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Transforming the skill landscape

Human Resource and Skill Requirements in the Food Processing Sector (2013-17, 2017-22)



cutting through complexity

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In addition, we convey our gratitude to all those who have, in some way or other, contributed towards the successful completion of this study.

Executive Summary

The food processing sector is expected to witness 15 percent CAGR over 2012–17

Key Growth Drivers

- **Growth in organised retail** - Food retail is expected to grow well due to low penetration of organised retail and the potential market thereof.
- **Changing consumer preferences** - India has one of the largest consumer bases in the world with a young population (more open to trying out new food products), increasing income (marking a shift towards premium food products) and more time-starved consumers (leading to an increasing shift towards RTE and packaged foods).
- **Favourable government policies** - Direct support in the form of financial assistance for technology upgrade and setting up/modernisation/expansion of food processing industries is being encouraged. 100 percent FDI under the automatic route (except for alcohol, beer, and sectors reserved for small scale industries) is now permitted and this has spurred investment in India.
- **Supply of raw materials** - India ranks number one in the production of milk, bananas, guavas, mangoes, buffalo meat and cashew nuts. It ranks second in the world in the production of rice, wheat, groundnuts, onions, peas, and sugarcane. We have a climate that is suitable for year-round supply of agricultural products.
- **Availability of cheap labour** - India's comparatively cheaper workforce can be effectively utilized to set up large low-cost production bases for domestic and export markets.

Industry Size

- India is the second-largest producer of fruits and vegetables in the world, accounting for about 10 percent of the global production.
- India ranks first in the world in production of milk. Milk and milk products account for a significant 17 percent of India's total expenditure on food.
- The 'meat and marine products' market share is expected to increase from INR25200 crores in 2012 to INR56500 crores by 2017, witnessing a CAGR of 17 percent.
- The Indian packaged food market, including confectionary, dairy, baked goods, sauces and household staples, such as packaged rice, was worth INR1 lakh crores at the end of 2011.

Concerns and challenges in the sector

- **Lack of robust infrastructure** - 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. Storage infrastructure specific to grain and oilseed is a critical challenge to in reducing wastage levels.
- **Sub-optimal use of technology and research** - Commercial R&D activities in the food industry have remained confined to only a few areas. R&D activities have scarcely emerged from the laboratory to be extensively adopted on the field
- **Low productivity of land resources** - Despite India being an agrarian economy and one of the largest producers of vegetables, fruits, spices, milk, eggs, potatoes, wheat, meat etc., the productivity of crops is quite low when compared to international standards. The problem of low productivity is compounded by poor quality of food produce, lack of grading and sorting, limited marketing infrastructure and research and development facilities.

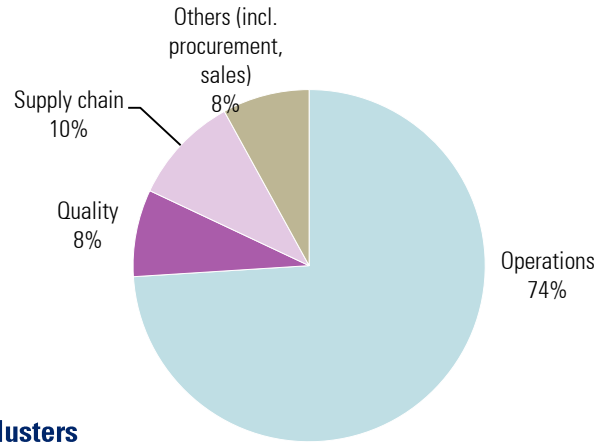
Demographic characteristics of workforce

Industry is traditionally dominated by unorganized workforce

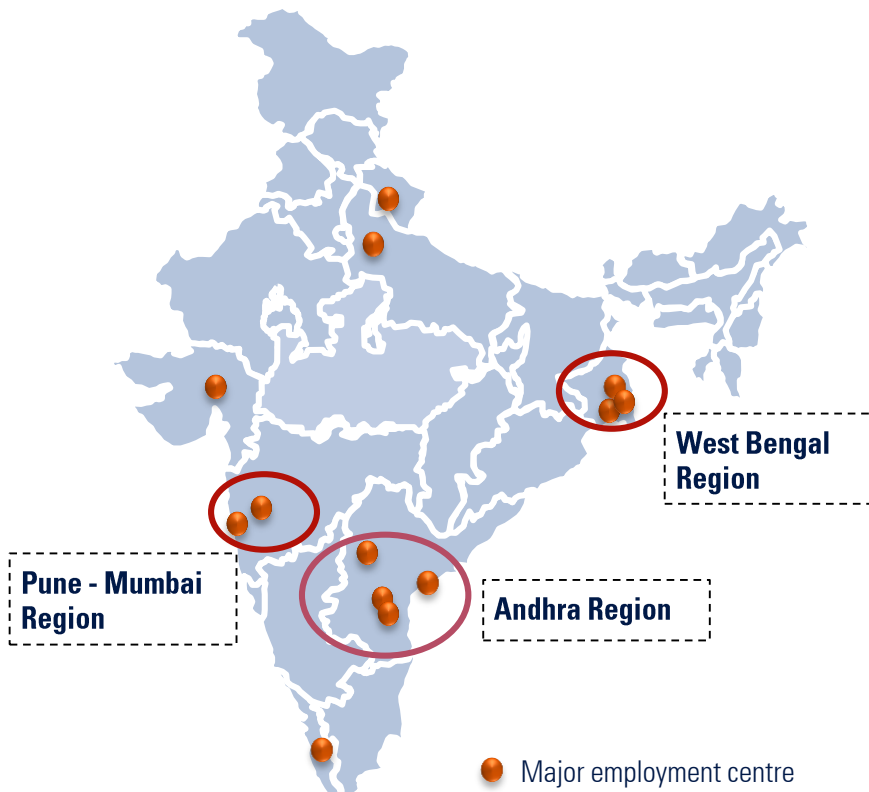
This industry prefers hiring experienced professionals for the supervisory and managerial roles. A fresher is employed as a trainee or operator and undergoes on-the-job training up to one year. ITI or diploma certified joins the sector in maintenance or processing functions. They join at an operator or trainee grade. typically, promotions and career progression are performance-oriented and, to some extent, tenure/seniority also plays a significant role in promotions. Many of the workers complete their graduation along side and this practice is encouraged by the employers. Most of the employees in procurement and processing function are Science-graduates from agricultural universities.

Functional distribution of human resources in the food processing industry (2013)

The food processing industry demands different skill sets on the basis of their relevance to various segments. The basic functional distribution of human resource in the industry is involved in operations stage with 10 percent of the workforce dedicated towards supply chain.



Employment clusters



Andhra Pradesh has the maximum registered food units in the country and is expected to be one of the top regional clusters in the sector.

Further, new emerging clusters in MP and Jharkhand will be expected to attract a bulk of manpower.

The Pune-Mumbai region is growing on the account of high urbanisation resulting in high demand.

West Bengal region is dominated by players in marine processing and labour is supplied from the neighbouring state, Odisha.

Sources: Industry Interactions; KPMG in India analysis

Incremental Human Resource Requirement (2013-22)

By 2022, the food processing industry is expected to generate about 4.40 million additional employment opportunities

Industry growth along with demand for quality standards and technology adoption in manufacturing are driving the need for fresh skilling and up-skilling in the sector. Grain and Oilseed and Packaged Foods account for lion's share of employment growth in the sector during 2013-22. Technological growth in processing industry segments like Meat & Marine, Beverages are expected to result in lower labour elasticity of 0.3-0.4 during 2013-22 reflecting in subdued employment growth

Supervisory and technician roles covered under Level 4, 5 and 6 as per NSQF classification are expected to witness high demand for manpower during 2013-22. Due to increasing adoption of technology and automation, some roles in the technical functions, such as maintenance, will play an important role. Quality is another domain, which will be in demand due to enforcing of quality parameters and focus on exports.

Human Resource Growth Trends in the Sector (in million)

Sub-Sector	Employment Growth 2013-17	Employment Growth 2017-22	Employment Growth 2013-22
	(In million)	(In million)	(In million)
Fruits & Vegetables	0.01	0.01	0.02
Milk and milk products	0.06	0.07	0.13
Meat and Marine products	0.24	0.34	0.58
Grain and Oilseed	0.69	1.08	1.77
Packaged Food	0.63	1.00	1.63
Beverages	0.13	0.16	0.29
Overall Sector	1.75	2.65	4.40

- Several skill gaps exist in various stages of the food processing value chain that need to be addressed. This includes the food processing sector as well as ancillary industries, such as bottling and packaging.
- The growing quality consciousness by the consumers requires the workforce to be skilled in basic hygiene and sanitary practices. Processing units are also adopting mechanisation and technology. There is a growing need to impart technical skills to more specialist personnel who are capable of working on imported machines in specific sub-segments.
- Focus also needs to be on the front-end staff for developing customer relationship management skills, which are integral to maintaining healthy relationship with institutional players, such as hotels, restaurants and retailers.
- Farm procurement is an important area for processing units and need to streamline their raw materials' supply for the rising demand. At a farm level, the growers are poorly equipped and lack awareness of implementing the best practices for growing. This is where the need for procurement staff to be proactively engaged in crop/production advisory is missing.

There is a huge potential to improve the availability of quality manpower through the development of training centres by organisations, such as the NIFTEM and IICPT

Agricultural universities and governmental research institutes dominate the supply landscape for this sector. There is virtually no presence of any private player as a training provider. To inculcate practical hands-on training, high capital expenditure prohibits private TPs from entering this space. PPP is the most viable alternative in the given situation.

Private players can set up a training academy close to the employment clusters and develop an apprentice-trainer model. For processing grain, a milling operator is a critical job role; however there is no course, which trains a personnel in milling operations. Similarly, documented training modules for catching/culling of animals and vocational courses for deboning could be potential areas for training players to focus on meeting sector's manpower requirement.

Challenges pertaining to training infrastructure

Need to develop sector specific training programs

Procurement functions require considerable backend linkages, which require specific skill sets at the processor and farmer levels.

Food processing companies also face the challenge of the lack of availability of workforce at the pre-processing stage. For example, in the F&V sub-segment, workers are hired on a contractual basis for such roles. The meat and poultry sub-segments face severe unavailability of staff for deboning.

Challenges in establishing training infrastructure

The industry cannot afford to spend their productive man-hours on training employees since it will adversely affect the production.

This industry requires more practical training than theory. Simulation-based hands-on practical training cannot be done due to lack of prototypes. The food processing industry requires more practical training than theoretical lessons. It is difficult to impart simulation-based hands-on practical training due to the lack of prototypes in India. The estimated cost to establish a prototype is about 10-15 crores and such high investment can be made only through government support or on PPP model.

Employers engaging in training

Primarily, training for entry-level resources are undertaken in-house by employers for on the job training model where senior employees are responsible for imparting requisite skills and training them. The varying quality of training does not ensure either standard job role or pay for the trained students.

Several food processing players have to invest significantly in training workforce on basic hygiene and sanitation practices, since most of the workers are inadequately educated. There is a need to introduce courses on basic hygiene and sanitation practices; perhaps through some nationally recognised institute. A standardised accreditation system should be in place to certify employees for these basic prequalification before entering this sector.

Several employers have established in-house training institutes in the absence of specific courses or training institutes. There is no course for food machinery, such as canning, dehydration and handling frozen foods. This has led to a clear disparity among major players who have the resources to invest in such initiatives and small and medium enterprises with limited resources.

Select recommendations & implications

Recommendation	Implications
Establish training centres closer to employment clusters/food parks	<ul style="list-style-type: none"> ▪ Establish training centers closer to employment clusters/food parks which would enable industry to access larger talent pool mitigating the risks associated with migration and attrition
Introduction of new tailor-made courses targeted towards the food processing sector	<ul style="list-style-type: none"> ▪ ITIs should develop courses on operating and/or maintaining food machinery. ▪ Dairy plant machinery is another domain where skilled personnel at operational level are not available since no institute provides training in operating dairy machines.
Government owned training institutions should involve private players and operate on a PPP model	<ul style="list-style-type: none"> ▪ Government owned training institutions like NDRI, Centre of Food Science & Technology to open avenues for private players in leveraging the existing training infrastructure to optimal capacities through PPP mode
Establish short term certification which will be recognised by the industry	<ul style="list-style-type: none"> ▪ Establish a nodal body similar to MCI (Medical) or AICTE (Engineering), which will provide industry defined courses for skilling manpower in the country
Creation of database /repository of all the informal workers at entry level with their work history, skill sets and employers' feedback could be initiated	<ul style="list-style-type: none"> ▪ For an employer, it will give an opportunity to find a worker with specific set of skill set for their operations.
Encourage employment of women in the industry	<ul style="list-style-type: none"> ▪ The success of self-employment-based cooperative organisation — Shri Mahila Griha Udyog can be replicated in other parts of the country. ▪ The government can develop employment guarantee schemes specifically to women for this sector.
Enforcing of safety and hygiene standards will bring in more certified professionals to this sector	<ul style="list-style-type: none"> ▪ Treat the sector as a major export-oriented industry and create favourable policies/incentives for exports.

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Abbreviations

AEZ	Agri-Export Zone
APEDA	Agricultural and Processed Food Products Export Development Authority
APMC	Agricultural Produce Market Committee
ASI	Annual Survey of Industries
CAGR	Compounded Average Growth Rate
EOU	Export Oriented Unit
FAO	Food and Agriculture Organisation of the United Nations
F&V	Fruits and Vegetables
FDI	Foreign Direct Investment
FMCG	Fast-Moving Consumer Goods
FPI	Food Processing Industry
FSSAI	Food Safety and Standards Authority of India
GDP	Gross Domestic Produce
GMP	Good Manufacturing Practices
HACCP	Hazard analysis and critical control points
ITI	Industrial Training Institutes
MOFPI	Ministry of Food Processing
MoRD	Ministry of Rural Development
MSME	Medium and Small Enterprise
NDDB	National Dairy Development Board
NIC	National Industrial Classification
NSSO	National Sample Survey Organisation
PDS	Public Distribution System
QA	Quality Assurance
QC	Quality Control
R&D	Research and Development
RTC	Ready to Cook
RTD	Ready to Drink
RTE	Ready to Eat
SGSY	Swarnajayanti Gram Swarojgar Yojana
SSC	Sector Skills Council
TP	Training Provider
UHT	Ultra-high temperature

Context and approach

<p>Brief background</p>	<p>NSDC had conducted sector-wise skill gap studies for 19 high priority sectors in 2008–09 .</p> <ul style="list-style-type: none"> ▪ KPMG has been engaged as a consultant to help evaluate the skill gap across 25 sectors and develop actionable recommendations for its stakeholders. ▪ Mandate includes sector and sub-sector level analysis, demand-supply projection, estimation of incremental man-power requirement between 2013-2017 and 2017-2022, identification of key-employment clusters, and SWOT analysis of each sector ▪ Study also aims to take qualitative insights from stakeholders on enablers and challenges for each sector, way forward in terms of specific policy level actionable recommendations,
<p>Inclusions over the previous study</p>	<ul style="list-style-type: none"> ▪ Study led by industry – Sector Skill Councils and a panel of professionals from different sub-sectors were consulted for their inputs on industry trends, key takeaways in terms of skill requirement, qualitative insights to understand specific interventions required for each sector and to validate the quantitative results and recommendations ▪ 6 sectors were added to the list of NSDC priority sectors for studying the skill gaps <p>Updated study also includes</p> <ul style="list-style-type: none"> ▪ Identification of top 20 job-roles in each sector, case studies around good training practices, sub-sector level indicators and growth factors ▪ Study also includes understanding of existing training infrastructure, work-force characteristics and employment clusters, ▪ Macro economic factors, central and state governments policies and their envisaged impact ▪ Synchronisation of the sector wise demand from the district level skill gap studies ▪ Recommendations for key stakeholders - Industry, NSDC, Training organizations and Government ▪ Environment scans every year till 2015-16 including SWOT analysis for the sector

Industry classification

Industry classification

Industry classification

Sector and sub-sectors as per NIC classification

Food processing

Meat and marine products

National Industrial Classification (NIC)	
Section	C
Division	10
Group	101, 102
Title	<ul style="list-style-type: none"> ▪ Processing and preserving of meat ▪ Processing and preserving of fish, crustaceans and molluscs and products

Meat products include slaughtered, processed, preserved and canned mutton, beef, pork, poultry and others. The marine products segment includes sundried, artificially dehydrated, radiation preserved, processed, preserved and canned fish.

Fruits and vegetables

Section	C
Division	10
Group	103
Title	<ul style="list-style-type: none"> ▪ Processing and preserving of fruit and vegetables

This includes fresh fruits and vegetables, dry fruits(raisins, cashew etc.), processed and preserved fruits and vegetables .

Grain and oilseed

Section	C
Division	10
Group	104, 106
Title	<ul style="list-style-type: none"> ▪ Manufacture of vegetable and animal oils ▪ Manufacture of grain mill products, starches and starch products

This includes milling of flour, rice, dal/pulses, grain and other grains. In addition, includes processing and manufacture of cereals (for breakfast), flour mixes and dough and other readymade powders (idli, dosa, gulab jamun, etc.)

Milk and milk products

Section	C
Division	10
Group	105
Title	<ul style="list-style-type: none"> ▪ Manufacture of dairy products

This includes pasteurised milk, milk powder, ice cream powder, condensed milk, infant foods, cream, butter, cheese, ghee, khoya, ice cream, kulfi and other dairy products.

Packaged foods

Section	C
Division	10
Group	107, 108
Title	<ul style="list-style-type: none"> ▪ Manufacture of other food products ▪ Manufacture of prepared animal feeds

This includes spices (processed and other), snacks and savouries, ready to eat (RTE) and ready to cook meals (RTC), chocolate based (and non-chocolate based) confectionery, biscuits, bakery items (breads, cakes and pastries)

Beverages

Section	C
Division	11
Group	110
Title	<ul style="list-style-type: none"> ▪ Manufacture of beverages

This includes distilled alcoholic beverages, wines, beer, soft drinks, mineral water and other non-alcoholic beverages

Sub-sector	Brief description	Outlook
Fruits and vegetables	This includes fresh fruits and vegetables, dry fruits (raisins and cashew), processed and preserved fruits and vegetables (jams, jelly, pickle, sauce, food, paste, juice, concentrates, potato flour, canned fruit and vegetables).	<ul style="list-style-type: none"> ▪ Largely dominated by unorganised players, the industry has, over the years, witnessed rapid growth in ready-to-eat foods, frozen vegetables and processed mushrooms. ▪ The key challenge is the unavailability of infrastructure to store the produce. The cultural preference for fresh fruits and vegetables dominates over processed items.
Milk and milk products	This includes pasteurised milk, milk powder, ice cream powder, condensed milk, infant foods, cream, butter, cheese, ghee, khoya, ice cream, kulfi and other dairy products.	<ul style="list-style-type: none"> ▪ Growth in value-added dairy products is likely to increase rapidly. There has been a marked shift towards packaged milk particularly in urban areas and a decline in loose milk consumption. ▪ Packaged milk segment in India is projected to grow from INR 46560 crores to INR197400 crores by 2030, registering an annual growth of 8 percent.
Meat and marine products	Meat products include slaughtered, processed, preserved and canned mutton, beef, pork, poultry and others. Marine products segment includes sundried, artificially dehydrated, radiation preserved, processed, preserved and canned fish.	<ul style="list-style-type: none"> ▪ Dietary habits of people across the globe are changing fast and India with 25 percent of cattle population is gearing up to cater to the market. ▪ Indian seafood processing units are being encouraged to pursue value addition and export by the establishment of new units, capacity expansion and diversification of current activities.
Grain and oilseed	This includes milling of flour, rice, pulses, grain and other grains. It also includes processing and manufacturing of cereals (for breakfast), flour mixes and dough and other readymade powders (idli, dosa and gulab jamun).	<ul style="list-style-type: none"> ▪ India will continue to be one of the largest producer of cereals with more than 200 million tonnes of production annually. Growth in processing infrastructure in India may help the industry to optimally leverage its raw material advantage.
Packaged foods	This includes spices, snacks and savouries, ready-to-eat (RTE) and ready-to-cook (RTC) meals, beverages, chocolate and non-chocolate-based confectionery, biscuits and bakery items.	<ul style="list-style-type: none"> ▪ Packaged foods market is largely organised and has been witnessing strong growth across categories. Potato chips and potato-based products constitute about 85 percent share of the Indian snack market.
Beverages	This includes distilled alcoholic beverages, wines, beer, soft drinks, mineral water and other non-alcoholic beverages.	<ul style="list-style-type: none"> ▪ Consumption of non-alcoholic beverages in India is expected to increase by 16.5–19 percent over the next three years. ▪ Sales of alcoholic drinks are forecast to increase by CAGR of 8 percent by volume in 2012–17 period.

