. No	Segments	Potential areas for funding
1	Grains & Pulses	Rice mill, dal mill, flour mill, bakeries, starch & starch products, corn / wheat flakes, fermented products, malted foods, grain based alcohol, etc.
2	Fruits & Vegetables	Juices, concentrates, pulp, slices, jams, jellies, purees, frozen and dehydrated products, etc.
3	Dairy products	Liquid milk, whole milk powder, skimmed milk powder, condensed milk, ice cream, butter, ghee, cheese and indigenous milk products (<i>Rasogolla</i> , <i>Gulab jamun</i> , <i>Shrikhand</i> etc.)
4	Marine products	Fresh, frozen, dried and canned products.
5	Meat & Poultry	Fresh meat, chilled, frozen and packed meat, value added meat products (Sausages, ham, bacon, nuggets etc.), egg & egg products etc.
6	Oils & Fats	Edible oils, spice oils and oleoresins, lard, margarine, etc.
7	Consumer Products	Snack food, biscuits, ready-to- eat (RTE) food, extrusion cooked products, non-alcoholic beverages, etc.
8	Animal Feed	Poultry, cattle feed and pet food.

S. No.	Segment	Emerging areas for future investment
1	Food Preservation / Storage	Controlled atmosphere storages, Precooling units, ripening chambers, silos.
2	Food Processing	Aseptic pulping, UHT processing, individual quick freezing, minimal processing, irradiation, high pressure processing, pulsed electric field processing, high intensity pulsed light processing, application of ultrasound / microwave / ozone in food processing, membrane processing, ohmic heating, radio frequency processing, infrared heating, designer foods (functional & nutraceuticals, etc.), application of nano-technology, etc.
3	Food Packaging	Aseptic packaging, intelligent or smart packaging, edible / water soluble packaging, modified atmospheric packaging, vacuum packaging, application of radio frequency identification (RFID) system and nano-technology in food packaging, etc.
4	Food safety / Quality certification	FSSA / HACCP / ISO 22000 / ISO 14000 etc.







There are a number of central sector and centrally sponsored schemes operating for promotion of cold chain, agri marketing infrastructure and food processing industries. The details are discussed in this section.

8.1 Central Sector Schemes

8.1.1 Pradhan Mantri Kisan SAMPADA Yojana

Government of India has approved a new Central Sector scheme - PM Kisan SAMPADA (Scheme for Agro Marine Processing and Development of Agro Processing Clusters) with an outlay of ₹6000 crore for the period 2016-20 co-terminus with the 14th Finance Commission cycle. The scheme will implemented by Ministry of Food Processing Industries, GoI New Delhi. SAMPADA is the comprehensive package aimed at creation of modern infrastructure from farm gate to retail outlet. The scheme consists of the following sub-schemes:

- Mega Food Parks
- Integrated cold chain and preservation infrastructure
- Creation/expansion of food processing and preservation capacities
- Infrastructure for agro processing clusters
- Creation of backward and forward linkages
- Food safety and quality assurance infrastructure
- Human resources and institutions

The details are available in link http://mofpi. nic.in/sites/default/files/important_noticesampada-19.05.2017_0.pdf

8.1.2 Mission for Integrated Development of Horticulture (MIDH)

MIDH has been launched by Ministry of Agriculture, GoI by subsuming various existing schemes such as National Horticulture Mission

(NHM), Horticulture Mission for North East & Himalayan States (HMNEH), National Bamboo Mission (NBM), National Horticulture Board (NHB), Coconut Development Board (CDB) & Central Institute for Horticulture (CIH). The subsidy for postharvest management and cold chain projects implemented through NHM and NHB are also part of the MIDH. Details of the scheme can be obtained from the link http:// www.midh.gov.in/PDF/MIDH_GL(E).pdf

8.2 Centrally Sponsored Schemes

National Food Security Mission (NFSM) - Gol of India enacted Food Security Act with a right to every targeted beneficiary belonging to eligible targeted public distribution system to receive 5 kilogram of food grains at subsidised price. The scheme is implemented through State Government and required investment in post- harvest management, especially warehousing and transport logistics. Details of NFSM for 2017-18 can be obtained from the link http://nfsm.gov.in/Circulars_ Notifications/2016-17/ActionPlan2017_18.pdf



