Skill Requirement and Human Resource in Food Processing & Post Harvest Technology*

[1]W.A. Khan and [2]C.V. Murumkar

[1]Tuljaram Chaturchand College, India.
[2]Savitribai Phule Pune University, India.
[1]Corresponding Author. Email: wajid510@gmail.com

Abstract

Food processing industry is highly significant for India's development because of the vital linkages and synergies, it promotes between the two pillars of our economy, industry and agriculture. In India, the food sector has emerged as a high-growth and high profit, sector due to its immense potential for value addition, particularly within the food processing industry. Accounting for about 32 percent of the country's total food market, the food processing industry is one of the largest industries in India and is ranked fifth in terms of production, consumption, export and expected growth. The total food production in India is likely to double in the next 10 years with the country's domestic food market estimated to reach USD 258 billion. It is estimated that India's overall food consumption will be 23 lakh crore by 2030. This is the only industry that can ensure food security, inclusive growth and sustainable development for the country. The industry employs 13 million people directly and 35 million people indirectly. It accounts for 14% of manufacturing GDP, nearly 13% of India's export and 6% of total industrial export. Several skill gaps exist in various stages of the food processing value chain that need to be addressed. Make in India cannot happen without skilling the country's workforce. Consequently, Finance Minister announced the setting up of 1,500 multi skill training institute. Entrepreneurship education and training will be provided through 2,200 colleges, 300 schools, 500 industrial training institutes and 50 vocational training institutes through open online courses. (Union budget 2016-17) Paper for presentation in 5th, the Greater Mekong Sub region International Conference 2018 on "The Knowledge Discovery of Management Science and Economics for Development in GMS" to be held at NBS Nong Khai Business School, Rajapark Institute, Bangkok, Thailand 6th July, 2018

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Introduction

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

In India the food processing industry is ranked fifth in terms of production, consumption, export and expected growth (MoFPI Annual Report, 2006-07). A strong and dynamic food processing sector plays a significant role in diversification of agricultural activities, improving value addition opportunities and creating surplus for export of agro-food products (Merchant A, 2008). Food Processing accounts for about 14% of manufacturing GDP, i.e. Rs. 2,80,000 crore, and employs about 13 million people directly and 35 million people indirectly. Its employment intensity can be seen by the fact that for every Rs. 1 million invested, 18 direct jobs and 64 indirect jobs are created in organized food processing industry only (MoFPI Report, 2011).

It is widely accepted that the food processing sector is the most appropriate sector for creating jobs for rural poor, and thus reduce the burden on agricultural sector for creation of their livelihood. This is due to their familiarity with the agricultural sector which would make it easier to train and place them in food processing enterprises. The multiplier effect of investment in food processing industry on employment generation is also higher than any other sector. Therefore, for the overall progress of economy it is important that the farmers and backward communities working in rural food-processing units are treated at the top of the growth process.

The government's "Make in India" initiative aims to increase share of manufacturing to 25% of GDP by 2022 from the current 12 per cent. This is expected to result in the creation of 100 million jobs. Our food processing industry has a similar allure as well. We have a vast pool of an unbeatable cost arbitrage opportunity. Therefore, big food processing companies have set up offshore factories in India. MNCs and global financial institutions have also set up their back office hubs in the country due to lower costs and easy availability of labour. In some cases, an additional attraction is the considerable domestic demand that is growing.

Food processing is the transformation of raw ingredient into food, or of food into other forms. Food processing typically takes clean, harvested crops or butchered animal products and uses these to produce attractive, marketable and often long shelf-life food products. The processed food industry is divided into the following broad segments.

- **Primary Processed Food:**

This includes products such as fruits and vegetables, packed milk, unbranded edible oil, milled rice, flour, tea, coffee, pulses, spices, and salt, sold in the packed or non-packed forms

- **Value added processed food:**

This includes products such as processed fruits, and vegetable, juice, jams, pickles, squashes, processed dairy products (ghee, paneer, cheese, and butter) processed poultry and processed marine products, confectionary, chocolate, and alcoholic beverages.