Industry overview

Industry overview

Overview

Over 51 percent of our population is employed in the agriculture sector. Despite the steady decline, agriculture still contributes significantly to the GDP and is an integral part of the economy. Food processing is closely interlinked with the two of our core industries — manufacturing and agriculture. Agricultural farm produce is the contributor to this sector while processing for value addition is enabled by the technology applied in a typical manufacturing setup.

Traditionally, every household has been involved in value addition to food at a very small scale. Few traditions have carried it forward and passed it on to generations spurring growth in small scale enterprises. These business are now at the cusp of transformation due to expansion and market opportunities. The food machinery in this sector is undergoing rapid modernization giving rise to employment to a large number of operational equipment professionals.

Food processing is one of the crucial sectors for the Indian Government, given the high opportunity in exports. Large Indian diasporas also make a ready market for the manufacturers of Indian RTC/RTE products. The export-market can be tapped provided we implement good manufacturing practices and adhere to the highly stringent quality norms. Some of the sub-sectors (namely meat and marine processing and packaged foods) have already started complying with the demanding standards of exports. They are reaping the benefits by translating exports into higher revenues. This has enabled manufacturing units to liaise with international players and access the latest technologies and equipment for food processing.

Before the 1960s

- Both agriculture and food processing were at a nascent stage of development.
- Industry was marred by stringent license requirements and the focus of the government was more towards the industry sector.

1960–1991

- Self-sufficiency in food was recognised as critical and the Green Revolution was ushered in. The Green Revolution resulted in a record grain output of 131 million tonnes in 1978–79. This established India as one of the world's biggest agricultural producers.
- Focus was on production while other parts of the value chain, such as logistics and processing, remained largely unattended.

After 1991

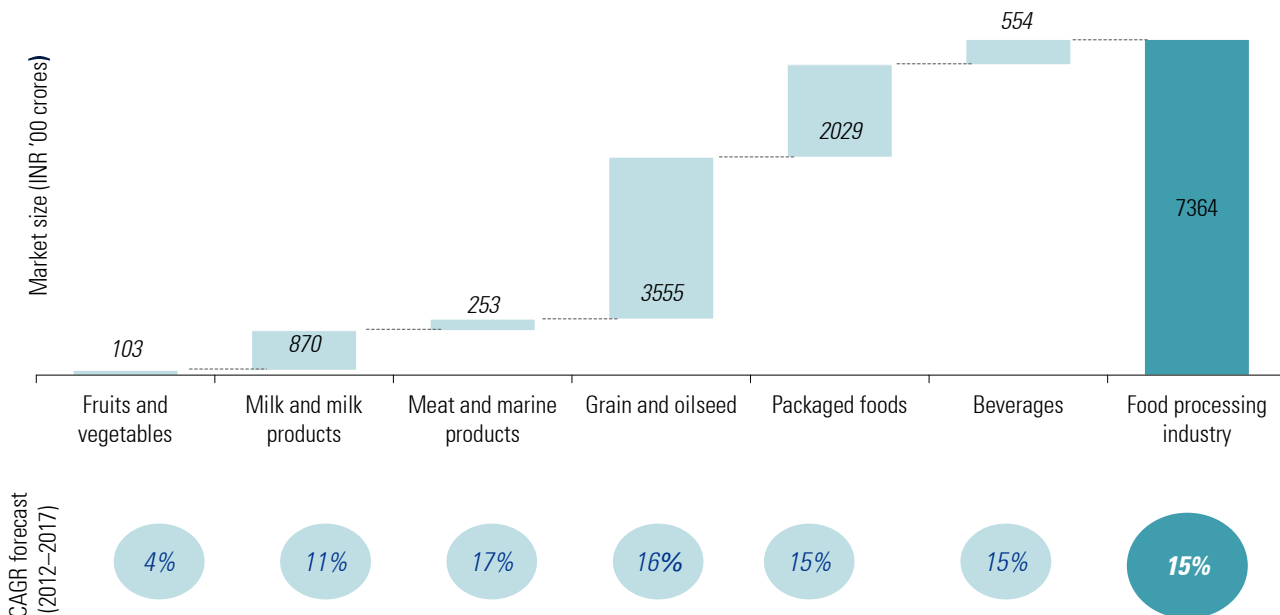
- Revoking of several policy barriers took place, such as easing license requirements to facilitate the establishment of the food processing industry.
- Significant steps for export promotion, such as setting up of export promotion zones, were initiated.
- Financial incentives for establishing food processing units came in to the picture.
- Entry of international players was seen, post liberalisation.

In our report, we have categorised the sector as per NIC (National Industrial (Activity) Classification lists. The Central Statistical Organisation (CSO) in the Ministry of Statistics and Programme Implementation is the nodal authority for bringing out the National Industrial Classification in India. It lists out economic activities and tasks with reference to industrial sectors in a systematic manner. The food processing sector is primarily classified in division X with five separate sub-groups representing sub-sectors, such as fruits and vegetables, milk and milk products, grain and oilseed, meat and marine processing and packaged foods. We have also included beverages as a separate sub-sector covering division XI from NIC.

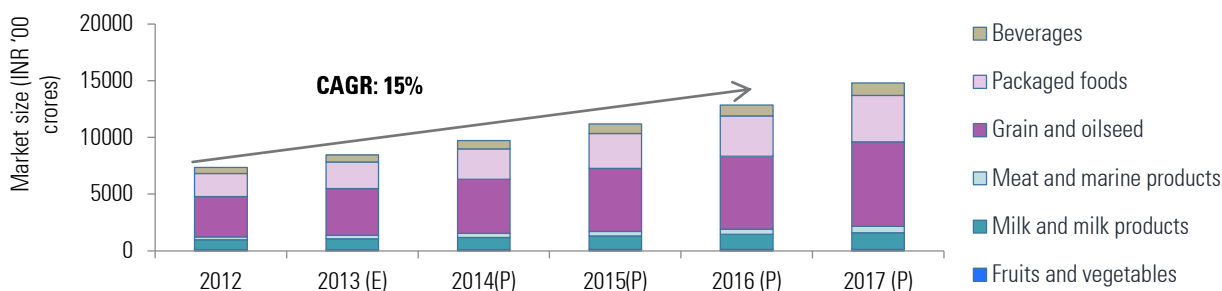
Industry overview

The food processing sector is expected to witness 15 percent CAGR over 2012–17

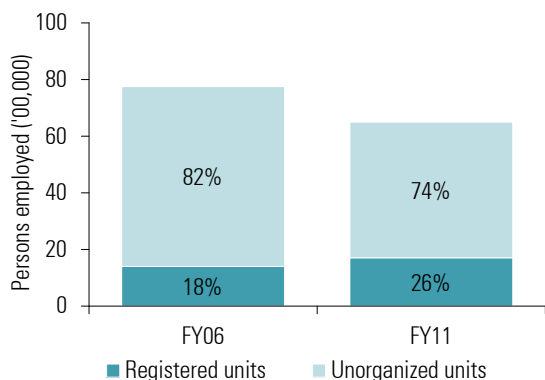
Market size of India's food processing sector — sub-sector-wise



India's processed food output stood at INR736400 crores in FY12. It is expected to reach INR1481100 crores by FY17 (CAGR of 15 percent).



Employment in the food processing sector

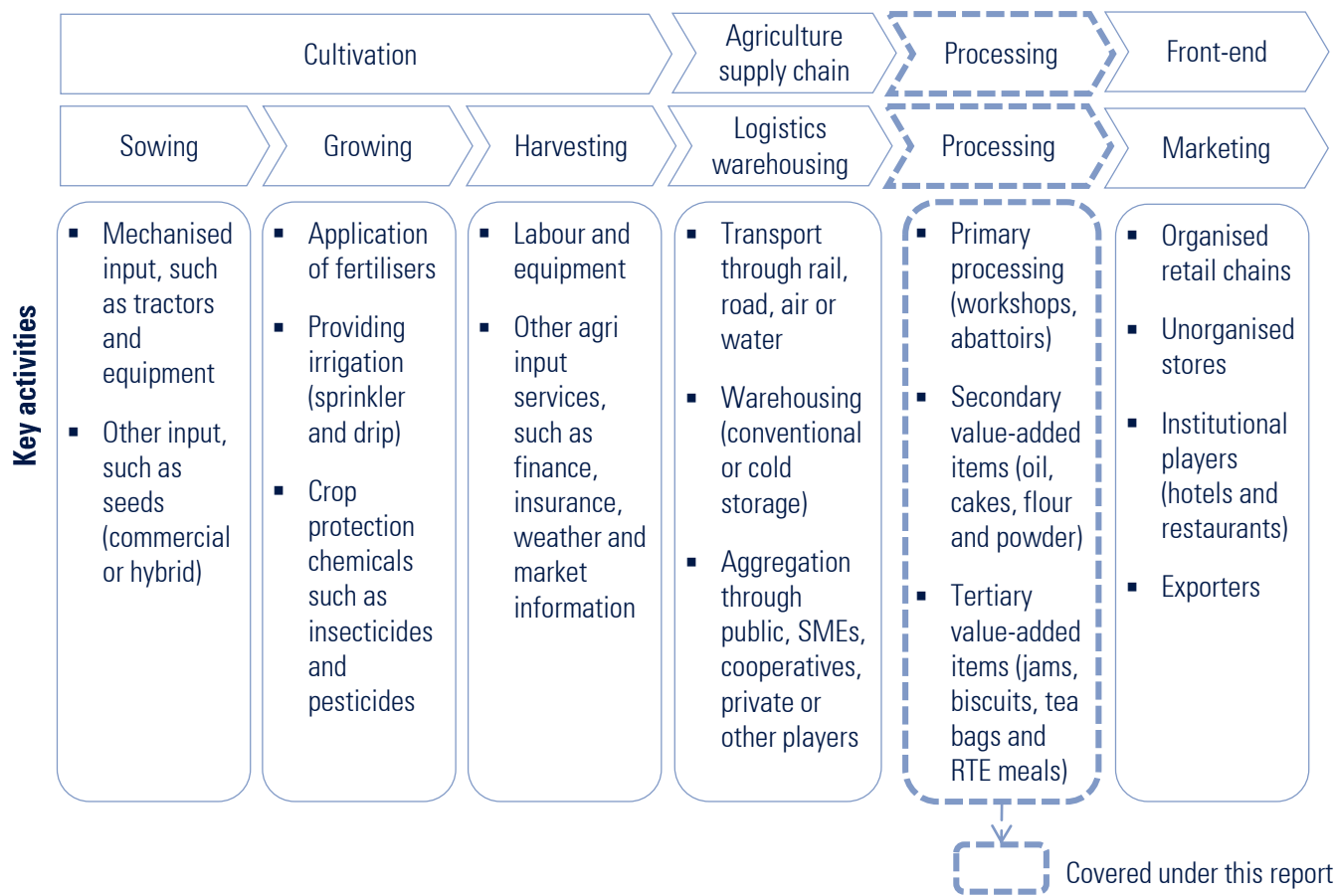


- The structure of the industry is changing as registered units are now increasingly contributing to the output (66.4 percent in FY12), compared to 50 percent in FY05.
- The employment share of registered units has increased from 18 percent to 26 percent during FY06–11. However, the total employment in the sector has decreased due to a considerable decline in the employment of the unorganised sector.
- Industry is moving from the unorganised to organised sector due to demanding quality standards and technology adoption.

Source: Statistics, MOFPI website, KPMG analysis

Food processing can be identified as the key 'linkage' between the farm and fork

Value chain — food processing industry



- Key activities across value chain in various categories, such as dairy, poultry, fruits and vegetables, is broadly similar with the only difference being the production techniques and quality requirements.
- A considerable section of this value chain (production, logistics, processing and retailing) are unorganised with limited resources in training and development, which leads to significant skill gaps in key positions across the sector.
- For items, such as fruits, vegetables and other agricultural products (wheat, maize and rice), the produce typically passes through several intermediaries, such as commission agents (arthiyas and mashokars) and wholesalers, before reaching the food processing industry. This prevailing environment leads to a supply chain that has several intermediaries from the farm to the consumer. The unreasonably long supply chain results in steep escalation in the total cost to the consumer.
- Another key difference between dairy and other segments is the degree of forward integration of processing companies, where a number of outlets selling milk and milk products are either owned or closely controlled by processors. Similarly, even the larger grain and oilseed brands are acquiring or operating mills and manufacturing product(s) for their own labels.

Source: KPMG in India analysis

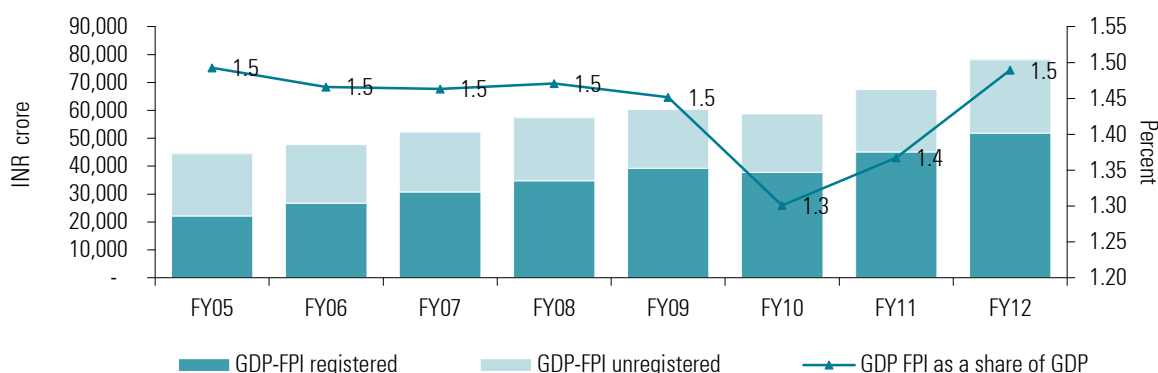
Industry overview

Skilling opportunities in the sector

Overview

- In the last five years, the growth of the Indian food processing (FP) sector has been faster than agricultural growth. The sector is poised for strong growth of about 15 percent till FY17, driven by growth in organised retail, changing consumer preferences and favourable government policies.
- By 2022, the food processing industry is expected to generate about 44.34 lakh new jobs, primarily entry-level and supervisory profiles.
- Several skill gaps exist in various stages of the food processing value chain that need to be addressed. This includes the food processing sector as well as ancillary industries, such as bottling and packaging.
- The growing quality consciousness by the consumers requires the workforce to be skilled in basic hygiene and sanitary practices. Processing units are also adopting mechanisation and technology. There is a growing need to impart technical skills to more specialist personnel who are capable of working on imported machines in specific sub-segments.
- Focus also needs to be on the front-end staff for developing customer relationship management skills, which are integral to maintaining healthy relationship with institutional players, such as hotels, restaurants and retailers.
- Farm procurement is an important area for processing units and need to streamline their raw materials' supply for the rising demand. At a farm level, the growers are poorly equipped and lack awareness of implementing the best practices for growing. This is where the need for procurement staff to be proactively engaged in crop/production advisory is missing.

Actual and percentage contribution of the food processing sector (FPI) to India's GDP (2004-05 prices)



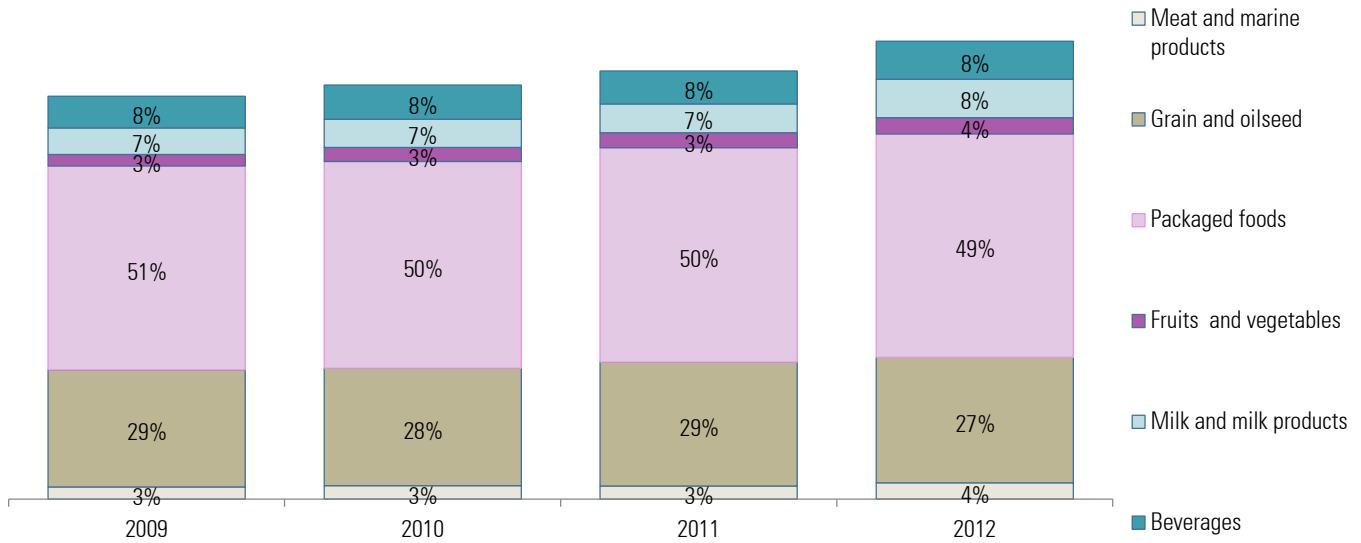
- The contribution of food processing (FP) to GDP has grown at 8.4 percent during FY05–12 broadly in sync with the overall manufacturing sector of India, and faster than the agriculture sector (CAGR of 3.8 percent during FY05–12).
- The employment growth rate in registered units has slowed down after FY07 due to substantial economic slowdown.