8.3 Other Initiatives

8.3.1 Start-up India

The programme was announced in January 2016 with an action plan for promoting the bank financing for Start-Up ventures to boost the entrepreneurship and encourage start-up with job creation. As per the Department of Industrial Policy and Promotion (DIPP), a Start-up means an entity incorporated or registered in India not prior to seven years (for biotechnology not prior to ten years) with an annual turnover not exceeding ₹ 25 crore in any preceding financial year working towards innovation, development or improvement of products, processes or services or if it is a scalable business model with a high potential of employment generation or wealth creation.





A Start-up India hub was operationalised by GoI in April 2016 which acts as single point of contact for the entire ecosystem and to enable knowledge exchange and access to funding. The hub assists the start-up through the latter's lifecycle with specific focus on obtaining financing, feasibility testing, business structuring advisory, enhancement of marketing skills, technology commercialisation and management evaluation. Various State Governments in India have launched specific policy and schemes for promoting start-up development. A Start-up India online hub was also launched in June 2017.

Small Industries Development Bank of India (SIDBI) has developed a SIDBI Start-up Mitra portal wherein the details of advantages of the State-specific policies and schemes can be explored. The details of modes of financing of Start-Ups can be accessed from https://smallb. sidbi.in. GoI has established the "Fund of Funds for Start-ups" with SIDBI for the purpose of contribution to Alternate Investment Fund (AIF) registered with Securities and Exchange Board of India (SEBI), which in turn, will invest in Startups. Start-ups related to food processing / food retailing, etc. are also eligible for investment from the Fund of Funds for Start-ups.

NABARD also invests in Venture Capital Funds (VCFs) to facilitate venture investments in agriculture and rural development so as to promote technological innovations and technology dissemination in the sector. NABARD's commitments in VCF have led to venture capital investments to the tune of ₹ 650 crore in 37 portfolio companies. Noteworthy innovations which may be related to the food processing sector are solar operated micro cold storages and solar dryers, supply chain aggregation through mobile application platform, etc.

8.3.2 Stand-Up India (SUI):

The Stand-up India scheme was launched by Government of India in April 2016 to support at least one SC/ST and one women entrepreneur per bank branch to set up greenfield enterprises in manufacturing, services or the trading sector

and become job creators. Over 16,000 new enterprises have come up through this scheme in activities as diverse as food processing, garments, diagnostic centres, etc. The scheme offers a huge opportunity for the investors in the food processing sector. The guidelines for Stand-up India Scheme can be accessed at www. standupmitra.in.

SIDBI operates and maintains the Stand-up India portal and acts as connect centre along with NABARD. The role of NABARD in the scheme is to arrange the handholding support for trainee borrowers, liaise with the banks for follow-up in potential cases, review and monitor through District Level Committee and organise events for experience sharing, etc.

8.3.3 Skill India

The skill development in food processing industry is one of the major challenges today. There is dearth of skilled manpower. As per a study conducted by National Skill Development Corporation (NSDC) on human resources and skill requirement in food processing sector, the annual human resource requirement in food industry is estimated at 5.3 lakh people, including one lakh, in organised sector. Skill India programme was launched in July 2015 to train a minimum of 300 million people in India in different sectors by 2022. The following are some of the flagship programmes of Government of India for promoting skill development in the country.

8.3.3.1 Prime Minister Kaushal Vikas Yojana

The scheme was launched by GoI in July 2015 to skill one crore youth of the country with an outlay of ₹ 12000 crore. It is being implemented by the NSDC. The PMKVY (2016-2020) is being implemented by the centre along with the states which has three training formats, viz. Short Term Training (STT), Recognition of Prior Learning (RPL) and Special project. Pradhan Mantri Kaushal Kendra (PMKK) plays a crucial role in imparting vocational training to the youth. Under PMKVY, training is imparted for pickle making technician, traditional snacks and savoury maker, baking technician, mixing technician, plant biscuit production specialist, etc. The number of candidates trained under the RPL and STT under food processing stood at 2119 and 1038 respectively as on 24.08.2017.