In today's global market, quality and food safety have become competitive edge for the enterprises producing foods and providing services. "With proper investment in food processing, technical innovation and infrastructure for agriculture sector, India could well become the food basket of the world". (Meeta, 2007)

Food processing industry in India is highly fragmented and is dominated by the unorganized sector. A number of players in this industry are small. About 42% of the output

comes from the unorganized sector, 25% from the organized sector and the rest from small players. Though the unorganized segment varies across categories but approximately 75% of the market is still in this segment. The organized sector is relatively bigger in the secondary processing segment than the primary processing segment. Increasing urbanization, consciousness on health and nutrition and changing lifestyle are changing the consumption habits of India. The number of working women, single students/professionals and nuclear families are creating demand for processed ready-to-eat foods. Growth of organised retails, which makes the processed food readily available, is also driving growth of food processing (Rais et.al, 2013).

Current situation

India's Food Processing Sector ranks fifth in the world in exports, production and consumption. The major parts of the food processing sector are milled grain, sugar, edible oils, beverages and dairy products. India's food processing industry has grown annually at 8.4% for the last 5 years, up to 2012-13. The value addition of the food processing sector as a share of GDP manufacturing was 9.8% in 2012-13.

Investment in registered food processing sector had grown by 20.1% at the end of 2012. The number of registered processing factories has increased from 35,838 in 2010-11 to 36,881 in 2011-12, marking a growth rate of 2.9%. The industry is also one of the largest direct employments in the organized food processing sector standing at 6.05 % between 2010-11 and 2011-12.

Food is the biggest expense for an urban Indian household. About 38.6% of the total consumption expenditure of households was spent on food in 2011-12. The total household expenditure on the purchase of food items in 2012-13 was INR 11 Trillion. An average household in India spent INR 41,856 on food.

Key Growth Factors

1) **Growth in organized Retails:** Food retail is expected to grow well due to low penetration of organised retail and the potential market thereof.

2) **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).

3) **Favourable Government Policies:** Direct support in the form of financial assistance for technology upgrade and setting up / modernization / expansion of food processing industries is being encouraged. 100% 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.

4) **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.

5) 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.

Concerns and challenges in the sector

1) **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 & warehousing facilities, road& rail and port infrastructure. Storage infrastructure specific to grain & oilseed is a critical challenge in reducing wastage levels.

2) **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

3) **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.

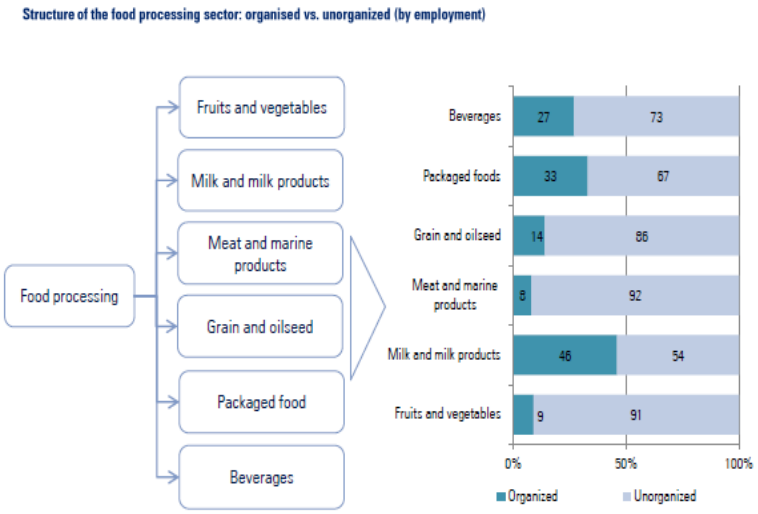
Opportunity areas

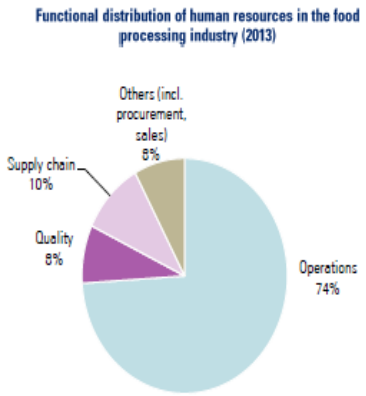
- In the area of creating production infrastructure, the government can join hands with private players to offer the latest technology, techniques, and farming practices;
- Some key player in the food processing space such as PepsiCo, Coca Cola, Reliance, McCain Foods, and McDonald's work directly with farmers and hence an integrated supply chain which not only ensures the timely availability of raw material and significantly reduces procurement costs, but also provide farmers with an assured market for their produces, besides better technology and remunerative prices;
- Post-harvest infrastructural facilities, examples, cold storage, cooling chambers, sorting and grading facilities and pack house can help in preserving food quality.