Source: Data Bank, MOFPI website,

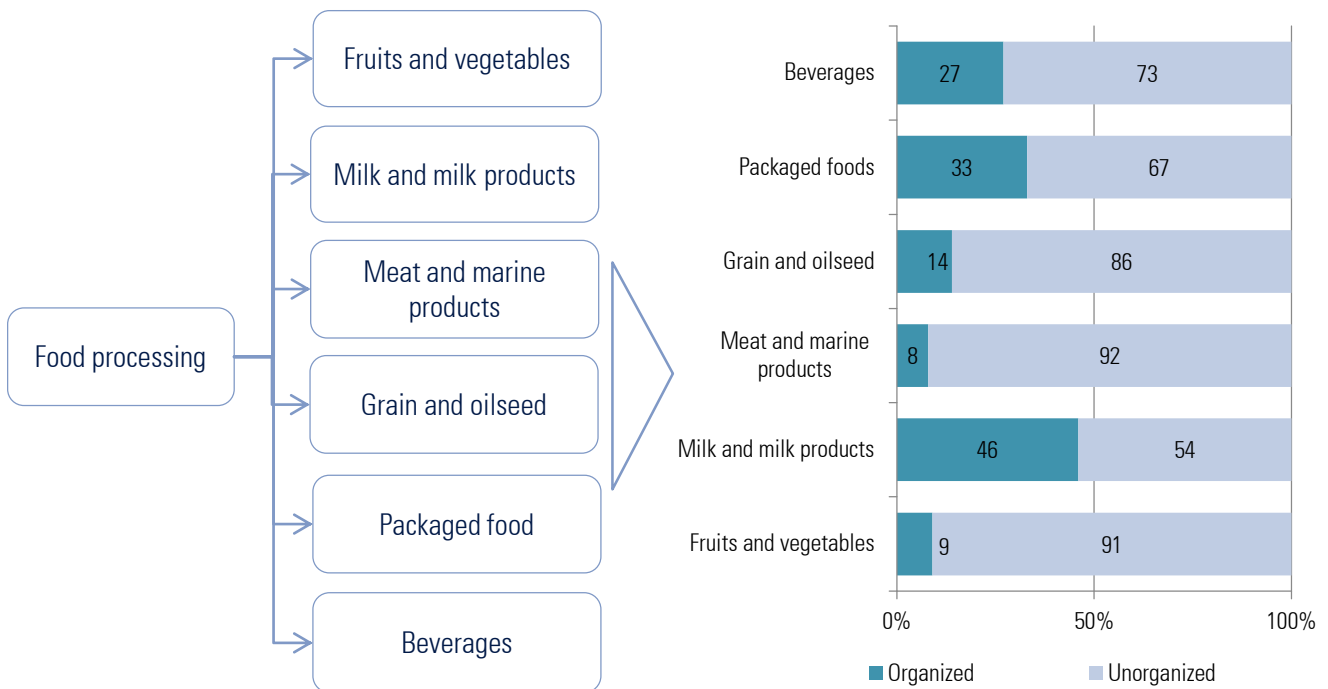
Industry overview

Employment is concentrated in a few selected segments, such as packaged foods and grain and oilseed and dairy

Total personnel engaged in sub-sectors for 2011–12 (in nos.)



Structure of the food processing sector: organised vs. unorganized (by employment)



Sources: Annual Survey of Industries, MOSPI

Growth in organised retail

Food retail is expected to grow well due to low penetration of organised retail and the potential market thereof. With the rising competition between private retail players, strict quality norms and operating standards are implemented by the retailers to attract consumers. There is a considerable focus of retailers on processed food rather than fresh food (which requires more front and back-end efficiencies). This may help the sector, which is currently a fresh produce/primary processing dominated sector, to evolve into a value-added secondary processing dominated sector.

Changing consumer preferences

India has one of the largest consumer bases in the world with a young population (more open to trying out new food products), increasing income (marking a shift towards premium food products) and more time-starved consumers (leading to an increasing shift towards RTE and packaged foods).

Additionally, growing consciousness on health and nutrition among domestic consumers has led to strict control over ingredients and the manufacturing process.

There are growing global concerns over issues, such as food quality and sustainability, are leading to increased efforts in areas, such as operations and traceability.

Favourable government policies

Direct support in the form of financial assistance for technology upgrade and setting up/modernisation/expansion of food processing industries is being encouraged.

Increased alignment with international quality standards, especially for export-related units (in sub-sectors such as meat and marine products, and grain and oilseed) is being encouraged.

100 percent FDI under the automatic route (except for alcohol, beer, and sectors reserved for small scale industries) is now permitted and this has spurred investment in India. FDI in food processing for FY13 stood at INR2406 crores.

Additionally, 30 mega food parks are planned in the Twelfth Five-Year Plan, which is likely to bring value-chain players closer and strongly aligning retailer expectations with the processors.

Supply of raw materials

India ranks number one in the production of milk, bananas, guavas, mangoes, buffalo meat and cashew nuts. It ranks second in the world in the production of rice, wheat, groundnuts, onions, peas, and sugarcane. We have a climate that is suitable for year-round supply of agricultural products. Apart from that, India is strategically placed and closer to the markets of South Asia, Far East, the Middle East, and Africa; which could be a huge production base for the supply of food products.

Low labour costs is also a key factor to consider while establishing production base in the country. India's comparatively cheaper workforce can be effectively utilised to set up large low-cost production bases for domestic and export markets.

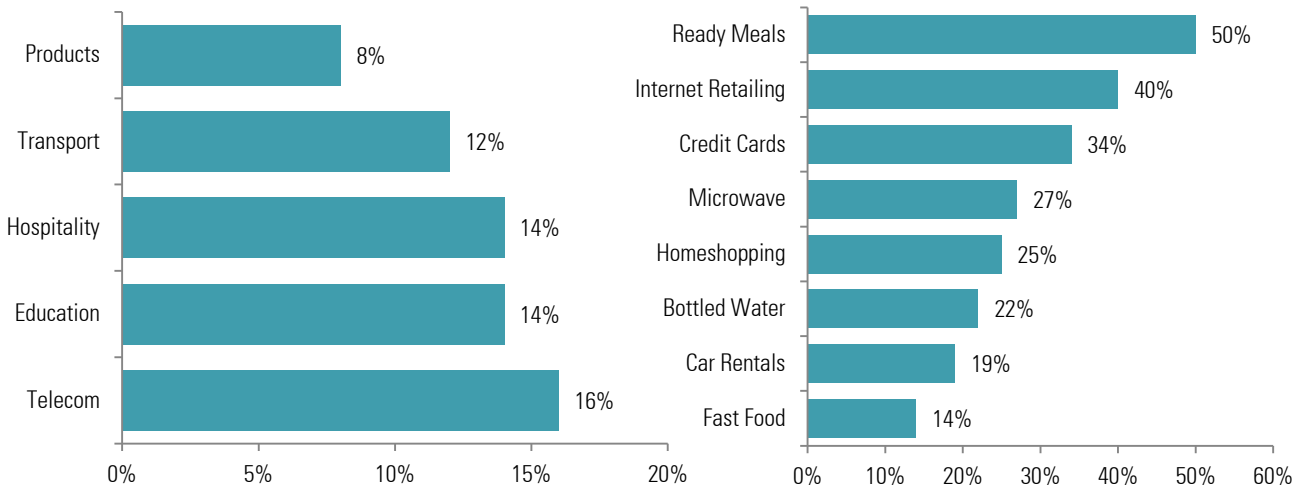
Premiumisation in impulse and indulgence products

Economic growth in India has resulted in increased disposable incomes among the middle-class, and consumers are on the lookout for premium offerings. Indian consumers have shown a willingness to pay extra for indulgence even when unit prices are soaring. This trend has been particularly strong in impulse and indulgence products, such as ice creams and biscuits.

Impulse and indulgence products in India witnessed 22 percent value growth in 2013. This growth was similar to that recorded in 2012. Impulse and indulgence products have been growing at fast pace due to rising income levels, growing urbanisation and busy lifestyles. The gradual switching of consumers to packaged products and aggressive marketing campaigns by manufacturers to attract consumers to their brand have added to the growth. Other factors that have contributed to the growth may be — irregular eating times, long breaks between lunch and dinner, increasing influence of Western culture, including unhealthy eating habits.

Packaged foods, beverages and dairy sub-sectors are targeting this lucrative market by introducing newer products or partnering with multinationals to introduce new products from their global portfolios.

Changing consumption trends and convenience as a key driver



Services are growing faster than products. This has led to tremendous growth in products/services that offer convenience:

Industry overview

There are several trends emerging in the industry, which augurs well for growth in the industry, especially the organised segment

Meeting quality expectations of organised retailers

- Growth in large format (hypermarkets/supermarket) stores could result in increasing demand for processed food.
- Skilled workforce is required at the lower and supervisory levels to ensure the maintenance of established quality norms.
- A growing organised retail sector may also spur demand for senior-level executives from the food processing industry for strategy and business development.
- Special focus is also required to ensure that the front-end staff possesses customer relationship management skills to maintain healthy relationship with institutional players, such as hotels, restaurants and retailers.

- Food consumption was once dominated by cereals; however, with growing income and urbanisation, this trend is increasingly shifting to products, such as dairy, meat and poultry.
- There's a growing need to impart technical skills to staff members capable of working on imported machines in these 'sunrise segments' .
- Focus is also required on support or ancillary sectors, such as packaging/bottling. Food companies are introducing new/unconventional bottles and cans of differing shapes and sizes while a majority of workers are used to working only on standard sizes.

Growing demand of high-end food items and growing innovation in the food industry

Growing demand for value-added food items and low degree of innovation in production practices

- As consumers become more knowledgeable and time-starved with respect to food, the demand for value-added food (such as functional and RTE foods) is likely to increase in the coming years.
- Significant skill-enhancement training are also required to tap the potential of these segments.
- There is a need to increase innovation and improve quality by meliorating procurement processes. Today, procurement staff is required to increasingly engage in crop/production advisory, which requires technical knowledge.

- The food processing industry in India is one of the largest in terms of production, consumption, export and growth prospects. However, there is significant scope for primary and secondary processing, which would create employment opportunities at entry and middle levels.

Top producer of food but lowest production yield among BRIC countries

Lack of robust infrastructure

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, the lack of modern logistics infrastructure, such as logistics parks, integrated cold-chain solutions, last mile connectivity, technology adoption are some of the lacunae that exist in supply chain and logistics sector in India.

Storage infrastructure specific to grain and oilseed is a critical challenge to in reducing wastage levels. Few state governments have started integrating storage areas in a PPP with leading grain processors.

Sub-optimal use of technology and research

Commercial R&D activities in the food industry have remained confined to only a few areas. R&D activities have scarcely emerged from the laboratory to be extensively adopted on the field. Awareness and mechanism to relay information to farmers is very low in the country.

Effective use of farm input, such as high yielding seeds, efficient use of fertilisers and pesticides and crop advisory are some areas that can enable more produce.

Unorganised nature of the sector

The sector is still highly unorganised and the shift of industries is taking place from unorganised to organised but at a slower pace to keep up with the demand. Job creation and skill requirement will multiply manifold provided the shift happens.

Low productivity of land resources

Despite India being an agrarian economy and one of the largest producers of vegetables, fruits, spices, milk, eggs, potatoes, wheat, meat etc., the productivity of crops is quite low when compared to international standards. The problem of low productivity is compounded by poor quality of food produce, lack of grading and sorting, limited marketing infrastructure and research and development facilities. New technologies, innovative business models, government incentives, contract farming initiatives and collaborative efforts by public and private players is expected to help in addressing these challenges and stir the growth of this sector.

Skill Deficit

A survey done during an interaction with employers gave certain key areas where the employees lack in skills and knowledge in this sector. Lack of technical skills was the most frequent skill deficit found with the employers.

Several favourable policy initiatives from state governments have further aided the sector's growth

Over the years, some Indian states have taken independent initiatives to boost the development of agriculture and agri-business industries through various policies and proposed measures. Such initiatives have helped these states attract considerable attention of investors. Baddi in Himachal Pradesh, for instance, has developed into a hub particularly for food processing industries.

The following diagram provides a snapshot of policies across four key states in India:

Punjab

- The Agro Industrial Policy 2009 is incentivising the food processing sector.
- State nodal agencies, such as Punjab Agro Industries Corp Ltd. (PAIC), also work to infuse fast growth by encouraging more industrial partnerships.

Rajasthan

- Rajasthan's policy for the promotion of 'Agro-processing and Agribusiness 2010' will give focus to the areas in oilseeds processing and livestock.

Gujarat

- The food processing sector gets coverage under the Agro Industrial Policy 2000.
- F&V processing units have set up their plants in this state due to industry friendly labour policies.

Maharashtra

- Part 2010–15. Further, the Maharashtra State Food Processing Mission is an extension of a national initiative managed by the state government by the Maharashtra Agro Industries Development Corporation of the Food Processing Policy

Karnataka

- The food processing sector is covered under the Integrated Agribusiness Development Policy 2011.
- Karnataka with its ten different agro-climatic zones and other bounteous natural advantages offers immense opportunities for high growth in agriculture and allied sectors.

Haryana

- The food processing sector is covered under the Government of Haryana's Industrial and Investment Policy 2011.
- Grain processing units will be a major beneficiary of this initiative.

Uttar Pradesh

- The food processing sector is covered under the Food Processing Policy 2012 of Uttar Pradesh.
- Meat processing units are majorly concentrated in this state.

West Bengal

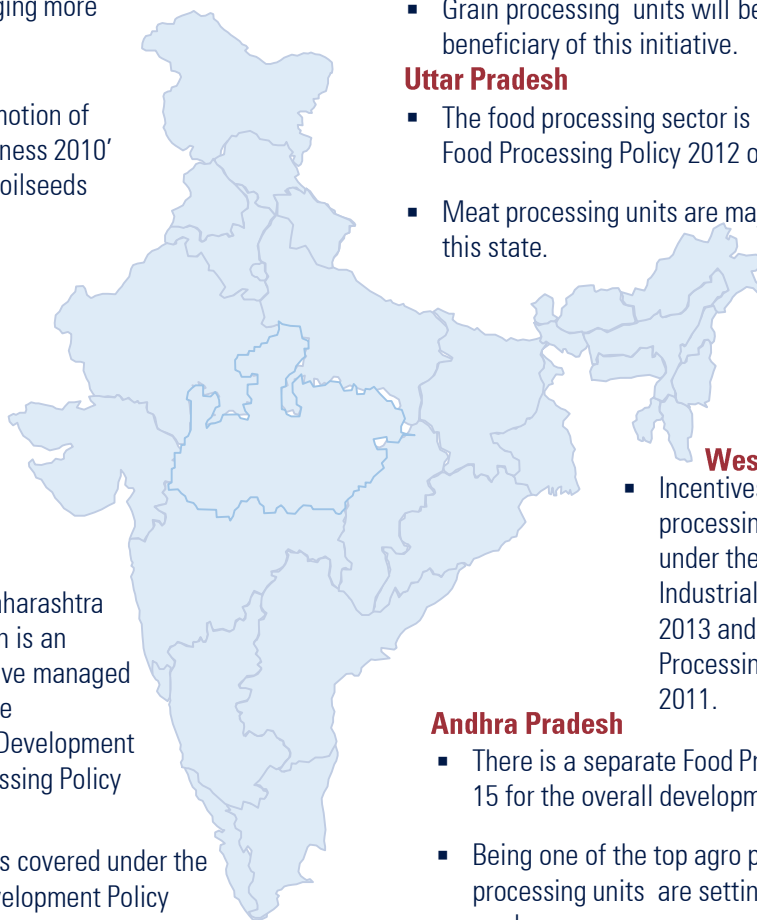
- Incentives for the food processing sector are covered under the Investment and Industrial Policy of West Bengal 2013 and the West Bengal Food Processing Industrial Policy 2011.

Andhra Pradesh

- There is a separate Food Processing Policy 2010–15 for the overall development of the sector.
- Being one of the top agro producers, food processing units are setting plants close to the produce.

Tamil Nadu

- The food processing sector is covered under the Tamil Nadu Agro and Agro Processing Policy 2008.



Strengths	<ul style="list-style-type: none"> ▪ Abundant availability of raw material through India’s diverse agro-climatic conditions and large population of livestock. For example, India is the highest producer of milk in the world and ranks first in the production of bananas, guavas, mangoes and cashew nuts. It also ranks second in the world for production of rice, wheat, groundnuts, onions, peas, and sugarcane. ▪ Large population translating into a vast domestic market, with food consumption set to nearly double in the next 10 years. ▪ Priority sector status for agro-processing given by the central government. ▪ Low-entry costs and government incentives to promote food processing.
Weaknesses	<ul style="list-style-type: none"> ▪ Storage warehouses are poorly equipped to handle the large food grains produce. ▪ Cold chain facilities face erratic electricity supply. ▪ Inadequately skilled workforce, especially in terms of technical skills and knowledge of operating and maintaining food machinery. ▪ Lack of adequate training institutes, courses, R&D and testing facilities. Food testing laboratories are in the initial phase of setup all over the country by FSSAI. Most of them possess outdated infrastructure. ▪ Lack of variety in offerings and high degree of commoditisation, especially among small unorganised players that still employ a majority of workforce.
Opportunities	<ul style="list-style-type: none"> ▪ Increasing demand for secondary processing and packaged food items, such as RTE items and milk products. ▪ Mandating contracts with organised retailers that may improve adherence to international quality standards, which could, in turn, encourage skill improvement for FP players, leading to improved access to domestic and export markets. ▪ Growing role of regional FP players due to increased need for localisation and customisation of offerings by food companies to suit the Indian palate. ▪ Extremely low processing levels especially in F&V sub-sector. ▪ Gradual liberalisation of the retail sector leading to improved backward linkages with processors
Threats	<ul style="list-style-type: none"> ▪ Lack of any incentives or skill development from the government on the packaging front may limit deeper penetration into small cities. ▪ Delay in government initiatives — land acquisition and environmental hurdles in commissioning of mega food park projects. ▪ Limited production and availability for processing variety of products, such as fruits and vegetables. ▪ Lack of concerted efforts to integrate cooperatives (which are major players in the FP industry) in initiatives, such as food parks. ▪ Limited growth in storage and warehousing capacity for other types of products may hamper the growth of the FP industry. Currently, a majority of cold-storage facilities are utilised for potatoes.

Sub-sectoral overview

Sub-sectoral overview- Fruits & Vegetables

Fruits and vegetables (F&V)

Industry structure

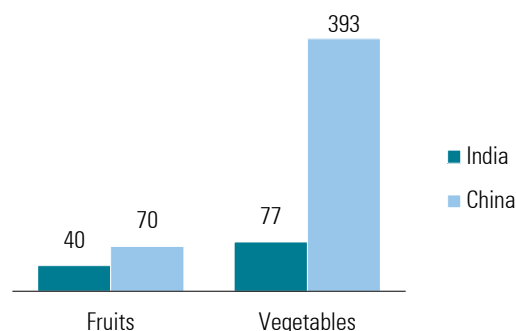
India ranked second-largest in the world, in 2012, as the producer of fruits and vegetables (F&V) as per FAO. Increasing domestic and international demand for fruits created this significant growth opportunity.