The Government has set up a Food Sector Skill Council called Food Industry Capacity & Skill Initiatives (FICSI) in Federation of Indian Chambers of Commerce and Industry (FICCI) which is promoted by FICCI with financial support by NSDC. It has 46 affiliated Training Partners and 192 Training Centres across 26 States in the country. FICSI is working on identification of job roles and competencies required for each job role so as to develop National Occupational Standards for different sectors of food processing. The two institutions under the administrative control of MoFPI, i.e. National Institute of Food Technology Entrepreneurship and Management (NIFTEM), Haryana and Indian Institute of Crop Processing Technology (IICPT), Tanjavur, Tamil Nadu are conducting regular trainings in food processing on self-financing basis & sponsored funds from others sources including under PMKSY.

8.3.3.2 Udaan

It is the Special Industry Initiative (SII) for Jammu & Kashmir to train 40000 unemployed youth in J&K over a period of 6 years. It is funded by the Ministry of Home Affairs and implemented by the NSDC of India. Increasing investments in the sector have led to higher demand for more qualified people.

8.3.4 Make in India

The programme was launched by GoI in September 2014. Under this initiative, 25 thrust sectors, including manufacturing as well as relevant services sectors, have been identified. The major objective of the scheme is to improve the competitiveness of the private and public sector firms operating in the country, facilitating their integration into the global value chains and enabling them to compete better in the global markets. The various objectives of the scheme also include investor facilitation, ease of doing business, overall amplification of investment promotion and outreach, etc. The initiative has made a tremendous impact on the investment climate of the country which can be evidenced by significant growth of 46% in FDI equity inflows and highest ever FDI inflows at UD 55.5 billion in 2015-16.

8.3.5 Investors' Portal

MoFPI is having a dedicated investor portal in which a range of information like resource base, availability of land, state specific



policies, fiscal incentives, etc. are shared with potential investors to attract investments in the food processing sector. Further, Ministry is collaborating with Invest India to help the investors in terms of locating joint venture partners, extending handholding services, expedite regulatory approvals, etc. The investors can put their query in the Investors Portal for obtaining the necessary information.

8.3.6 Ease of Doing Business

Various reforms / flagship programmes being implemented by India for holistic development of the Industrial, infrastructure sectors have resulted in improvement in the investment climate. As per the World Bank's Report on doing business, India's rank for ease of doing business has improved to 130 in 2017 (from 131 in 2016) out of a total of 190 countries. India has performed better in many of the indicators namely getting electricity, trading across borders, paying taxes, registering property, enforcing contracts, resolving insolvency, protecting the minority investors, etc. Between April 2000 and June 2017, India has attracted approximately USD 342.40 billion of FDI, of which USD 7.81 billion was in food processing sector, making it the 13th largest sector receiving FDI in India and almost 80% of sectors' FDI since April 2000 has been received since April 20124.

For ease of doing business, FSSAI has introduced initiatives such as online application for registration and licensing of food business, single window clearance for imported food products, trainings for food safety professionals, constitution of scientific panels and committees for review, updating and enactment of new standards and implementation of IT interfaces to minimise visits of food business operators to FSSAI offices.





9.1 Food Safety and Standards Act, 2006

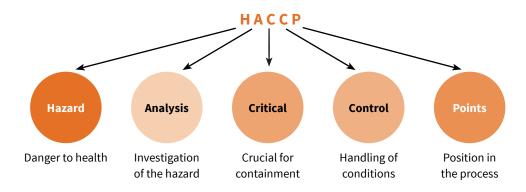
The FSS Act was enacted by the Government of India in 2006 which was operationalised with notification of Food Safety and Standards Rules, 2011 and six regulations w.e.f 05 August 2011. The Act envisages regulation of manufacture, storage, distribution, sale and import of foods to ensure availability of wholesome and hygienic food for human consumption. The Food Safety and Standards Authority of India (FSSAI) was established in 2008 under the aegis of Ministry of Health and Family Welfare to enforce the provisions of the new law. Under the FSS Act, FSSAI is the regulatory body for all matters related to food safety and standards in the country. FSSAI & State Food Authorities are jointly responsible for implementation an enforcement of FSS Act, 2006. States/ UT Governments have appointed Commissioners of Food Safety, notified Adjudicating Officers, Designated Officers and Food Safety Officers for their respective jurisdictions to perform various functions mandated under the Act.