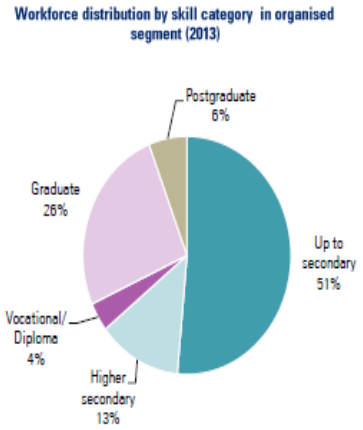
Human Resources and Skills Required in Food Industry:

1) Distribution of Human Resources in the food processing Industry:

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% of the workforce dedicated towards supply chain.







2) Incremental Human Resource Requirement (2013-22)

By 2022, the Food Processing Industry is expected to generate about 4.40 million additional employment opportunity

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.

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 & Milk Products	0.06	0.07	0.13
Meat & 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.

3) Various Job roles in Food Processing Sector

	Process line workers	**Non-Process line workers**
Fruits & Vegetables	➢ Refrigeration technician ➢ Maintenance technician/Engg. ➢ Packers and loaders ➢ Machine operator ➢ Checker ➢ Supervisor	❖ Agronomist ❖ Procurement executive ❖ Quality head ❖ Shift head
Milk & Milk Products	➢ Chemist ➢ Supervisor ➢ Production manager ➢ Refrigeration technician ➢ Dairy Technologist	❖ Marketing executive ❖ R&D head ❖ R&D Scientist
Meat & Marine Products	➢ Deboners and butchers ➢ Feeders and hangars ➢ Maintenance technician ➢ Sanitation inspector ➢ Shift supervisor	❖ Microbiologist ❖ Plant Head
Grain & Oilseed	➢ Milling operator ➢ Sorter ➢ Shift Supervisor ➢ Electrician ➢ Boiler operator ➢ Packaging operator	❖ Commodity buyer ❖ QC analyst/executive/ manager ❖ Warehouse executive
Packaged foods	➢ Packers and loaders ➢ Process line operator ➢ QA (Analyst/checker) ➢ Technician (Boiler, WTP, ETP) ➢ Supervisor	❖ R&D Scientist ❖ Marketing executive ❖ Chef/Nutritionist ❖ Quality Head ❖ Shift Head
Beverages	➢ Process line operator ➢ Filling line operator ➢ QA (analyst/chemist) ➢ Shift Supervisor ➢ Maintenance technician ➢ Electrician ➢ Instrumentation engineer	❖ 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.

Additional Hiring

1) 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.

2) 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.

Conclusion and Recommendations

Huge prospects are emerging in the ready-to-eat and ready-to-cook segments in India. Availability of skilled manpower has been identified as one of the major challenges, which creates a lot of opportunities for unemployed youth to work as skilled manpower in the food processing sector.There has been an increase of 40% of Foreign Direct Investment in the food processing sector during 2016-17. Of the total agriculture products only 10% is processed in India leading to wastage of agriculture products and middle men cheating and farmer's distress. At a time agriculture is moving towards agribusiness, sustainability of the sector depends on diversification towards food processing sector.

Ministry of Food Processing Industries is working in close collaboration with Food Industry Capacity and Skill Initiative (FICSI), the Sector Skill Council (SSC) in food processing. The FICSI is working on identification of job roles and competencies required for each job so as to develop National Occupational Standards for different sectors of food processing.

It is forecast that India's retail sector will show a growth of $1.3 million growth from $600 billion over the next three years; of which 70% will be from food market. Ministry of food processing is planning to creat employment opportunity of around five lakh by 2022 with the investment under Sampada Yojana Programme. Following recommendation should be consider for the skill requirement and human resource.

- **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
- **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.

- **Government Owned training institutions should involve private players and operate on 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
- **Establish short term certification which will be recognized 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
- **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.
- **Encourage employment of women in the industry**
  - The success of self-employment-based cooperative organization - 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**
  - Treat the sector as a major export-oriented industry and create favourable policies/incentives for exports.

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