The F&V consumed in India are mainly in the primary form. A lot of time is spent in cutting, cleaning and sorting F&V before cooking. This presents an opportunity to offer tertiary processed products that can substitute domestic cooking with ready-to-eat meals and canned food.

However, the F&V processing sector is still in its embryonic stage. Compared to 65 percent in the US, only 2.2 percent of India's total F&V are processed.

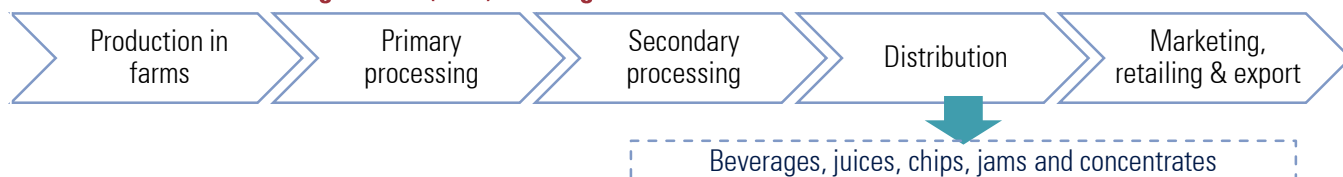
Evolving lifestyle trends, such as the emergence of nuclear families, rising cases of lifestyle diseases, growing exposure to international markets and increased awareness due to media proliferation is driving the demand for fresh F&V.

Per capita/annum consumption of fruits and vegetables in India and China (in kilogram)



The Chinese population consumes more quantities of fruits and vegetables as compared to Indian population. This can be attributed to their lifestyle and high level of health consciousness.

Value chain - fruits and vegetables (F&V) sub-segment



F&V — major segments and sub-segments							
Fresh F&V	Dry fruits		Processed/preserved F&V				
Grapes, mangoes, bananas, mushrooms, chillies, onions	Raisins	Cashew	Jams, jelly, pickle	Sauce, food paste	Juice/concentrates	Canned F&V	Potato flour

Economic performance

India is the second-largest producer of fruits and vegetables in the world, accounting for about 10 percent of the global production.

India exported 11 percent of its fruits produce. Some of the major destinations include the Middle East and some of the South-Asian countries. The prominent processed items are fruit pulps and juices, fruit-based ready-to-serve beverages, canned F&V, jams, squashes, pickles and chutneys.

Key players

Category	Players
Jams	HUL, Marico, Kissan, Malas
Pickles	Priya Foods, Desai Brothers, Cavin Kare
Sauce	HUL, Nestle, Heinz, GD Foods
Pulp	Foods and Inns, BEC, Clean Foods, Usha International
Juices	Pepsi, Dabur, Parle, Godrej, Mother Dairy
Squashes	HUL, Haldirams, Mapro, Kissan
Ready to eat	Tasty Bite, ITC, MTR
Cooking pastes	Dabur, HUL

Source: India has immense scope in fruit processing, FnB News.com, FAOSTAT; FICCI – Flavours of Incredible India 2009; MoFPI – Vision 2015, vol. 2

Sub-sectoral overview- Milk and milk products

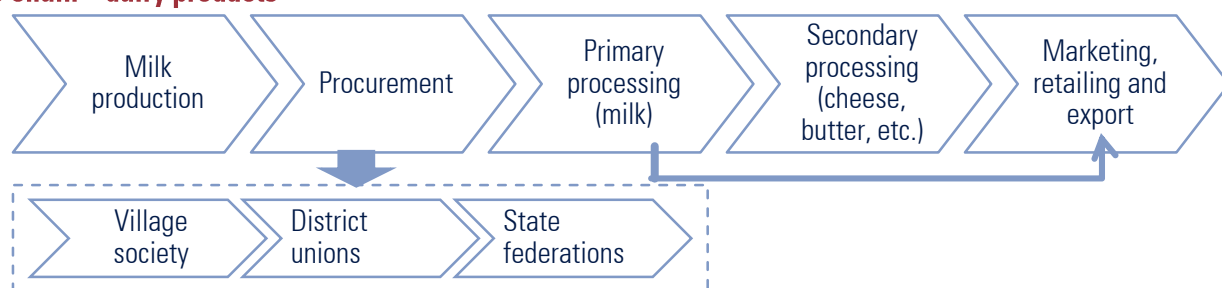
Milk and milk products

Industry structure

India ranks first in the world in production of milk. Milk and milk products account for a significant 17 percent of India's total expenditure on food. Despite a high growth rate, the per capita availability of milk in India (229 grams per day) is lower than the world average (285 grams per day).

This sector is highly fragmented with the organised sector processing 13 million tonnes of milk and unorganised sector processing 22 million tonnes per annum. While private dairies do exist, a large proportion of the milk is processed by dairy cooperatives in the country. The large unorganised sector exists partly because consumers have been unwilling to pay the additional costs of pasteurisation and packaging, which can raise retail prices by over 100 percent. Moreover, consumers often regard raw milk and traditional products obtained from reliable vendors to be of better quality than formally processed dairy products.

Value chain – dairy products



Major segments

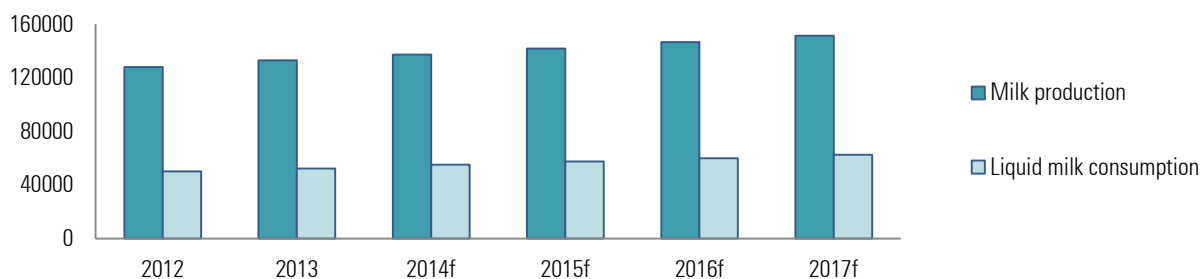
The milk and milk products can be broadly consists of the following six categories:

Pasteurised milk	Milk powder, ice cream powder, condensed milk	Infant foods	Cream, butter, cheese, curd, ghee, etc	Ice creams	Others
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Economic performance

In milk and milk products, India is the largest producer, accounting for 16 percent of global production. In terms of livestock, the country has the largest livestock population in the world, with 5.44 crore cows and 10.53 crore buffaloes as per 2008 data.

India milk production and consumption ('000 tonnes)



Notes: f = BMI forecasts
Source: "Report on Animal Husbandry and Dairying", Planning Commission 2007–12; National Dairy Development Board, FAPRI, BMI; FAOSTAT

Sub-sectoral overview- Milk and milk products

Milk and milk products

Key players

There are only a few large companies in India and the product range is limited as compared to those of their global peers. Also, lack of vertical integration restricts their expansion capabilities and economies of scale

Global and Indian food processing companies

Global companies	Indian companies
Nestle +++	GCMMF +++
Kraft foods +++	Nestle +++
Unilever ++	HUL +
	Britannia +
Note: Low presence in the category: + High presence in the category: +++	

Some of the major players in the milk and milk products segment are

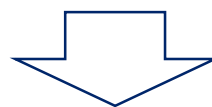
Company	Brands	Range
Gujarat Co-operative Milk Marketing Federation Ltd.	Amul	Milk, butter, cheese, yoghurt and other milk products
AP Dairy Development Cooperative Federation (APDDCF)	Vijaya	Table butter, UHT milk, skim milk powder, ghee, flavoured milk, khoya, pasteurised butter, kulfi and processed cheese
Punjab State Cooperative Milk Producers' Federation (MILKFED)	Verka	Ghee, flavoured milk, paneer, ice cream, skim milk powder, lassi, table butter, sweets and cheese
Mother Dairy	Mother Dairy	Milk and milk products
Nestle India Limited	Everyday, Milkmaid, Boost, Cerelac,	Milk, dairy whiteners, sweetened, condensed milk, nutritional and infant drink, milk food and yoghurt
Cadbury	Bournvita	Malt food

Key success and risk factors



- A majority of cattle is dependant on natural breeding
- Availability and the quality and cost of feed is a major issue
- Lack of availability of land for fodder grass
- Low productivity, large number of unproductive animals and poor genetic resources affect generation capacity
- Poor access to institutional credit and credit through informal channel

- Ability to increase the scale of output
- Wide product portfolio of high-value products, such as yoghurt and sweets
- Ability to tap export markets
- Developing a portfolio of milk-based products



The major growth drivers of the milk and milk products sector are increasing per capita income, increasing population and high per capita consumption of milk, which leads to greater demand for high-value dairy products, such as cottage cheese and yoghurt.

However, given the strong rate of consumption-growth, India is able to just meet its domestic demand and it is only marginally dependent on dairy imports.

Sub-sectoral overview-Meat and marine products

Meat and marine products

Industry structure

The 'meat and marine products' market share is expected to increase from INR25200 crores in 2012 to INR56500 crores by 2017, witnessing a CAGR of 17 percent.

The forecasted beef and buffalo production in India is set to rise by 9.8 percent and 4 percent in 2015 to 3.8 and 4 million tonnes, respectively.

Demand for dairy products is fuelling herd expansion. As a result of sustained production and export capacity growth, India is expected to remain the world's largest beef meat exporter in coming years as well.

Ready-to-eat meat and marine products, part of the processed food category, is expected to grow at a CAGR of 20–25 percent.

Increase in the level of processing

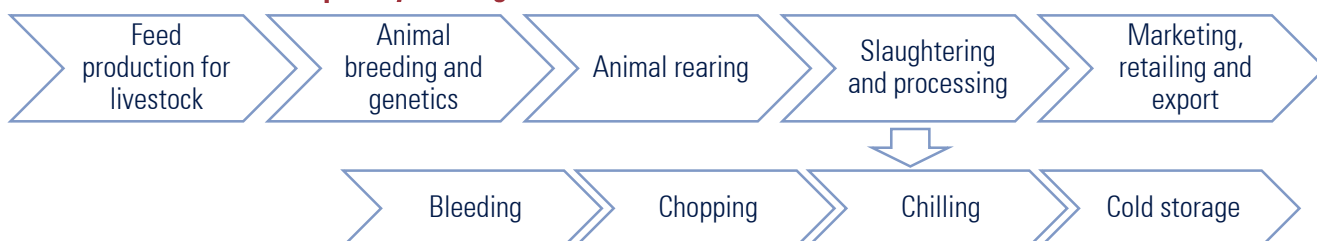
	Level of processing (%)			Value addition (%)
	2003–04	2009–10	2014–15 (E)	
Buffalo meat	21	35	45	5%
Poultry	6	15	25	5%
Marine products	8	15	20	10%

Note: The details pertains to only the organised sector. Source: Rabo India Finance, vision 2015

Key players in various segments

Poultry products	Godrej Agrovet, Venkateshwara Hatcheries
Marine products and seafood	Bell Foods, Deep Sea Products and ASF Sea Foods
Frozen buffalo meat, chilled/frozen sheep and goat meat	Frigo Refico Allana Limited, P.M.L. Industries, Alkabeer Exports Limited and Hind Agro
Pork and other meat products	A.P. Meat and Poultry Corporation, MAFCO, Ranchi Bacon Factory and U.P. Pashudhan Udyog Nigam Ltd

Value chain — meat and poultry sub-segment



Value chain — marine products



Source: KPMG in India analysis as on 18 February 2014

Sub-sectoral overview-Grain and oilseed

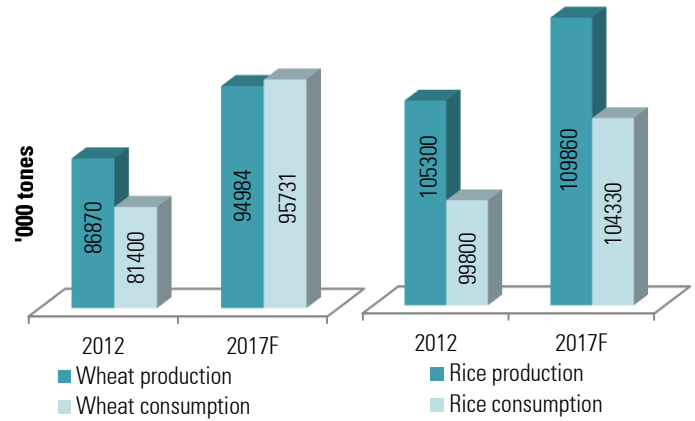
Grain and oilseed

Industry structure

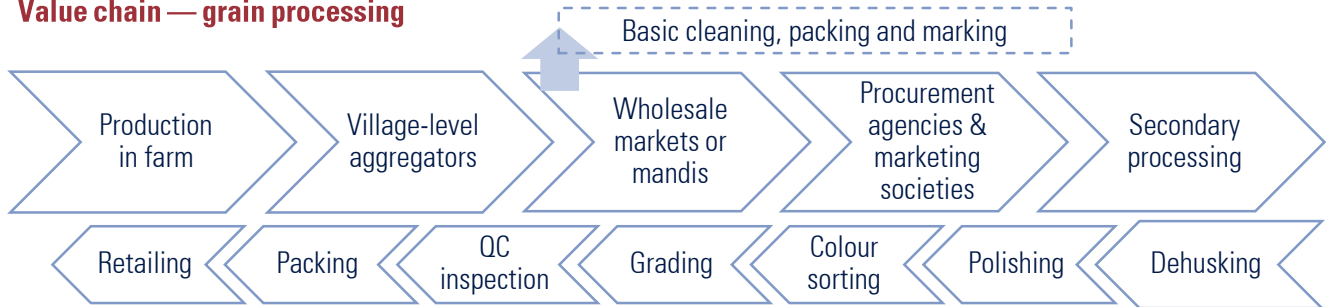
India produced 257.55 million tonnes of different food grains in 2011–12. Major grains, such as rice, wheat, maize, barley and millets such as jowar (great millet), bajra (pearl millet) and ragi (finger millet), are produced in India. Among these, wheat, rice and maize together account for about 80 percent of the country's total production.

Groundnut, mustard and soyabean oilseeds form over 92 percent of the country's total oilseed production.

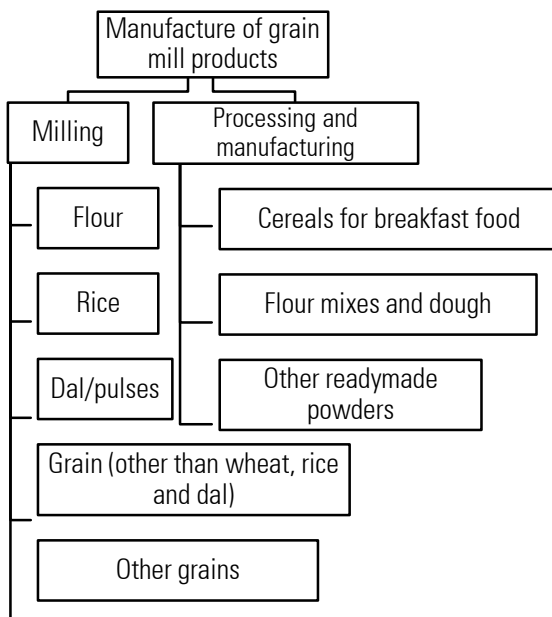
India's key grain production and consumption trend (2017 forecasts)



Value chain — grain processing



Major segments



Value chain — oilseed processing



Source: "Food Processing industry in India", <http://www.asa.in/pdfs/surveys-reports/Food-Processing-Sector-in-India.pdf>

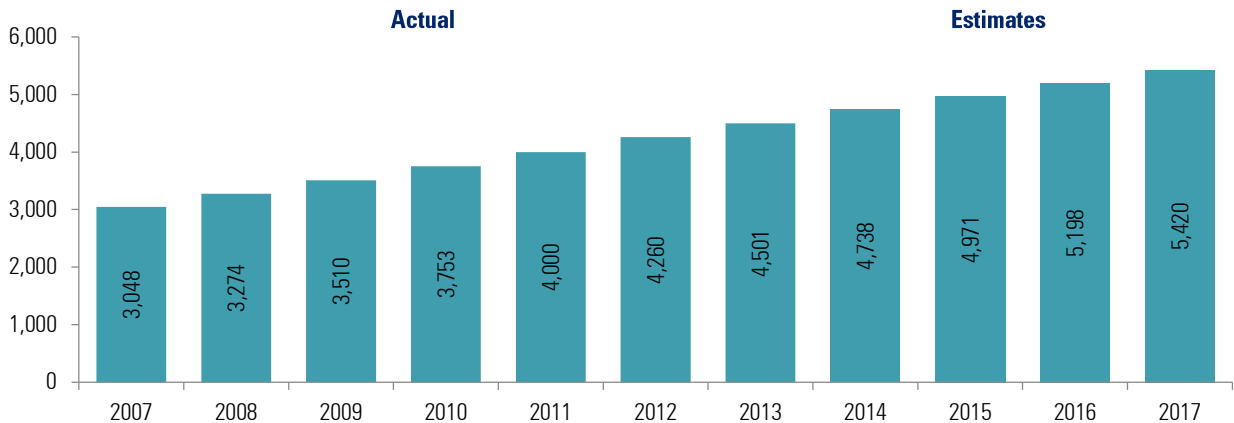
Sub-sectoral overview-Packaged foods

Packaged foods

Industry structure

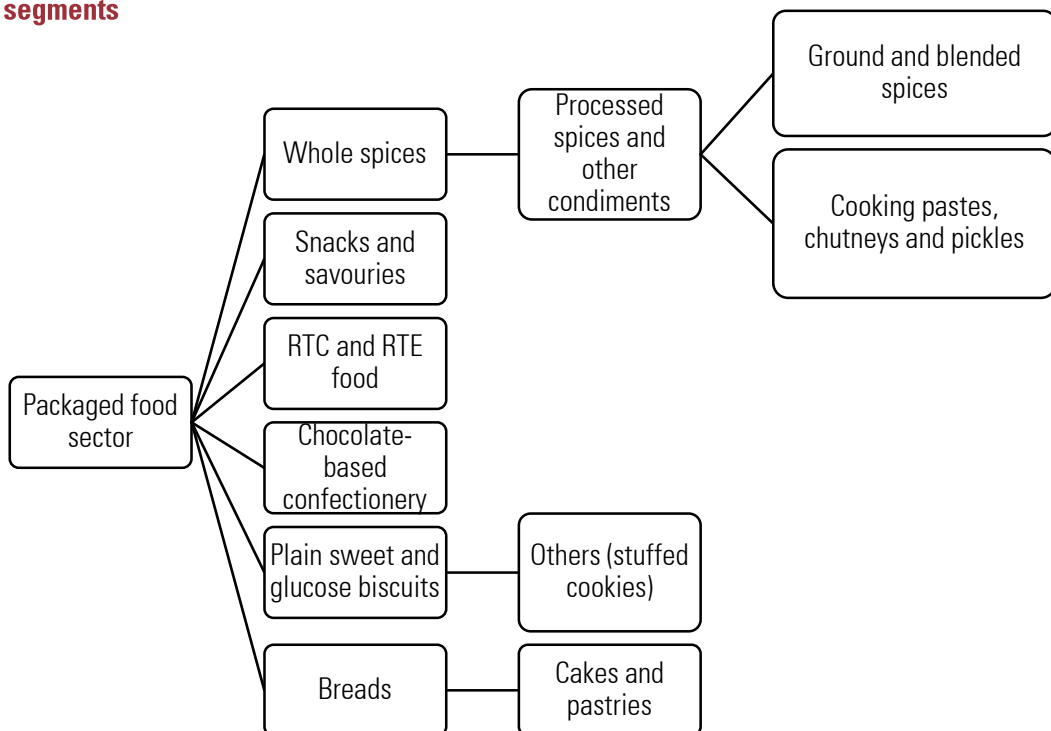
The Indian packaged food market, including confectionary, dairy, baked goods, sauces and household staples, such as packaged rice, was worth INR1 lakh crores at the end of 2011. With rising incomes, favourable demographics and changing lifestyles, this sector has grown at over 13 percent per annum over the last few years.