All food businesses in India across the food value chain are required to be licensed or registered under the provisions of the FSS Act 2006. FSSAI has laid down general and specific food safety and hygiene requirements for Food Business Operators (FBOs). Further, FSSAI requires every food business operator to have a documented Food Safety Management System (FSMS) plan, which includes sector-specific Good Hygienic Practices (GHPs) and Good Manufacturing Practices (GMPs).

FSSAI has created an online Food Licensing and Registration System (FLRS) and all States/UTs (except Nagaland) are issuing Food Licenses / Registrations through online mode. Common Service Centres (CSCs) are also authorized to register food businesses, which has particularly benefitted petty food businesses.

9.2 HACCP

Hazard Analysis and Critical Control Point (HACCP) is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product. For successful implementation of a HACCP plan, management must be strongly committed to the HACCP concept. A firm commitment to HACCP by top management provides company employees with a sense of the importance of producing safe food.





HACCP is designed for use in all segments of the food industry from growing, harvesting, processing, manufacturing, distributing, and merchandising to preparing food for consumption. Prerequisite programmes, such as current Good Manufacturing Practices (cGMPs), are an essential foundation for the development and implementation of successful HACCP plans.

9.3 ISSO 22000 Food Safety **Management Systems**

ISSO 22000 is an international standard that specifies the requirement for a food-safety management system and combines the following generally recognised key elements to ensure food safety along the food chain to the point of final consumption interactive communication, system management, prerequisite programmes, and HACCP principles. It delivers a common global framework of safety requirements for all organisations in the food supply chain, including crop production, processing,

distribution and related operations. This food safety management system harmonises various exiting national and industry certification schemes. The food industry can implement this food management system to export their products successfully.

9.4 International Food Standards

The Codex Alimentarius of "Food Code" is a collection of standard guidelines and codes of proactive adopted by the Codex Alimentarius Commission. Codex has worked since 1963 to create harmonised International Food Standards to protect the health of consumer all s and ensure fair trade practices. The Codex Alimentarius covers all foods, whether processed or semi-processed or raw. In addition to standard for specific foods, the Codex Alimentarius contain general standard covering matters such as food labelling, food hygiene, food additive and pesticide residue, and producers' for assessing the safety of foods derived from modern biotechnology.









10.1 Strengths

- Abundant availability of diverse types of raw material and varied agro-climatic zones
- Leading producer of various agricultural commodities such as milk, fruits and vegetables, marine products, etc.
- Priority sector status for agro-processing given by the central Government
- Growing domestic market
- Proximity to growing international markets like Gulf, Middle East etc. with a sea route.

10.2 Weaknesses

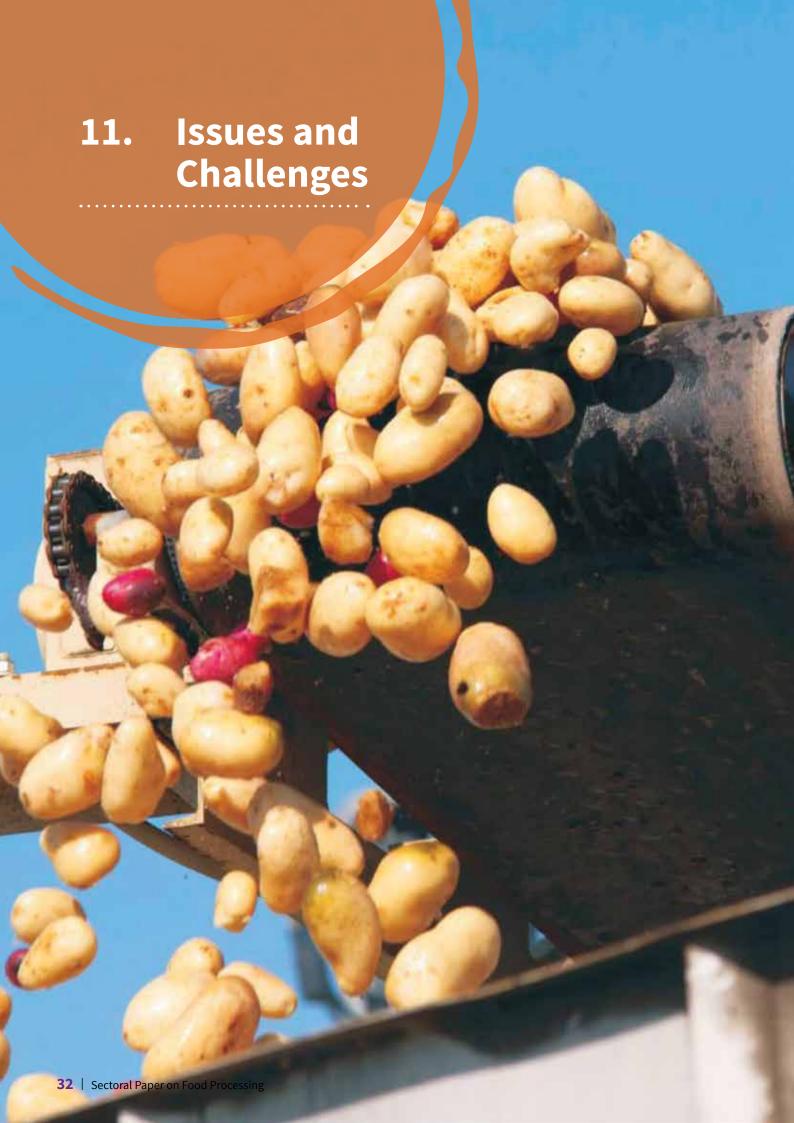
- Lack of adequate infrastructural facilities, viz., Power, Road & Rail connectivity, Storage, etc.
- Large number of intermediaries in the supply chain leading to wastage and price rise at each level.
- Capital intensive High requirement of working capital because of the seasonal nature of raw material
- Lack of established linkages between R&D labs and the industry.

10.3 Opportunities

- Diversification into cultivation of high value agricultural crops by the farmers
- Setting up of Special Economic Zones (SEZs), Agri-Export Zones (AEZs) and mega food parks for providing the needed infrastructure for small scale units.
- Rising income levels and changing consumption patterns of Indian population
- Emerging scope for functional foods, geriatric foods, low fat foods, etc.
- Opening of global markets
- Rationalisation of food laws and enabling policies of GoI & State Governments for development of the sector.
- Increased demand for ethnic food in most of the countries due to increased NRI population in those countries.

10.4 Threats

- Preferences for fresh food than chilled or frozen
- Competition from other countries / players