Food service sales of packaged food (volume in '000 tones)



Note: Market includes the baby food,
Source: "Packaged Foods in India", Euro monitor, 2013

Major segments



Source: KPMG in India analysis as on 18 February 2014

Sub-sectoral overview-Beverages

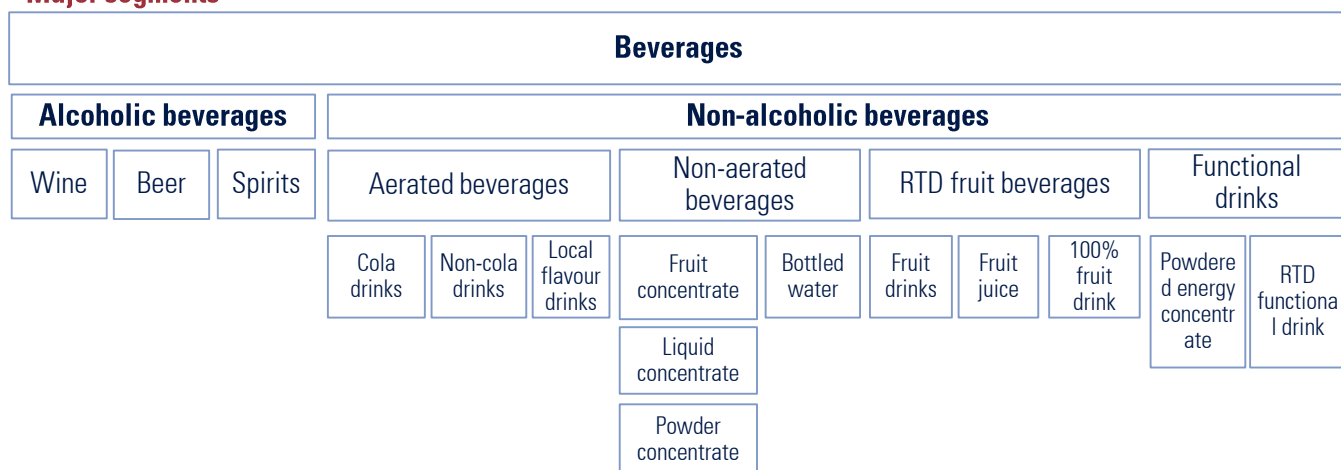
Beverages

Industry structure

The beverages industry in India has come a long way from local flavoured drinks to fruit beverages and soft drinks to the introduction of international coffee and alcohol brands, the industry has the potential to touch the market size of more than INR1 lakh crores.

The following figure presents the sub-sector classification of the beverages industry.

Major segments



The introduction of breweries to India is likely to be a major driver of growth of in the alcohol sub-segment. These breweries make and sell their own beer as opposed to selling traditional bottled ones. Another attribute is the increasing acceptance of alcohol-based beverages in society across age groups.

Key growth drivers

Increasing focus on health giving rise to increased consumption and demand for 'organic beverages'

Increasing availability of functional/fortified beverage brands

Increasing demand for 'better for you beverages', such as Diet Coke

A growing number of cinemas and the spread of the mall culture further drives the sale of soft drinks and hot beverages

Key players

	Products	Key players
Non-alcoholic beverages	Fruit juice, fruit drinks	PepsiCo, Dabur, Parle
	Tea, coffee, milk	HUL, Nestle, Tata
	Bottled/mineral water	Bisleri International, Parle, Coca Cola
	Instant drink, soft drink, concentrate	Rasna, Tata
	Energy drink, syrups	Red Bull, PepsiCo
Alcoholic beverages	Beer	United Breweries, Sab Miller
	Wine	Grover Vineyards, Sula Vineyards
	Whisky	Pernod Ricard, Radico Khaitan, UB
	Rum/Brandy	Mohan Meakin Ltd., Radico Khaitan

Source: Organic Beverages in India' – Beverage and tobacco product manufacturing – Euromonitor-Sector capsules KPMG in India analysis

Geographical clusters

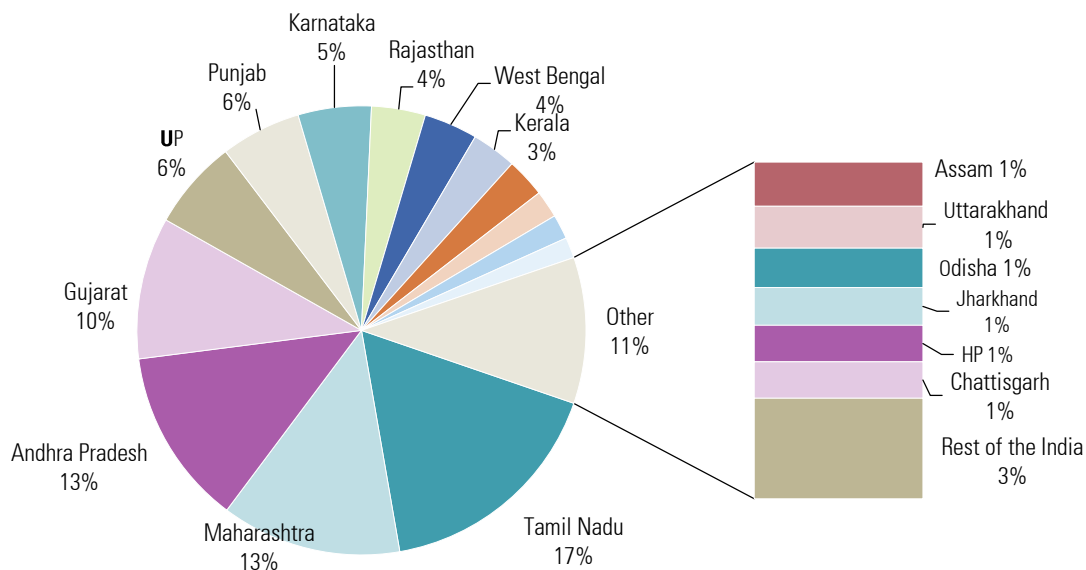
Geographical clusters

Geographic distribution of the food processing sector

State	Number of factories	Total persons engaged
Tamil Nadu	36,996	1,940,819
Maharashtra	28,215	1,880,767
Andhra Pradesh	27,708	1,362,788
Gujarat	22,220	1,383,773
Uttar Pradesh	14,090	864,346
Punjab	12,593	600,041
Karnataka	11,460	905,946
Rajasthan	8,444	474,883
West Bengal	8,402	654,276
Kerala	7,031	393,425
Haryana	6,142	582,372
Madhya Pradesh	4,286	314,838

- Due to India's diverse geographic and agro-climatic conditions, several food processing segments have emerged in various states.
- The creation of clusters is also gaining momentum because they are increasingly considered as a viable option for improved productivity and export development.
- There is a huge potential to improve the availability of quality manpower through the development of training centres by organisations, such as the National Institute of Food Technology Entrepreneurship and Management (NIFTEM) and the Indian Institute of Crop Processing Technology (IICPT).

State-wise distribution of food processing units



Source: ASI 2011-12 from MOFPI, Food processing, Invest India website

Geographical clusters

Major production clusters

The food processing industry in India is fragmented. The following diagram depicts the state-wise distribution of major production and service clusters in India:

Punjab

- Milk and milk products
- Meat and marine
- Grain and oilseed

Himachal Pradesh

- Fruits and vegetables

Haryana

- Milk and milk products
- Meat and marine
- Grain and oilseed
- Packaged foods
- Beverages

Rajasthan

- Milk and milk products

Gujarat

- Fruits and vegetables
- Milk and milk products
- Packaged foods

Maharashtra

- Fruits and vegetables
- Milk and milk products
- Meat and marine
- Grain and oilseed
- Packaged foods
- Beverages

Karnataka

- Fruits and vegetables
- Milk and milk products
- Meat and marine
- Packaged foods

Kerala

- Fruits and vegetables
- Meat and marine
- Grain and oilseed



Uttar Pradesh

- Fruits and vegetables
- Milk and milk products
- Meat and marine
- Grain and oilseed
- Packaged foods

Bihar

- Meat and marine
- Grain and oilseed

Madhya Pradesh

- Milk and milk products
- Grain and oilseed
- Packaged foods
- Beverages

West Bengal

- Meat and marine

Andhra Pradesh

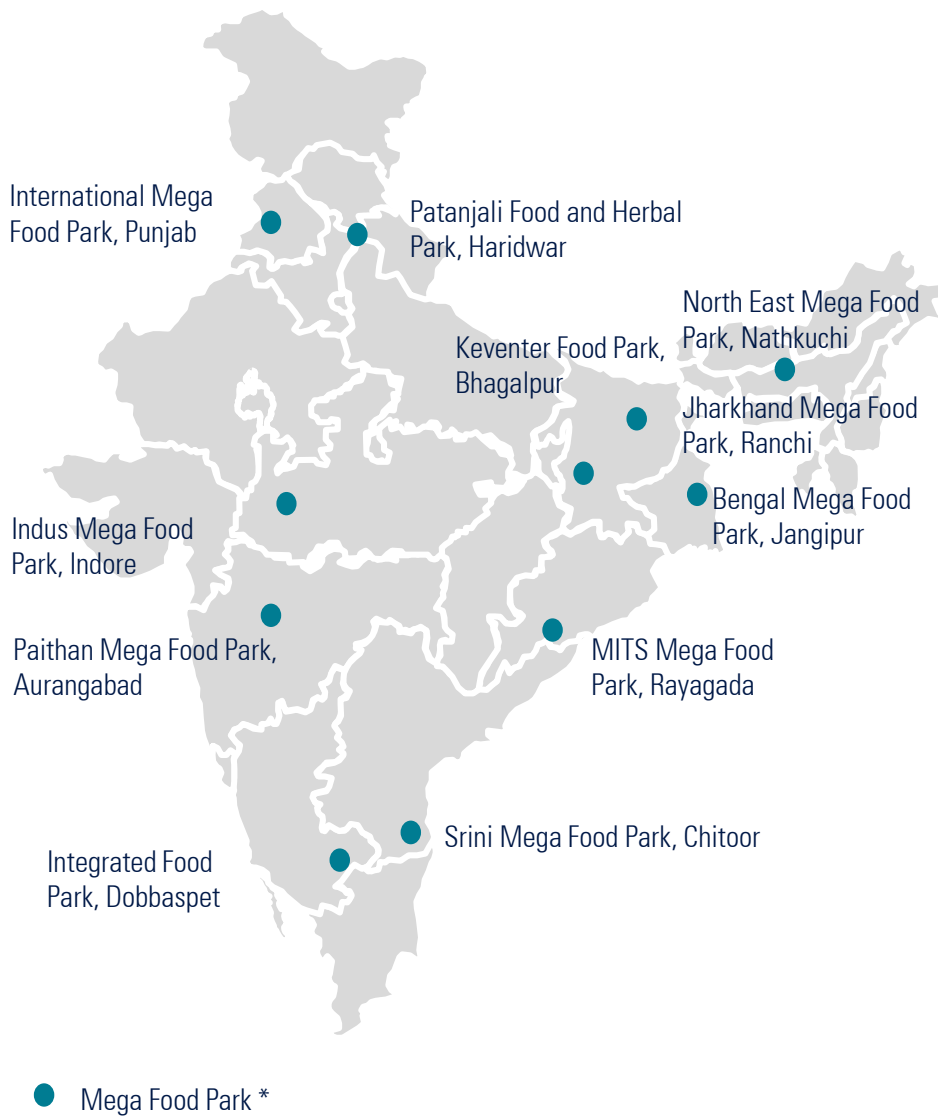
- Fruits and vegetables
- Milk and milk products
- Meat and marine
- Grain and oilseed
- Packaged foods
- Beverages

Tamil Nadu

- Fruits and vegetables
- Milk and milk products
- Meat and marine
- Packaged foods
- Beverages

Geographical clusters

Geographical mapping of food parks and key employers in various sub-sectors of the food processing sector



* Indicative list of operational food parks

Key employers (sub-sector-wise)

Fruits and vegetables

HUL, Nestle, Parle Agro, Pepsico

Milk and milk products

Amul, Britannia, Mother Dairy, HUL

Meat and marine products

Hind Agro, Godrej Agrovet, Al-kabeer Exports

Grain and oilseed

LT Foods, Kohinoor, Bunge, Cargill

Packaged foods

Britannia, ITC Foods, HUL

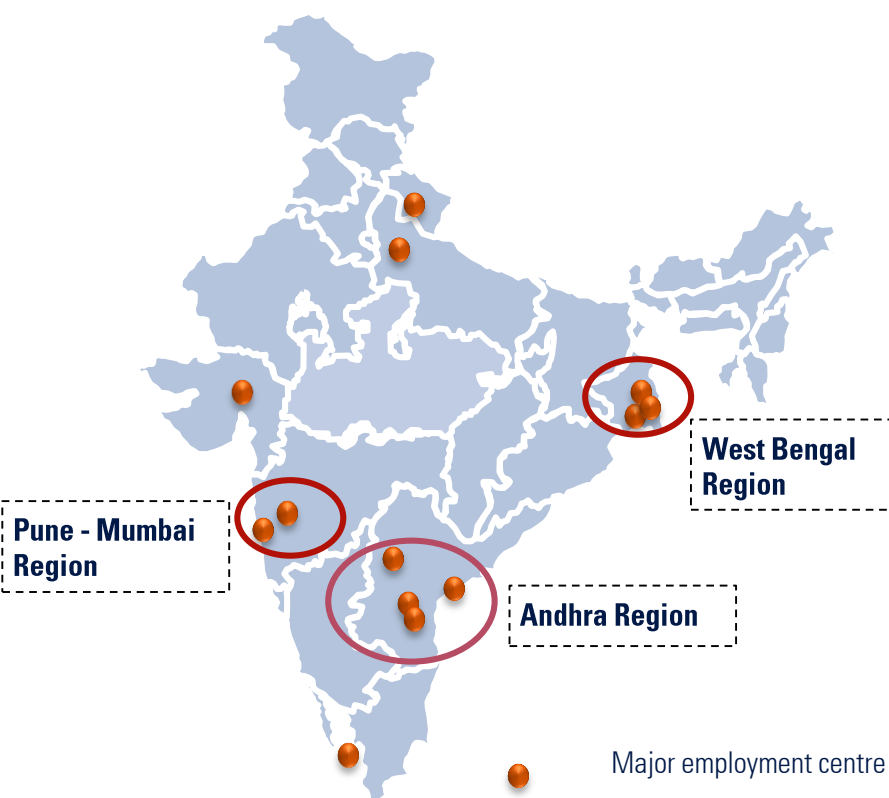
Beverages

Coke, Pepsico, Dabur, SAB Miller

The scheme for Food Parks was introduced in the Eighth Five-Year Plan envisaging the integration of the entire value-chain comprising of farmers, processors and retailers. Apart from the above list of food parks, 19 other projects have been granted 'in-principle' approval.

Geographical clusters

Major employment clusters



Andhra Pradesh has the maximum registered food units in the country and is expectedly one of the top regional clusters in the sector.

Further, new emerging clusters in MP and Jharkhand will be expected to attract a bulk of manpower.

The Pune-Mumbai region is growing on the account of high urbanisation resulting in high demand.

West Bengal region is dominated by players in marine processing and labour is supplied from the neighbouring state, Odisha.

District	Total Employment (Unorganised)
Chittoor	192,607
Cuddapah	75,800
Anantapur	58,236
Purba Midnapore	79,170
Bardhaman	29,510
North 24 Parganas	42,212
Pune	45,284
Mumbai	103,252
Kollam	10,022
East Godavari	44,401
Haridwar	5,688
Mehsana	7,024
Aligarh	18,539

Paddy production has increased manifold resulting in Andhra Pradesh taking over the mantle of the country's top paddy producer from Punjab. Several rice mills are located at the coastal regions in Andhra.

Several aspects, such as abundant natural resources, availability of land and cost effective labour force is propelling Jharkhand as one of the top investment destinations for setting up food parks.

Jharkhand and Andhra Pradesh will be major employers by 2022 due to favourable state-level policies and good supply of raw materials in those regions.

Source: NSSO Round 67 for Unorganised Employment and Primary Interactions

Realising the potential of growth in this sector, the government has initiated several policies as per the Twelfth Five-Year Plan. Key recommendations as per the Twelfth Five-Year Plan are:

Setting up of National Mission on Food Processing to improve coordination and implementation of schemes and to enable greater involvement of state governments.

Expanding and modifying existing infrastructure development schemes, such as Mega Food Parks Scheme, and Integrated Cold Chain Scheme.

Setting up and Modernisation of Abattoirs — establishment of new abattoirs and modernisation of existing abattoirs.

Developing and strengthening existing and new institutions.

Taking up a nation-wide skill development programme along the lines of special projects for skill development of rural youths under SGSY of MoRD.

Putting in place a network of food testing labs (government/private) through providing incentives.

Encouraging larger participation in Codex deliberations and setting up/strengthening of Codex Cell in FSSAI to promote, coordinate and monitor related initiatives at the level of stakeholders.

Setting up of an 'Innovation Fund and Venture Capital Fund for Food Processing' to promote innovations and technology development.

Considering the growth potential — every state has made significant investments for focused infrastructural growth of the sector

This industry is less capital-intensive and more labour-absorptive in nature as compared to capital goods or manufacturing sector. Currently dominated by MSMEs, there is a huge scope of employment from this sector and successful policies and their implementation is vital for the country to achieve its job creation goals.

The key regulation in the agricultural sector, especially for horticultural produce, is the APMC Act. The Government of India has circulated model legislation titled 'The State Agricultural Produce Marketing (Development and Regulation) Act, 2003' to bring about reforms in agricultural marketing. Contract farming, direct marketing and public-private partnership, among others, in the management and development of agricultural markets are the major instruments of change. Twenty-five states/UTs have already amended their respective APMC Act or made varying provisions for the purpose, while other states are in the process of amending the Act.