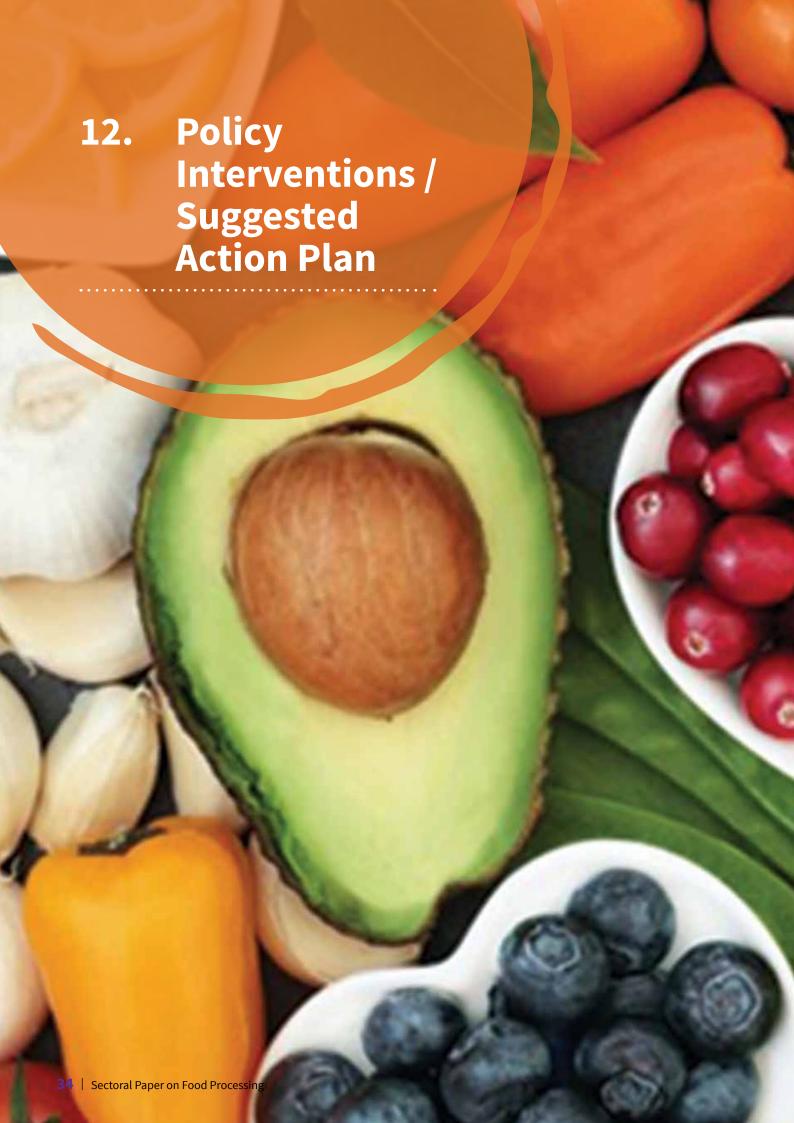


The following are the illustrative list of issues and bottlenecks for steady growth of food processing sector in the country.

- Lack of comprehensive national food processing policy leading to inconsistency in Central and State policies.
- Delays in land acquisition due to requirement of conversion of land use (non-agricultural use permission).
- Lengthy procedures for Government clearance - The clearances from Government apartments like Municipal/ Town Planning Authorities, Pollution Control Board, State Electricity Department, Boiler Inspector, etc. usually delay project implementation.
- Dominance of unorganized sector (42%) & small scale (28%) in the food industry operating at low scale and high cost of production.
- Organised production of raw materials for processing, leading to low recovery rate, high cost of raw materials and low quality products.
- Inadequate facilities for mentoring of Start Ups & pilot testing of technologies and

innovations. There is also lack of applied research on processes and technology.

- High cost of manufacturing and packaging making the products as luxury items and unaffordable to common population.
- Fluctuation of raw material prices leading to viability issues in food industries. Sudden rise in the prices of raw materials have resulted in temporary or complete shutdown of food factories in the past.
- Inadequate flow of credit, especially for working capital requirement. The assessment on working capital cycle followed by banks does not hold good due to seasonal availability of raw materials.
- Non-availability of skilled man power for food processing is a big challenge. Industrial training institutions providing skill-based training / diploma courses are limited.
- Poor adoption of quality standards by food industry leading to lowering of brand value of Indian Food Industry.
- Lack of market intelligence and brand building of Indian Food Processing Industries.





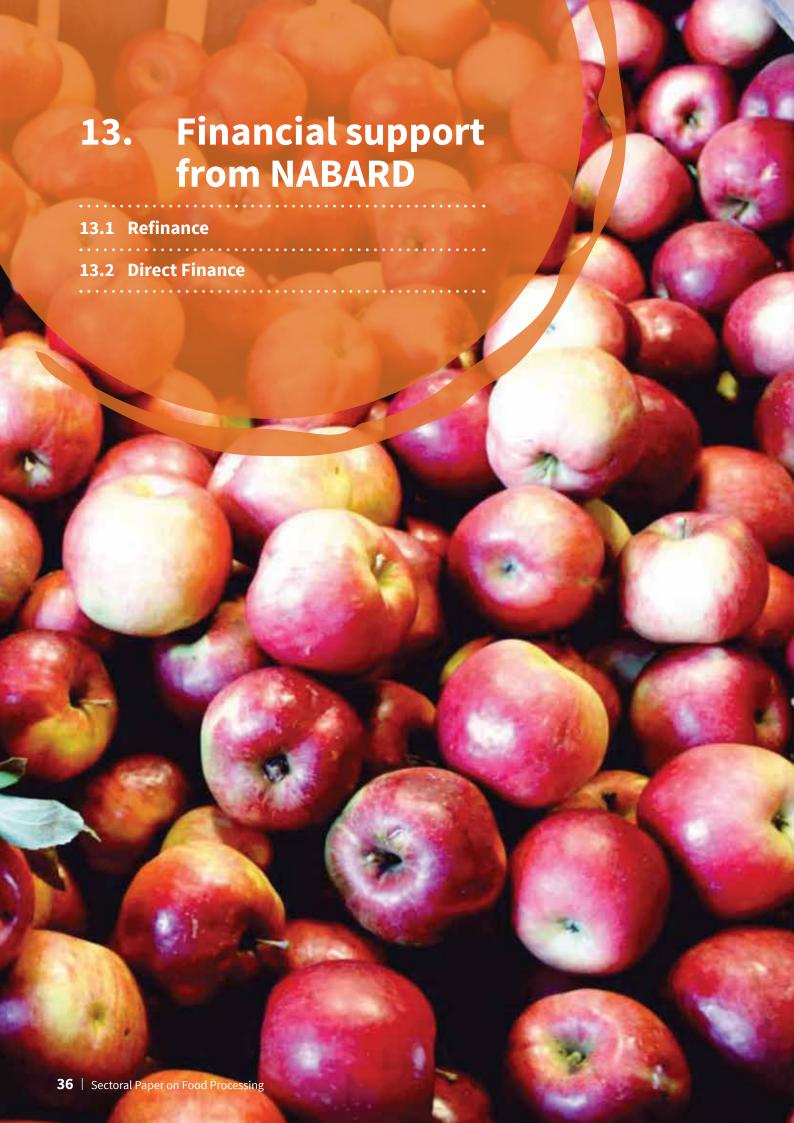




The following are few interventions among various stakeholders which may facilitate the steady growth of the food processing sector in the country.

- A National Food Processing Policy may be formulated to follow a uniform approach for food processing sector on Pan-India basis.
- Relax non-agricultural land use permission for food industry procuring raw materials directly from the farmers and to Farmer **Producer Organisations**
- The Single Window approach for Government clearances may need to be in place in all the States.
- Exclusive Food Technology Skilling Mission for bridging the skill gap in food in view of the emerging food safety systems and food standards which require GHP & GMP.
- The Model Contract Farming Facilitation Act 2017 under consideration of Government may need to be expedited.
- Constituting a task force to study the working capital requirement, adequacy of

- working capital finance to food industry, especially considering the recent initiatives of the GoI such as Make in India, etc.
- Providing affordable credit to food processing Industry to promote creation of investments in the sector.
- Enlarging the scope of credit guarantee fund / creation of a risk fund will help in mitigating stress on banking industry on financing the sector which is mostly of seasonal nature and capital and labour intensive.
- Infrastructure for setting up food research and testing facilities, traceability may be promoted in a big way to provide safe food in domestic market and also remain competitive in world market.
- Creation of a National Brand Equity Fund for Food Industry with a contribution from Industry Associations, GoI, etc. to India brands internationally.
- Make in India to give focus on manufacture of plant and machinery and packaging materials locally to reduce cost of production.





13.1 Refinance

NABARD provides refinance by way of short term and long term credit to Commercial Banks, Cooperative Banks, Regional Rural Banks (RRBs) and non-banking finance companies (NBFCs) to meet the credit and financial needs of the food processing industry. The short term credit (production credit) assists the rural financial institutions to meet the production and working capital needs of farmers, while the long term credit (investment credit) supports the asset creation and capital formation. Refinance is available for various agriculture and allied activities and off-farm activities including food and agro processing. NABARD also identifies thrust areas from time to time to boost the credit flow to a particular sector, wherein up to 100% refinance would be available to the eligible institutions.

13.2 Direct Finance

Besides refinance, NABARD also provides direct finance to the eligible entities under its different loan products for establishment of infrastructure related to food processing industry.