The table on the next page highlights the status of the food processing industry infrastructure in key Indian states:

States	Food processing industry projects and investments
Andhra Pradesh (AP)	<ul style="list-style-type: none"> ▪ Andhra Pradesh has approximately 27,000 registered food processing units as per data from the Department of Industries, State Government (2011–12). ▪ Agri-export zones: Hyderabad, Vijayawada, Ranga Reddy, Medak, Mahaboobnagar, Guntur and Chittoor have agri-export zones in the state for produce such as mangoes, fresh vegetables, chilli, grapes and gherkins. ▪ Mega food parks: Under the Mega Food Parks Scheme, two Mega Food Parks - Srini Food Park in Chittoor and Godavari Mega Aqua Food Park in the Godavari district have started commercial operations. ▪ Cold chain projects: MOFPI has sanctioned five cold chain projects in the state under its 'Scheme for Cold Chain, Value Addition and Preservation Infrastructure'. One project in Hyderabad district has already started commercial operations.
Bihar	<ul style="list-style-type: none"> ▪ Agri-export zones: In Bihar, agri-export zones have been identified in Muzaffarpur, Samastipur, Hajipur, Vaishali, East and West Champaran, Bhagalpur, Begularai, Khagaria, Sitamarhi, Saran and Gopalganj for focus products such as litchi, vegetables and honey. ▪ Industrial areas: There are designated industrial areas in almost all the districts of the state. The Bihar Industrial Area Development Authority (BIADA) is the state government agency responsible for these industrial estates. ▪ Mega food parks: There are two food park projects operating in Kahelgaon, Bhagalpur, and Khagaria. ▪ Cold chain projects: Under the 'Scheme for Cold Chain, Value Addition and Preservation Infrastructure', the cold chain facility in Begusarai district has already started its operations.
Chhattisgarh	<ul style="list-style-type: none"> ▪ Since rice is a prominent agriculture produce, the state has more than 600 rice mills. The state government has also established 25 production units for value-added services, such as grading, processing, waxing, extraction and distillation. Additionally, MOFPI has identified 10 production clusters to establish processing plants in the state ▪ Mega food parks: MOFPI has accorded an in-principle approval to two mega food park projects in the Raipur district. ▪ Cold chain projects: One cold chain project is also underway in the state under the 'Scheme for Cold Chain, Value Addition and Preservation Infrastructure'.
Maharashtra	<ul style="list-style-type: none"> ▪ The share of the food processing industry in the total share of the industrial sector is 11.1 percent. There are ~173 approved FDI proposals in the food processing sector with an investment of INR1,039 crores between August 1991 and March 2012. ▪ There are eight notified agri-export zones for products like mangoes, grapes and pomegranate and two wine parks. ▪ Six food parks were established in the state during the tenth FYP under MOFPI's Food Park Scheme. ▪ There are approximately 10 projects approved by MOFPI under its cold chain, value addition and preservation scheme.

States	Food processing industry projects and investments
<p>Gujarat</p>	<ul style="list-style-type: none"> ▪ More than 30,000 food processing units are operating in Gujarat and provide employment to over one million people. ▪ Agri-export zones: Under the Agricultural and Processed Food Export Development Authority (APEDA) scheme, the state government has earmarked Agriculture Export Zones for mangoes and vegetables (Ahmedabad to Valsad) and for value-added onions (Saurashtra). ▪ Mega food parks: The state has Anil Mega Food Park Pvt. Ltd. (project SPV) in Vadodara and recently, MOFPI has also accorded in-principle approval for a mega food park project to be established in the Surat district. ▪ Cold chain projects are being implemented with assistance from MOFPI; the ministry has approved four projects in Gujarat.
<p>West Bengal</p>	<ul style="list-style-type: none"> ▪ Agri-export zones: Six AEZs have been proposed in West Bengal, one for each — pineapple, mango, lychee, vegetables, potato and flowers. ▪ Agro-food parks: About eight agro-food parks have been developed in the state with the intention of providing support to small and medium entrepreneurs by assisting them (financially) in establishing capital-intensive facilities, such as cold storages, warehouses, quality control labs and effluent treatment plants. ▪ Mega food parks: One mega food park is being implemented by SPV Jangipur Bengal Mega Food Park Pvt. Ltd. and is being established at Jangipur with an estimated investment of INR132.70 crores, with a grant of INR5 crores.
<p>Karnataka</p>	<ul style="list-style-type: none"> ▪ There were ~1,550 food products and beverage manufacturing units registered in the state until the end of 2011–12. Total investment in these units was estimated at INR230 crores. ▪ Agri-export zones: About eight zones in the state have been earmarked for gherkin, three for rose onion, six for flowers and vanilla, each. ▪ Mega food parks: One mega food park (located in Tumkur) is operational in Karnataka. Additionally, the state government has a Food Parks Scheme under which food parks are being established in six districts, including Bangalore (rural), Tumkur, Shimoga, Davangere, Bijapur and Belgaum. The state government is also planning to set up a spice park at Byadagi in the Haveri district.
<p>Haryana</p>	<ul style="list-style-type: none"> ▪ As of March 2013, ~2,248 companies in the state were registered as food processing units, which are engaged in the processing of food grains and fruits and vegetables. ▪ Cold chain projects by MOFPI: Three projects were approved by 2012. ▪ There are no APEDA-notified agri-export zones in the state. However, the Haryana State Industrial and Infrastructure Development Corporation (HSIIDC) and the Haryana State Agriculture Marketing Board (HSAMB) have played a key role in the development of the food processing infrastructure in the state through various initiatives, such as food parks at Rai (Sonapat) and Saha (Ambala).

Demographic characteristics of workforce

Demographic characteristics of workforce

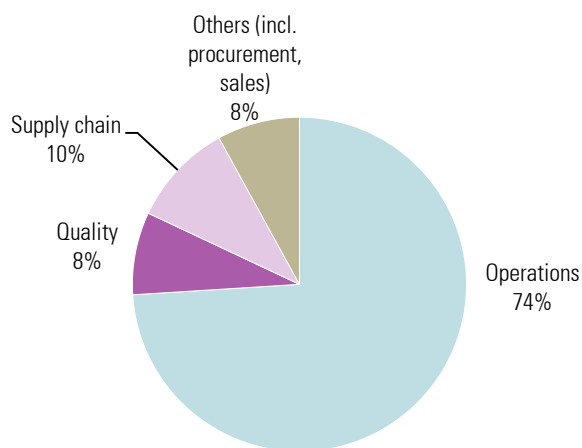
Fruits and Vegetables segment

Predominantly concentrated by unorganised players, contractual or informal employees are recruited in high number as compared to other sub-sectors. For fruits and vegetables sub-sector, seasonality plays a big role in peak-time employment. However, these roles are contractual for jobs, such as packers and loaders. The employers in this sub-sector almost double their contract labourers during the peak season.

There is no homogeneity on the levels of education of the workforce; however one can say that process operators are higher secondary or below and this forms the bulk of hiring. Workers and operators are hired locally from nearby areas where the plant is situated. Word of mouth and employee referrals or region specific employment newsletters play a big role in hiring at this level.

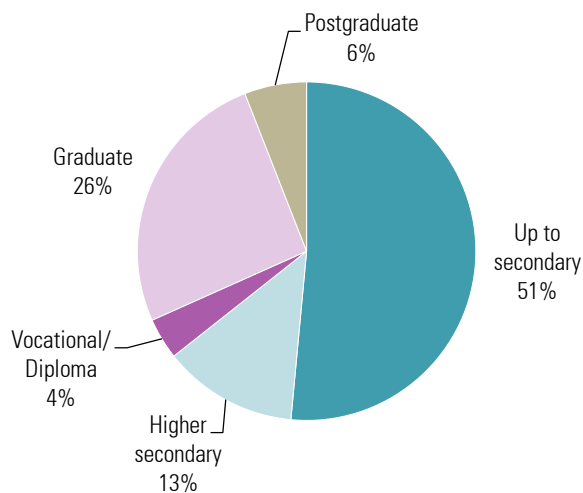
This industry prefers hiring experienced professionals for the supervisory and managerial roles. A fresher is employed as a trainee or operator and undergoes on-the-job training up to one year. ITI or diploma certified joins the sector in maintenance or processing functions. They join at an operator or trainee grade. typically, promotions and career progression are performance-oriented and, to some extent, tenure/seniority also plays a significant role in promotions. Many of the workers complete their graduation along side and this practice is encouraged by the employers. Most of the employees in procurement and processing function are Science-graduates from agricultural universities. Large number of women can be found employed in this sub-sector. They are employed in MSMEs or cooperative organisations manufacturing pickles, papad or jams.

Functional distribution of human resources in the food processing industry (2013)



The food processing industry demands different skill sets on the basis of their relevance to various segments. The basic functional distribution of human resource in the industry is involved in operations stage with 10 percent of the workforce dedicated towards supply chain.

Workforce distribution by skill category in organised segment (2013)



This sub-sector has a high concentration of employees in the up to secondary. They are hired for job roles, such as packers and loaders, machine operators and checkers.

Demographic characteristics of workforce

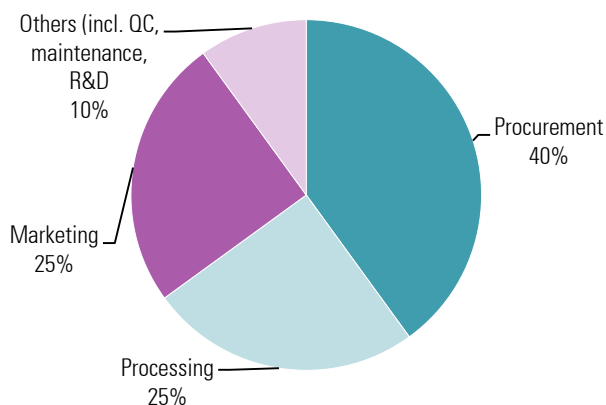
Milk and Milk products segment

This sub-sector employs large number of resources at the procurement level. The procurement function is a field-level job and requires no specific educational qualification except for the supervisor who should be a graduate. Marketing functions are employed with personnel having professional degrees. The demographic structure is quite distinct for cooperatives and private player. Since they have advanced process line equipment, personnel hired for processing is less as compared to the workforce in cooperative organisations. Veterinary doctors are also hired on company's payrolls who work at the breeding centres. Procurement function prefers employing resource within the milk collection area due to their familiarity with the roads and language.

This sub-sector employs highly qualified technicians for the maintenance of dairy plant machinery and dairy technologists at a supervisory role. Young graduates do not find the milk and milk products attractive enough as a career option. Few sub-sectors have a low aspiration or desirability quotient especially milk and milk products. To promote food processing as a desirable career option for the youth, training institutions should increase focus on counseling and setting right expectations. Very few students enroll for the dairy technology engineering course since computers and core mechanical courses are given higher preference.

Retirements have been considered negligible in most of the sub-sectors except for cooperative dairy processing units. Most of the employees joined the cooperative organisations during the 'Milk Revolution' in the 1970s and are due for retirement, very soon.

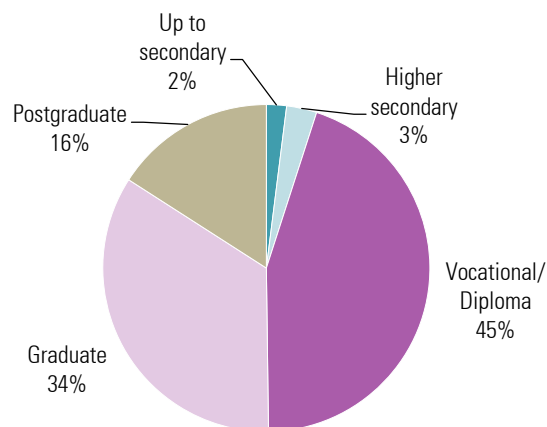
Functional distribution of human resources in milk and milk products sub-sector (2013)



The basic functional distribution of human resource across various segments in the food processing industry is given above. About 25 percent of the human resource in the industry is involved in processing stage with 25 percent of the workforce dedicated towards marketing. The structure changes for cooperative organisations and private players. Private players have more resources in marketing function as compared to cooperative organisations.

Procurement personnel are mainly based in the collection centres and QC is an emerging function for this sub-sector.

Workforce distribution by skill category in organised segment (2013)



Graduates and above are hired for quality and testing role.

Maximum concentration of employees have vocational or diploma qualification and work as technicians and operators in the process line since high-end equipment is needed for the dairy sector and maintenance requires specific technical qualifications.

Source: KPMG in India analysis

Demographic characteristics of workforce

Meat and Marine products segment

This sub-sector is highly concentrated in select regions of the country. Marine processing units are located in coastal regions of West Bengal, Andhra Pradesh, Kerala and Maharashtra. Large scale migration is observed in marine processing units where they source the labour from Odisha and UP (Agra). Kerala used to be another major source for contractual labour; however, they now prefer heading to the Middle East for more lucrative career, such as mid-wives and nurses.

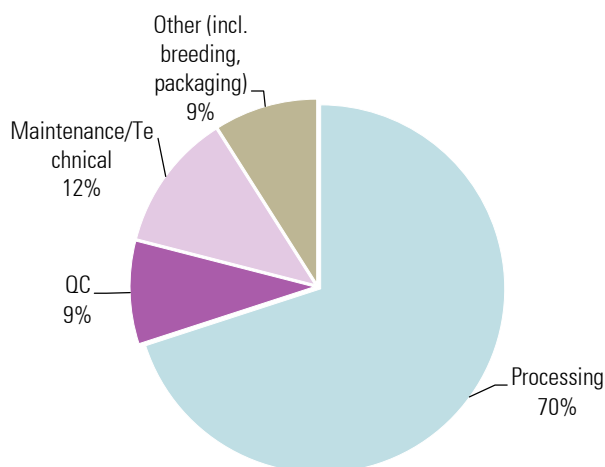
Marine processing units employ a large number of women to leverage their inherent domestic skills of handling food items.

The meat processing industry is starkly contrasting as compared to the marine segment since there are very less women employed in this industry. Labour force is mostly sourced from Uttar Pradesh, Assam and West Bengal and culinary habits play an important role while selecting an employee. Many export-oriented units for meat processing export to the Middle East market and the meat has to conform to halal standards. One of the requirement is that the butcher has to be a Muslim. The job of deboning has one of the lowest desirability quotient and the society also does not give respect to these workers.

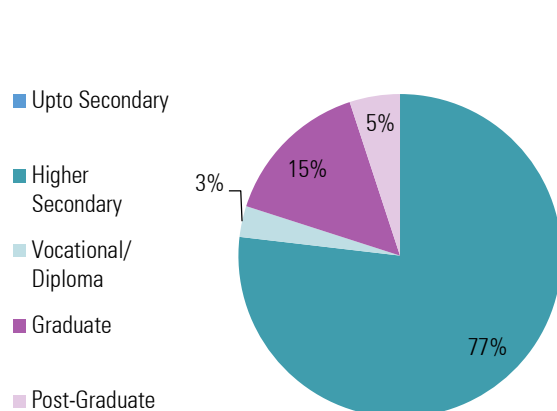
Higher secondary or below is the educational qualification for personnel hired as deboners and butchers, since educational qualification is not necessary to work in a abattoir. Graduates and above are hired for quality and testing roles. About 74 percent human resource in the industry is involved in processing stage with nine percent of the workforce dedicated towards quality control. Quality plays a crucial role in organised players of the sub-sector as most of them are tapping the export market.

Certain specialised skills, such as butchering is a family tradition and the new generation is refusing to take up the job as it is looked down upon by the society. The skills set of a butcher, which involves knowledge of various cuts, deboning and de-hiding is in demand not only in India but even abroad, since this is one job role that cannot be replaced by automation and it has to be done manually.

Functional distribution of workforce in organised segment (2013)



Workforce distribution by skill category in organised segment (2013)



Source: KPMG in India analysis

Demographic characteristics of workforce

Grain and Oilseed segment

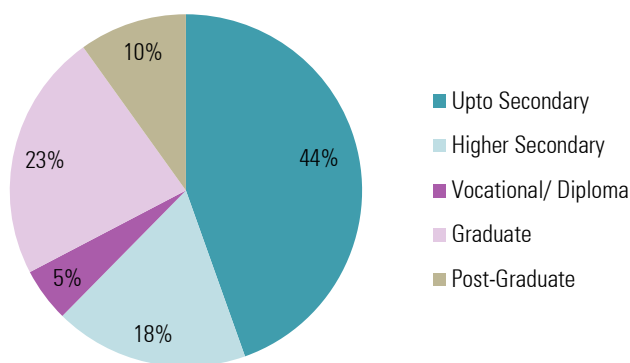
Grain and oilseed is a highly fragmented segment with maximum units under unorganised category. Recent entry of FMCG players into value-added grains is generating employment and the sub-sector is moving from unorganised to organised. It is expected that organised segment share of this sub-sector will reach 25 percent from the current 20 percent till 2017. Entry of multinationals has also resulted in automation at the processing units. This has resulted in more demand for qualified technicians and operators of the imported machines. Few firms transfer their employees to different plants to facilitate knowledge transfer among staff members. Another noticeable aspect about employment in this sub-sector is that very few women are employed in this sub-sector as compared to F&V.

This industry prefers hiring experienced professionals for the supervisory and managerial roles. A fresher is employed as a trainee or operator and undergoes on-the-job training up to one year. ITI or diploma certified join the sector in maintenance or processing functions. They join at an operator or trainee grade. typically, promotions and career progression are performance-oriented and, to some extent, tenure/seniority also plays a significant role in promotions. Many of the workers complete their graduation along side and this practice is encouraged by the employers. Most of the employees in procurement and processing function are Science graduates from agricultural universities. R&D function sees a large number of food technologists and chefs hired for innovation and new product development. This sub-sector has a high concentration of employees in the vocational / diploma education level. Higher secondary and below are typically hired for job roles like packers and loaders.

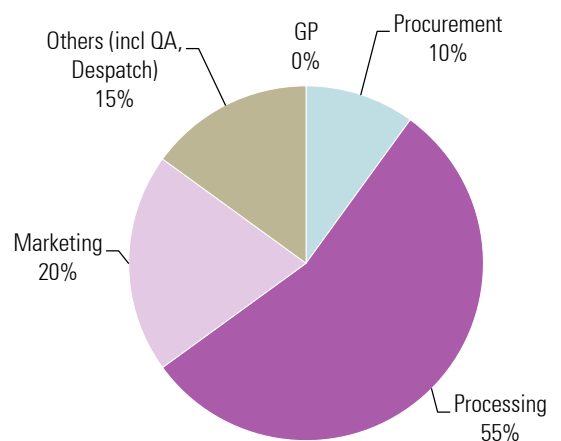
The traditional role of a arthiya or a grain merchandiser has lot of demand from grain and oilseed players but the trade is not being passed to the current generation and arthiyas are not readily available.

The basic functional distribution of human resource across various segments in the food processing industry is given below. About 55 percent of the human resource in the industry is involved in processing stage while 20 percent of the workforce is dedicated towards marketing.