13.2.1 Food Processing Fund

One of the major constraints faced by food industry is high cost of credit. To address the issue, Gol created a special fund (Food Processing Fund) in NABARD with corpus of ₹ 2000 crore for providing affordable credit to Designated Food Parks (DFPs) & the units set up in these designated food parks. This Fund is operationalized in close coordination with Ministry of Food Processing Industries (MoFPI), GoI. The financial assistance in the form of capital grant available under various schemes of MoFPI is dovetailed with FPF, wherever applicable. Financial assistance from FPF is available to State Governments, entities promoted by State Governments, Joint Ventures, Cooperatives, Federation of Cooperatives, SPVs, Farmers' Producers Organizations, Corporates, Companies, Entrepreneurs, etc.

NABARD has sanctioned a total of 11 mega food park projects from the Fund wherein an area of 840 acres would be developed by the Implementing Agencies which act as Central Processing Centres (CPCs). These CPCs would be supported by 40 PPCs and several collection centres to be established at suitable places in the catchment zone of the respective mega food parks. These projects on completion would



result in providing diversified and much needed core processing infrastructure viz., 1.6 lakh MT of dry warehouse, 83500 MT of silos, 49300 MT of old storage, 11800 MT of freezer capacity, 11 MT per hour of Individual Quick Freezing facility, 123 MT per hour of sorting and grading, 2040 MT of controlled ripening chambers and 36.50 MT per hour of pulping and aseptic packing of fruit, 12 Effluent Treatment Plants, 12 Food Testing Laboratories, etc.

13.2.2 Rural Infrastructure Development Fund (RIDF)

NABARD provides loans to State Governments for creation of rural infrastructure from RIDF set up from out of shortfall in priority sector lending by scheduled commercial banks. Thirty six infrastructure activities are eligible for funding under RIDF. The eligible activities are classified under three broad categories i.e. (i) Agriculture and related sectors, which are eligible for loans up to 95% of eligible project cost (ii) Social sector, where loan eligibility can be up to 90% of eligible project cost in North eastern and hilly States and 85% of project cost in all other States and (iii) Rural connectivity projects, where loans are extended up to 90% of eligible project cost in North eastern and hilly States and 80% in all other States. Major activities related to food preservation / processing / storage financed from the Fund are establishment of market yards, godowns, marketing infrastructure, cold storages, grading, sorting / certifying mechanisms, testing/ certifying laboratories, animal husbandry, including dairy, modern abattoirs, etc. The institutions eligible for RIDF finance are State Governments/Union

Territories, State Owned Corporations / State Govt. Undertakings, State Government Sponsored Organisations and Panchayat Raj Institutions/SHGs/ NGOs.

13.2.3 Producers Organization Development Fund (PODF)

NABARD created a dedicated fund "Producers Organization Development Fund" (PODF) out of its own profits during 2011, to support Producers' Organizations on 3 levels, i.e. credit support, capacity building and market linkage support. The objective of the fund is to meet end to end requirements of Producers Organizations (POs) as well as to ensure their sustainability & economic viability. Major activities of the POs assisted by NABARD include dairy activities, spices processing units and bio-processed and commercial production of fish.

13.2.4 NABARD Infrastructure Development Assistance (NIDA)

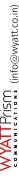
Infrastructure projects under agriculture, transport, energy, drinking water & sanitation and social and commercial infrastructure largely benefiting rural population are eligible for funding from NIDA. Under agriculture, irrigation agriculture production infrastructure, agriculture storage and marketing infrastructure, agriculture extension, agro processing, agro services, custom hiring and farm mechanization and other allied activities are given preference. The eligible Institutions are State/Central Govt. companies, corporations, other Govt. Institutions. The quantum of loan will be maximum 90% of the eligible project cost considered for funding. The margin from the borrower shall be minimum 10%.

13.2.5 Credit Facility to Federations (CFF)

Credit facility to federations provides shortterm credit support (less than 12 months) available for the marketing of agricultural commodities, input supply, value chain and supply chain management by the corporations, cooperatives, registered companies etc. NABARD has supported a number of state warehousing corporations under this facility.









The Banyan is great, not because of its trunk, but because of its offshoots. We take pride in our partners, because it is they who enable us to reach out to rural India.