Functional distribution of human resources in grain and oilseed sub-sector (2013)



Workforce distribution by skill category in organised segment (2013)



Source: KPMG in India analysis

Demographic characteristics of workforce

Packaged foods segment

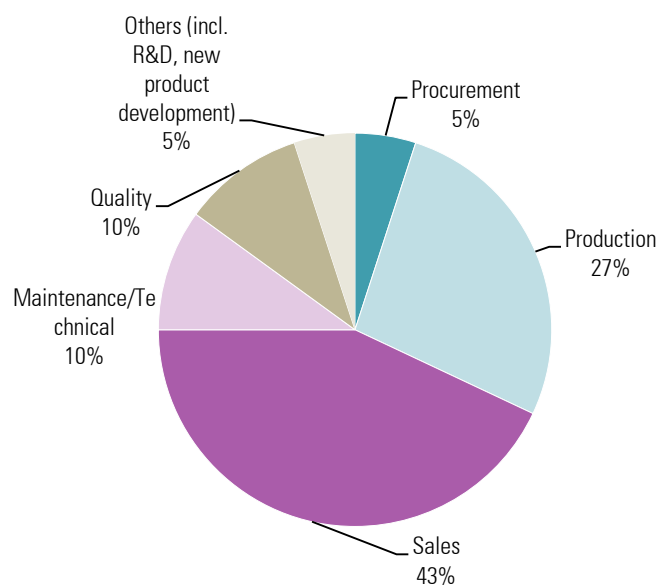
Packaged Foods is dominated by FMCG players at one end of the spectrum and small home grown enterprises who operate at the local level. MSMEs in the sub-sector are usually family owned business who do not require high educational qualifications. Of late, few family owned business brands have entered into collaboration with multinationals to start expansion and also target the export market. Changing customer preferences are also driving the growth in the sector. With increasing urbanisation and more women joining the workforce, eating out and making quick meals will drive the growth in this sector. Healthy living and nutrient rich food is a new fad that is giving rise to innovation and new products in the market. Some of the new market segments, which will grow are pet food and baby food segment.

FMCG players have to maintain stringent standards of quality and hygiene. They have a rigorous recruitment process and hire educated workforce. ITI qualified workmen join in a technical role as a maintenance technician while non ITI workmen join the production line and are minimum class X and above. These are full time employees with hiring done locally near the manufacturing plant. Production operators are trained to work on multiple product lines and job rotation is a part of the work schedule. Women are encouraged to work in this sub-sector due to their culinary and domestic skills.

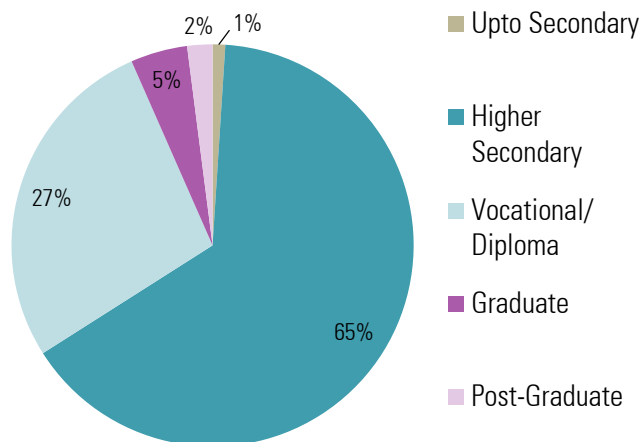
Quality team plays a crucial role in production and qualified professionals with graduate qualification in Microbiology and Food Technology are preferred. Sales and supply chain are other domain where qualified hiring is done with minimal qualification being a graduate. Sales forms a major chunk of employee distribution by function due to high level of competition. Quality is a major focus hence also has significant number of employees.

This sub-sector has significant presence of self employment in bakery segment. Specialised bakers and cooks for different cuisines are very much in demand in the emerging fine dining food service category. Women have a large presence in the bakery segment preparing home made food items, such as cakes and confectionary.

Functional distribution of human resources in packaged foods sub-sector (2013)



Workforce distribution by skill category in organised segment (2013)



Source: KPMG in India analysis

Demographic characteristics of workforce

Beverages segment

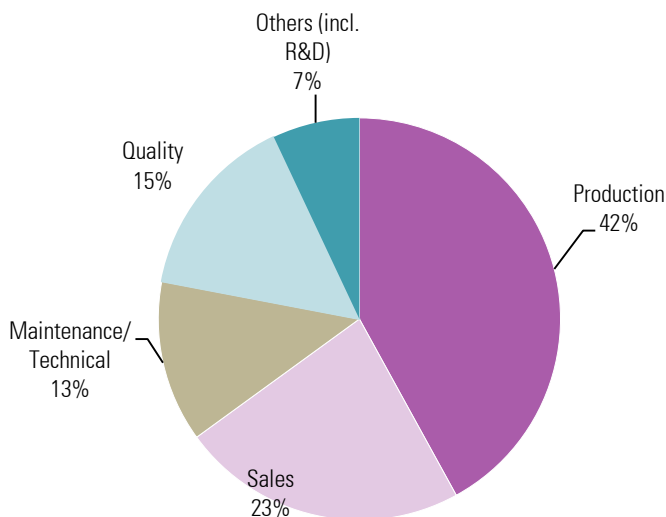
Employment in this sub-sector is highly organised and dependent on multinationals and bottling companies for hiring. A small part in beverages sub-sector is occupied by small regional or local players in the drinks or juices segment; such companies operate in the unorganised segment.

The production line is dominated by males while other functions have a fair representation of women. Increasing automation has resulted in more number of technically qualified employees working in this sub-sector.

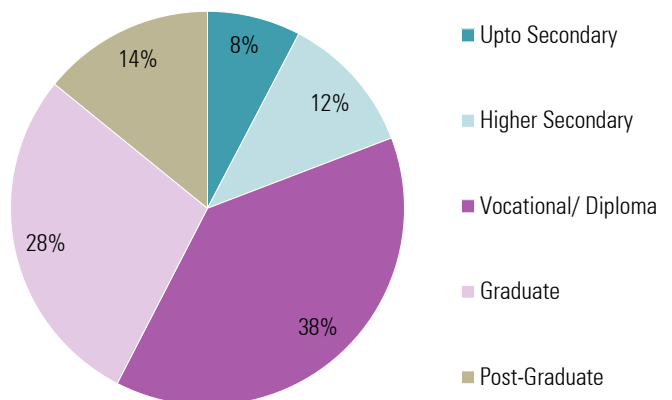
Industry prefers hiring experienced personnel with very less emphasis on educational qualifications. Career progression primarily depends on the tenure and the expansion plans of the bottler is also an important factor. Hiring is mostly done by word of mouth and employee referrals. Seasonality plays a big role in hiring informal workers due to high market demand during summers. Apart from sales, production, operators form a major chunk of employees in the beverages segment. Operators are diploma or ITI certified and possess skills to operate filling-line or bottling-line in the plant and perform periodic maintenance checks. With increased automation, instrumentation engineers will be more in demand.

The basic functional distribution of human resource across various segments in the food processing industry is given below. About 42 percent human resource in the industry is involved in production with 23 percent of the workforce dedicated to sales. Increased competition and a large untapped rural market is the reason for high composition of sales team in beverages.

Functional distribution of human resources in Beverages sub-sector (2013)



Workforce distribution by skill category in organised segment (2013)



Source: KPMG in India analysis

**Incremental human
resource
requirement
(2013-17, 2017-22)
and skill gaps**

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Manpower share and incremental requirement

Industry is traditionally dominated by unorganized players while entry of multi-national companies is driving the growth of organized segment in the industry. Industry growth along with demand for quality standards and technology adoption in manufacturing are driving the need for fresh skilling and up-skilling in the sector. By 2022, the food processing industry is expected to generate about 4.40 million additional employment opportunities. Grain and Oilseed and Packaged Foods account for lion's share of employment growth in the sector during 2013-22. Technological growth in processing industry segments like Meat & Marine, Beverages are expected to result in lower labour elasticity of 0.3-0.4 during 2013-22 reflecting in subdued employment growth

Sub-Sector	Employment (in Million)		
	2013	2017	2022
Fruits & Vegetables	0.14	0.15	0.16
Milk and milk products	0.32	0.38	0.45
Meat and Marine products	0.78	1.01	1.35
Grain and Oilseed	2.59	3.28	4.36
Packaged Food	2.60	3.23	4.23
Beverages	0.54	0.67	0.83
Overall Sector	6.98	8.73	11.38

Sub-Sector	Employment Growth 2013-17	Employment Growth 2017-22	Employment Growth 2013-22
	(In million)	(In million)	(In million)
Fruits & Vegetables	0.01	0.01	0.02
Milk and milk products	0.06	0.07	0.13
Meat and Marine products	0.24	0.34	0.58
Grain and Oilseed	0.69	1.08	1.77
Packaged Food	0.63	1.00	1.63
Beverages	0.13	0.16	0.29
Overall Sector	1.75	2.65	4.40

Supervisory and technician roles covered under Level 4, 5 and 6 as per NSQF classification are expected to witness high demand for manpower during 2013-22. Due to increasing adoption of technology and automation, industry provides significant opportunities for up-skilling of existing work force to the tune of 6.98 million.

Source: KPMG Analysis

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Organisation structure in a typical food processing unit



* Not applicable for beverages and milk and milk products sub-sector

† Not applicable for meat and marine sub-sector

^ Not applicable in beverages sub-sector

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

The sector employs job roles across various functions — select job roles

	Process line workers	Non-process line workers
Fruits and vegetables	<ul style="list-style-type: none"> Refrigeration technician Maintenance technician/engineer Packers and loaders Machine operator Checker Supervisor 	<ul style="list-style-type: none"> Agronomist Procurement executive Quality head Shift head
Milk and milk products	<ul style="list-style-type: none"> Chemist Supervisor Production manager Refrigeration technician Dairy technologist 	<ul style="list-style-type: none"> Marketing executive R&D head R&D scientist
Meat and marine products	<ul style="list-style-type: none"> Deboners and Butchers Feeders and Hangars Electrician Maintenance technician Sanitation inspector Shift supervisor 	<ul style="list-style-type: none"> Microbiologist Plant head
Grain and oilseed	<ul style="list-style-type: none"> Milling operator Sorter Shift supervisor Electrician Boiler operator Packaging operator 	<ul style="list-style-type: none"> Commodity buyer QC analyst /executive /manager Warehouse executive
Packaged foods	<ul style="list-style-type: none"> Packers and loaders Process line operator QA (analyst/checker) Technician (boiler, WTP, ETP) Supervisor 	<ul style="list-style-type: none"> R&D scientist Marketing executive Chef/Nutritionist Quality head Shift head
Beverages	<ul style="list-style-type: none"> Process line operator Filling line operator QA (analyst/chemist) Shift supervisor Maintenance technician Electrician Instrumentation engineer 	<ul style="list-style-type: none"> Marketing executive Microbiologist Shift head

Due to increasing adoption of technology and automation, some roles in the technical functions, such as maintenance, will play an important role. Quality is another domain, which will be in demand due to enforcing of quality parameters and focus on exports.

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Changing skills requirement - Fruits and Vegetables

Job role	Skills required	Skill gap
Packers and loaders	<ul style="list-style-type: none"> Hygiene and sanitation awareness Handling of perishable commodities to prevent wastage 	<ul style="list-style-type: none"> Awareness on hygiene and sanitation is low among informal workers. This directly affects productivity since the training provided to the process line workers is time-consuming and affects production.
Operators	<ul style="list-style-type: none"> Knowledge of operating machines in the process line 	<ul style="list-style-type: none"> Process line machinery is imported and there is a lack of experienced operators who have hands-on experience in operating them.
Checkers	<ul style="list-style-type: none"> Basic counting skills for enumeration of raw materials and production Knowledge of grading and separation of commodities Adhere to specific quality requirements 	<ul style="list-style-type: none"> Checkers lack in skill required to identify defects and invariably results in high wastage and less productivity. Skill needs to be developed for identifying the quality of commodity procured.
Buyers	<ul style="list-style-type: none"> Buyers should possess knowledge of quality parameters while selecting fruits/vegetables for processing 	<ul style="list-style-type: none"> Experienced procurement personnel with good communication are rare to find, since a majority of them are from rural areas and have poor communication skills.
Maintenance technician	<ul style="list-style-type: none"> Knowledge on maintenance and troubleshooting of process line machinery Adhere to periodic maintenance schedules 	<ul style="list-style-type: none"> Candidates lack practical experience in operating imported machinery. This is primarily due to theoretical learning in ITI institutes.

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Changing skills requirement - Fruits and Vegetables

Job role	Skills required	Skill gap
Supervisors	<ul style="list-style-type: none"> ▪ Responsible for per-day productivity and resource management. ▪ Should have operational knowledge of all the systems in the process line. ▪ Team-building and better time management skills are necessary to facilitate effective workforce management. ▪ Resource allocation to avoid downtime when the machine breaks down. 	<ul style="list-style-type: none"> ▪ Inexperience in team management ▪ Often promoted from the operator cadre, they are not highly educated ▪ Ignorant on crucial laws and regulations on food safety ▪ Not applying innovative methods to check food wastage
Agronomist	<ul style="list-style-type: none"> ▪ Agronomists should be aware of irrigation and crop-growing techniques with optimal usage of fertilisers and pesticides. 	<ul style="list-style-type: none"> ▪ Inadequate communication skills to convince and advise farmers/cultivators on optimal resources for better productivity and quality. ▪ Lacking knowledge of latest techniques of farming, such as precision farming

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Changing skills requirement - Milk and Milk products

Job role	Skills required	Skill gap
Chemist	<ul style="list-style-type: none"> Should be able to test the milk for fats and SNF on the spot 	<ul style="list-style-type: none"> Advanced equipment, such as fat analyser, co-analyser, automatic milk collection system are being deployed at various collection centres to check adulteration however the personnel deployed are technologically challenged to operate such equipments. Training to operate these machines need to be provided periodically.
Chilling centre operator	<ul style="list-style-type: none"> Attention to detail in storage during defrosting and avoid overloading the cold storage facility capacity. 	<ul style="list-style-type: none"> Refrigeration process not studied from a dairy aspect. Inadequate skill in understanding DG sets.
Dairy operator	<ul style="list-style-type: none"> Knowledge of dairy process line and technical equipment — valves and pumps. Should have knowledge on quality parameters and perform quality tests 	<ul style="list-style-type: none"> Entry-level operators lack experience of working on a dairy process line. Lack of short-term dairy courses is resulting in supply crunch for experienced entry-level workers.
Maintenance technician	<ul style="list-style-type: none"> Knowledge on maintenance and troubleshooting of process line machinery and utility equipment. Adhere to periodic maintenance schedules 	<ul style="list-style-type: none"> Inadequate knowledge in the domain of ambient and cold supply chain. Technical institutes do not have specific courses for dairy plant machinery. Dairy plant maintenance is another area where there is a deficit of skilled manpower.
Dairy technologist	<ul style="list-style-type: none"> Adopting latest technologies to improve shelf life and introduce new products. 	<ul style="list-style-type: none"> Dairy technologists lack field experience Very few take up the R&D domain

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Changing skills requirement - Meat and Marine products

Job role	Skills required	Skill gap
Deboners and butchers	<ul style="list-style-type: none"> ▪ Culling and deboning of animals ▪ Knowledge of various cuts ▪ Export-oriented unit abattoirs need halal certified workers 	<ul style="list-style-type: none"> ▪ Awareness on hygiene and sanitation is low among informal workers. ▪ Non-availability of documented standard operating procedures for various stages leads to lack of developing expertise. ▪ Very less awareness on handling perishable items is observed. ▪ Abysmal quality of deboners is available in the market. This art is passed on from families in the business to their younger generation. However, very few are now selecting this profession . ▪ Certifications for butchers on 'Good Manufacturing Practices' and 'Good Hygiene Practices' will be very helpful in improving their skillset.
Electrical/ Refrigeration technician	<ul style="list-style-type: none"> ▪ Experience in maintaining and servicing chillers and freezers ▪ Experience in operating and maintaining backup power gen-sets ▪ Operations and maintenance of the food-tech machinery and utility equipment 	<ul style="list-style-type: none"> ▪ Obsolete syllabus makes the technicians lacking in practical experience when it comes to maintenance of dairy plant machinery. ▪ The experience of maintaining and operating cold chain is rare for technicians hired for this role.
Packers	<ul style="list-style-type: none"> ▪ Operate on packaging line with basic labelling knowledge 	<ul style="list-style-type: none"> ▪ Improper GMP, GHP and HACCP training leading to dropped products
Microbiologist	<ul style="list-style-type: none"> ▪ Knowledge of GMP and HACCP ▪ This role is critical when tapping export markets since strict hygiene and sanitation standards should be maintained for exports. 	<ul style="list-style-type: none"> ▪ Strict quality standards are to be maintained for export market. Knowledge has to be enhanced to keep abreast with demanding quality standards. ▪ Hygiene/sanitation inspector is an emerging role but there is no certification /qualification in India in this domain.
Supervisor	<ul style="list-style-type: none"> ▪ Thorough knowledge on the latest food safety laws to conform to stringent quality requirement for the export market. ▪ Leadership and people skills 	<ul style="list-style-type: none"> ▪ Supervisors lack the ability to manage people and communicate effectively with workers. These supervisors are often promoted from the workmen cadre and lack soft skills.

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Changing skills requirement - Grain and Oilseed

Job role	Skills required	Skill gap
Commodity Buyer	<ul style="list-style-type: none"> Financial acumen and quality conscious 	<ul style="list-style-type: none"> Buyers lack in domain knowledge pertaining quality size, colour, density and properties like soil quality for procurement.
Milling Operator	<ul style="list-style-type: none"> Good housekeeping practices. Workable knowledge of innovative manufacturing practices such as Lean and 5S. Should be well versed with processes such as de-husking, drying, destining and de-browning, polishing and sorting. 	<ul style="list-style-type: none"> As per our interactions, less availability of trained personnel who have practical hands-on experience on milling machinery. There is an acute demand for structured courses in milling since no institute/university provides such courses. Boiler operators exist in every manufacturing industry and are abundant in the market since there is a specialised course for this. Technically, they are well equipped; however, they lack in good manufacturing practices such as safety and precaution standards for process and product. With rapid mechanisation being adopted in milling, operators are having difficulty to adapt to the newer technologies for this process.
Packaging Machine Operator	<ul style="list-style-type: none"> Coordination with the process line. Correct identification of labels. 	<ul style="list-style-type: none"> Packaging operators are unable to adapt to technical complexities involved in customised packaging
Electrician	<ul style="list-style-type: none"> Knowledge of maintenance and troubleshooting of process line machinery. 	<ul style="list-style-type: none"> Inadequate technical knowledge on operating imported machinery. Good comprehension skills in English language since most of the machines being imported, training manuals are in English. Electricians do not undergo specific training in food milling machinery. The course curriculum is very generic.

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Changing skills requirement Packaged foods

Job role	Skills required	Skill gap
Process Line operators	<ul style="list-style-type: none"> Should be willing to work in shifts and fast-paced environment Be able to set the lines up for production and running the production line Follow GMP guidelines Be able to maintain awareness on wastage 	<ul style="list-style-type: none"> Operators experienced in food-tech machinery for canning, dehydration and frozen foods are not easily available since there are no specific training courses available for those jobs.
Checkers	<ul style="list-style-type: none"> Be able to work in teams since coordination is required with process line operators Must possess the knowledge of the quality parameters and specifications, such as appearance, weight and other designated parameters. 	<ul style="list-style-type: none"> Production planning and maintenance are some areas where the employees lack skillset. Checkers also lack handling skills, which leads to wastage or sub-standard products.
Chef	<ul style="list-style-type: none"> Acquiring knowledge for constant innovation in RTE/RTC segment to cater to the rising demand. 	<ul style="list-style-type: none"> Chef and the product development team need to keep a track of new culinary trends. They have inadequate knowledge and awareness of the buyer's behaviour.
Nutritionist	<ul style="list-style-type: none"> Should be abreast with health trends and lifestyle changes 	<ul style="list-style-type: none"> Nutritionist are unable to keep track of the technological developments in this highly competitive market. They lack in innovation skills Very few students opt for this role
Maintenance Technician	<ul style="list-style-type: none"> Equipped in operations and be able to manage maintenance of the food-tech machinery and utility equipment. Adhere to periodic maintenance schedules 	<ul style="list-style-type: none"> Technicians have inadequate technical knowledge on operations of imported machinery. Good comprehension skills for English language is very important since most of the machines being imported, training manuals are in English.

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Changing skills requirement - Beverages

Job role	Skills required	Skill gap
Process Line operators	<ul style="list-style-type: none"> Knowledge on beverage process is essential Knowledge of HACCP and other quality standards 	<ul style="list-style-type: none"> The beverage process line is modified as per market demands with respect to flavours, colours and shapes of bottles. Operators are unable to adapt to such rapid technological advancement.
Filling Line operator	<ul style="list-style-type: none"> Knowledge of filling machinery is essential Knowledge of HACCP and other quality standards 	<ul style="list-style-type: none"> Operators are well-versed with legacy slow speed filling lines. However, due to rapid growth, the newly installed sophisticated high-speed filling lines are posing a problem for the operators. Personnel either focus on bottled-line or canned-line. With constantly changing market preferences, operators are not skilled enough to switch from one line to the other.
Maintenance technician	<ul style="list-style-type: none"> Adhere to periodic maintenance schedules 	<ul style="list-style-type: none"> Technicians have inadequate technical knowledge on operations of the machinery. Technicians are unable to receive hands-on training on latest bottling/canning machinery. ITI/Diploma qualified recruits do not possess theoretical knowledge on the beverage process line since their academic syllabus is more focused on mechanical and automobile domains.
Instrumentation engineer	<ul style="list-style-type: none"> Process knowledge and knowledge on interlocks is desired 	<ul style="list-style-type: none"> Instrumentation engineers are not familiar with operations in a typical beverage process line.

Source: KPMG in India analysis

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Additional manpower requirement at various levels

▪ Additional hiring by roles

- There is a significant market for milk products, so, there is likely to be an increase in the demand for food technologists and chefs.
- Exports is another emerging focus area for food processing units. Emphasis should be laid on high quality control in factories and, consequently, the demand for certified inspectors may rise. Also, there may be more requirement for personnel with expertise in trade regulations.

“ITI-qualified workforce are not versed with handling food machinery. Custom courses catering to food machinery may be introduced since the handling and operation of equipment is different from the capital goods machinery.”

Food division head in a leading Indian FMCG company

“The meat industry is overlooked in spite of several allied industries starting due to meat processing, such as gelatine, soap making and feed for poultry.”

Director of a leading meat processing company

“I am anticipating a labour crisis after five years, since marine processing industries will not have sufficient labour supply.”

Production Head of a leading marine exports company

“Hygiene/sanitation inspectors in one emerging area where there is no certification/qualification in the country. Western countries have a well laid certification courses for hygiene and sanitation.”

CEO at a leading processed food supplier

▪ Additional hiring by region

- The top four states (Maharashtra, Andhra Pradesh, Tamil Nadu and Gujarat) account for approximately 55 percent of the total employment with Tamil Nadu alone accounting for 15 percent of the total workforce.
- A majority of recruitment in the future is also expected to happen in these states since new plants are being established here.

▪ Additional hiring by employers

- Cadbury India announced plans to invest more than INR1000 crores in phase one of the company’s largest manufacturing plant in the Asia-Pacific to be located in Sri City, Andhra Pradesh.
- PepsiCo aims to invest INR33000 crores by 2020 to increase the production capacity by more than double and develop infrastructure in India.
- MNCs are looking at India as a major sourcing hub. Collaboration between farmers and processing units is likely to increase.

Training Infrastructure

Select supply infrastructure in the food processing sector

Agricultural universities and governmental research institutes dominate the supply landscape for this sector. There is virtually no presence of any private player as a training provider. To inculcate practical hands-on training, high capital expenditure prohibits private TPs from entering this space. PPP is the most viable alternative in the given situation.

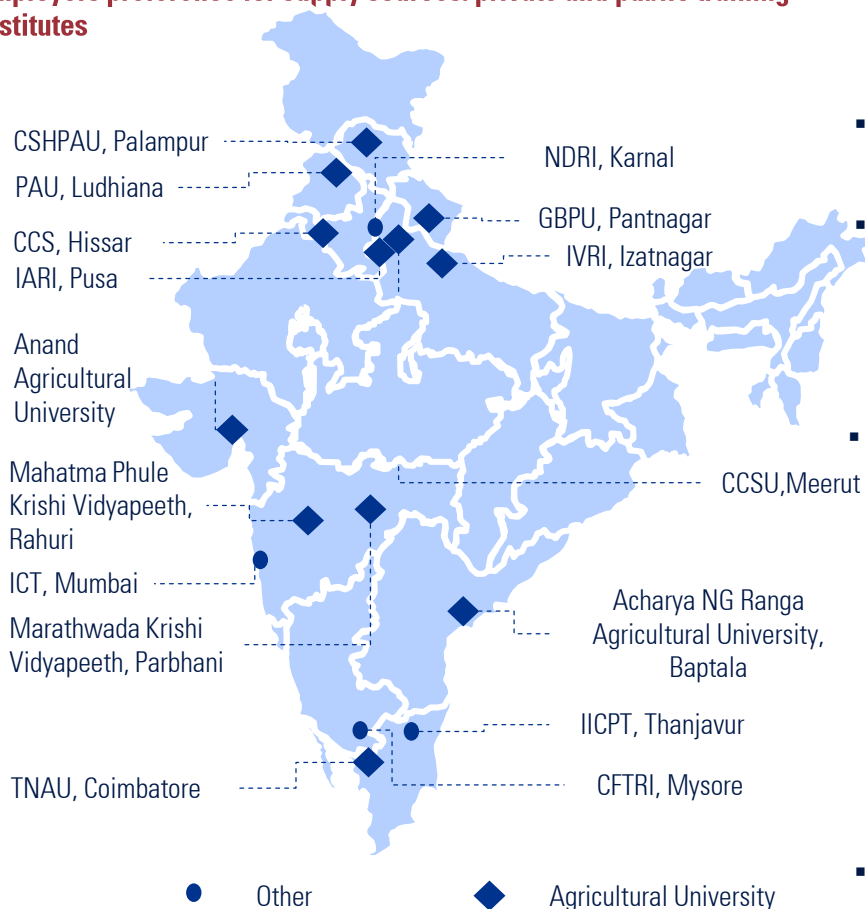
Private players can set up a training academy close to the employment clusters and develop an apprentice-trainer model. For processing grain, a milling operator is a critical job role; however there is no course, which trains a personnel in milling operations. Similarly, documented training modules for catching/culling of animals and vocational courses for deboning could be potential areas for training players to focus on meeting sector's manpower requirement.

Sub-sectors	List of food processing research centres and institutions in India
Fruits and vegetables	<ul style="list-style-type: none"> ▪ National Institute of Food Technology Entrepreneurship and Management (NIFTEM) ▪ Tamil Nadu Agriculture University (TNAU) ▪ Centre of Food Science and Technology (CCS) Haryana Agriculture University ▪ Central Food Technological Research Institute (CFTRI), Mysore ▪ The Defense Food Research Laboratory (DFRL) ▪ National Institute of Nutrition, Hyderabad ▪ Industrial Training Institutes (ITIs)
Milk and milk products	<ul style="list-style-type: none"> ▪ National Dairy Research Institute (NDRI), Karnal ▪ Sheth MC College of Dairy Science (Anand) ▪ National Dairy Research Institute (Karnal and Bangalore) ▪ Dairy Science College (University of Agricultural Sciences, Bangalore) ▪ Sanjay Gandhi Institute of Dairy Technology, Lohianagar, Patna ▪ Central Plantation Crops Research Institute ▪ Indian Institute of Horticulture Research
Meat and marine products	<ul style="list-style-type: none"> ▪ National Research Centre on Meat, Hyderabad ▪ National Institute of Fisheries Post Harvest Technology and Training (NIFPHATT) ▪ CIFT (Central Institute of Fisheries Technology) ▪ The Central Marine Fisheries Research Institute, Kochi ▪ Central Avian Research Institute, Izatnagar
Grain and oilseed	<ul style="list-style-type: none"> ▪ National Institute of Food Technology Entrepreneurship and Management (NIFTEM) ▪ Tamil Nadu Agriculture University (TNAU) ▪ The Indian Institute of Crop Processing Technology ▪ Central Food Technological Research Institute (CFTRI), Mysore ▪ Industrial Training Institutes (ITIs) ▪ Directorate of Sorghum Research (DSR)
Packaged food	<ul style="list-style-type: none"> ▪ National Institute of Food Technology Entrepreneurship and Management (NIFTEM) ▪ Centre of Food Science and Technology (CCS) Haryana Agriculture University ▪ The Defense Food Research Laboratory (DFRL) ▪ Central Potato Research Institute ▪ Indian Institute of Packaging, Mumbai ▪ Industrial Training Institutes (ITIs)
Beverages	<ul style="list-style-type: none"> ▪ Centre of Food Science and Technology (CCS) Haryana Agriculture University ▪ Central Plantation Crops Research Institute ▪ Industrial Training Institutes (ITIs)

Training infrastructure

Current supply infrastructure of the food processing sector

Employers preference for supply sources: private and public training institutes



Indian Agricultural Research Institute, Pusa

- Currently, the institute has 20 divisions and five multi-disciplinary centres situated in Delhi; eight regional stations, two off-season nurseries, three all-India coordinated research projects with headquarters at IARI and 10 national centres functioning under the all-India coordinated research projects. It has the sanctioned staff strength of 3540 comprising scientific, technical, administrative and supporting personnel.

Indian Institute of Crop Processing Technology, Thanjavur

- The Indian Institute of Crop Processing Technology (formerly Paddy Processing Research Centre) is a pioneer research and development institute under the Ministry of Food Processing Industries, Government of India.
- IICPT offers B. Tech, M. Tech and Ph. D programmes in Food Process Engineering.

National Agriculture & Food Analysis and Research Institute, Pune

- NAFARI is an autonomous, not-for-profit organisation registered under Section 25 of the Companies Act, 1956.
- It provides product development, testing, analysis and training to food processing companies.

Central Food Technological Research Institute (CFTRI), Mysore

- CFTRI is a large and diversified laboratory employing over 300 scientists, technologists, and engineers, and over 400 technicians, skilled workers, and support staff. There are sixteen research and development departments, including laboratories focusing on food biotechnology, microbiology, sensory science, and food safety.

National Dairy Research Institute (NDRI), Karnal

- NDRI is the premier dairy research institution in India that undertakes research, teaching and extension activities towards dairy development in the country.
- It provides high-quality human resources for the overall dairy development in the country. It also undertakes extension programs to facilitate the transfers of knowhow from laboratories to farmers' fields.

Punjab Agricultural University (PAU), Ludhiana

- PAU plays a key role in increasing food grain production in Punjab. It has contributed towards the success of the Green Revolution in India. It has also made notable contributions in increasing livestock and poultry production.

Source: "India Food processing Ingredients – 2013", GAIN report, KPMG in India analysis

Training infrastructure

Supply infrastructure across the country

Agricultural education system in India consists of Central and State Agricultural Universities (SAUs). There are other education institutes and research centres, which are dedicated to certain niches, such as veterinary sciences, vegetables, food grains, etc. Also, the industry linkage by engaging in industry sponsored programmes is missing in the current agricultural university setup.

Employers engaging in training

Primarily, training for entry-level resources are undertaken in-house by employers for on the job training model where senior employees are responsible for imparting requisite skills and training them. The varying quality of training does not ensure either standard job role or pay for the trained students.

Hygiene and sanitation, good manufacturing practices, safety awareness are some standard training modules that are undertaken by employers for new joiners. Several food processing players have to invest significantly in training workforce on basic hygiene and sanitation practices, since most of the workers are inadequately educated. There is a need to introduce courses on basic hygiene and sanitation practices; perhaps through some nationally recognised institute. A standardised accreditation system should be in place to certify employees for these basic prequalification before entering this sector.

Several employers have established in-house training institutes in the absence of specific courses or training institutes. There is no course for food machinery, such as canning, dehydration and handling frozen foods. This has led to a clear disparity among major players who have the resources to invest in such initiatives and small and medium enterprises with limited resources.

Need to develop sector specific training programs

Procurement functions require considerable backend linkages, which require specific skill sets at the processor and farmer levels. For instance, in the dairy processing sector, milk collection agent should be able to use the his communications skills to deal with milk producers. Also, it has been observed that most of the dairy training institutions are located in urban areas, which are consumption centres and not at the production centres since major dairy expansion is happening at the village level.

Food processing companies also face the challenge of the lack of availability of workforce at the pre-processing stage. For example, in the F&V sub-segment, workers are hired on a contractual basis for such roles. The meat and poultry sub-segments face severe unavailability of staff for deboning.

Challenges in establishing training infrastructure

The industry cannot afford to spend their productive man-hours on training employees since it will adversely affect the production.

This industry requires more practical training than theory. Simulation-based hands-on practical training cannot be done due to lack of prototypes. The food processing industry requires more practical training than theoretical lessons. It is difficult to impart simulation-based hands-on practical training due to the lack of prototypes in India. The estimated cost to establish a prototype is about 10-15 crores and such high investment can be made only through government support or on PPP model.

MIDFT is successfully moving ahead on a path of transformation of grass-root milk producing farmers' children into dairy professionals

Background

The Mehsana District Co-operative Milk Producers' Union Ltd. popularly known as Dudhsagar Dairy, was established in 1960 with a noble intention of ensuring a fair return to the milk producers. It is the district-level apex body of milk cooperative societies in Mehsana, Gujarat, which aims at not only providing remunerative returns to milk producers, but also to serve the interest of consumers by providing quality and safe milk and milk products returning value for their money.

The Mehsana Union in its Golden Jubilee year 2010, decided to establish an unaided educational and research institute under the aegis of Dudhsagar Research and Development Association, a trust functioning at Mehsana District Co-operative Milk Producers' Union Ltd. The institute, Mansinhbhai Institute of Dairy & Food Technology (MIDFT), is named in the memory of the Union's founder chairman late Shri Mansinhbhai Patel.

What it offers

MIDFT offers B. Tech (Dairy Technology) degree course and is affiliated with the Kamdhenu University of Government of Gujarat, Gandhinagar, for awarding degree to the students.

Its vision statement is "to be recognised as a global educational institution and to evolve as a centre of excellence for the dairy and food industry".

MIDFT started its academic activities in 2011 and the third batch of the course commenced in July 2013, totaling a student strength of 93 of which 61 are wards of primary milk producers and 32 are female students. MIDFT houses the state-of-art-facilities, such as administrative block, fully furnished class rooms, laboratories, library, and faculty room, meeting room, virtual classroom, auditorium and other amenities available in the institute.

MIDFT has a team of 18 qualified and dedicated faculty in disciplines like Dairy and Food Technology, Dairy and Food Engineering, Dairy and Food Chemistry, Dairy and Food Microbiology and Dairy and Food Business Management to take care of academic and research activities as per the UGC norms. The student to faculty ratio at MIDFT is two is to one per class. The faculty are engaged in in-house R&D activities related to the milk and milk products.

Going ahead

It is envisaged that MIDFT will open new avenues for the 'sons of the soil' to flourish using innovative and state-of-the-art dairy technology in time to come. MIDFT has taken several initiatives for the dissemination of knowledge and information regarding new developments and technology for dairy and food industry.

Milk producers to Dairy Technocrats

The establishment of this institute has enabled empowerment of milk producers with creating additional job opportunities and indirect employment for the cooperative organisation.

Recommendations for stakeholders

Development of industry accredited training centres for enabling rapid growth of all stakeholders of this sector

- While informal level courses, such as parboiling/milling do exist, they are not present near the employment clusters.
- With majority of workforce coming from local areas around the production units, training capacity needs to be built around the large employment clusters.
- New plants are being setup in the rural areas. However, most of the training institutions are located in the urban areas.

- With the growth of the food processing sector and emergence of new trends and technology, industry's requirement for specialised skillset has become critical.
- Microbiology/Technical streams are few of the conventional streams for students; however specialised courses at a specialist level (e.g., QA, food safety, sanitation and hygiene) are very few.
- Typical manufacturing roles, such as wireman, fitter, boiler operator are present in this sector and they are well versed with the technical knowledge. However, they need to be trained on manufacturing specific Good Manufacturing Practices (GMP), which can include safety and precaution standards.

- With high capital investment requirement and lower aspiration in youths to pay for training in the sector, there has been significantly lower participation from private training companies to set up training units. At the same time, ITIs do not have relevant and focused training courses for the food processing sector.
- Industry personnel can provide practical training, while academicians can act as a facilitator developing course content.

Recommendation 1: Establish training centres closer to employment clusters/food parks

- Establish training centers closer to employment clusters/food parks which would enable industry to access larger talent pool mitigating the risks associated with migration and attrition

Recommendation 2: Introduction of new tailor-made courses targeted towards the food processing sector

- ITIs should develop courses on operating and/or maintaining food machinery.
- Dairy plant machinery is another domain where skilled personnel at operational level are not available since no institute provides training in operating dairy machines.

Recommendation 3: Government owned training institutions should involve private players and operate on a PPP model

- Government owned training institutions like NDRI, Centre of Food Science & Technology to open avenues for private players in leveraging the existing training infrastructure to optimal capacities through PPP mode

Recommendations for stakeholders

- Develop a industry-trainer interface wherein the industry can invest in infrastructure for training institutes.
- Apart from identifying critical roles , SSC shall look to set up standards and certification for skills — sanitation inspection, food safety and hygiene, food laws and QC.

Recommendation 4: Establish short term certification which will be recognised by the industry

- Establish a nodal body similar to MCI (Medical) or AICTE (Engineering), which will provide industry defined courses for skilling manpower in the country

Lack of profiling and diversification of manpower for the food processing sector

- This would support workforce mobility considering the seasonality aspect.
- It would also enable the employer to track the workforce and ensure availability for the next season. Better workforce management for the employer is another benefit.

Recommendation 5: Creation of database /repository of all the informal workers at entry level with their work history, skill sets and employers' feedback could be initiated

- For an employer, it will give an opportunity to find a worker with specific set of skill set for their operations.

- Companies are increasingly realising the potential of employing women in processing operations.
- Their inherent domestic skills in areas such as kneading dough, winnowing grains and handling seafood makes them easily trainable for such jobs

Recommendation 6: Encourage employment of women in the industry

- The success of self-employment-based cooperative organisation — Shri Mahila Griha Udyog can be replicated in other parts of the country.
- The government can develop employment guarantee schemes specifically to women for this sector.

Implementation of standards

- Industry does not want to invest in trained resources due to the high investment costs involved in achieving particular standards. Industries are lax in safety and regulations adherence.
- Industry can tap into the large export market only when they adhere to the safety and hygiene standards in the process line.

Recommendation 7: Enforcing of safety and hygiene standards will bring in more certified professionals to this sector

- Treat the sector as a major export-oriented industry and create favourable policies/incentives for exports.



सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP



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