



To cite this article: Miss Aditi Chopra and Prof. Rajendra Mishra (2023). ROLE OF FOOD PROCESSING INDUSTRY IN FOOD AND NUTRITIONAL SECURITY IN INDIA, International Journal of Research in Commerce and Management Studies (IJRCMS) 5 (3): 11-37

ROLE OF FOOD PROCESSING INDUSTRY IN FOOD AND NUTRITIONAL SECURITY IN INDIA.

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DOI: <https://doi.org/10.38193/IJRCMS.2023.5302>

ABSTRACT

The conversion of horticultural products into food, or one kind of food in another, is known as food processing. Food processing assists in reducing negative food changes over time, pleasing customers with flavours, taste and colour, catering to cultural beliefs, empowering women, and providing choice, knowledge, and convenience to health-conscious customers. There are various sectors in food processing industry like fruits and vegetables processing, milk processing, sugar processing, cereal processing etc. The nutritional security of processed food can include four basic issues i.e., food availability, food accessibility, food utilization and food stability. The study aims to identify the status of food processing industries in terms of their production, employment and number of units established in India. The study also tries to find out the extent to which food processing units playing a role in achieving nutritional security among people in India. To achieve these objectives, the study collected data from various secondary sources including reliable data available in published and unpublished books, reports, journals, newspapers, and different research sites. Appropriate statistical tools are used to show the increase in number of food processing units, number of persons engaged and total output in various subsectors of food processing industries in India. The requisite regression equations are also calculated in the study which shows that the growth in number of units and employment are positively related with output levels of food processing units in India. Results by applying tests of significance shows that there is a strong association between two attributes viz. imports and exports of processed products in India. Thus, we can conclude that India is self-sufficient in making the processed products from different subsectors of food processing on the one hand and in achieving the nutritional security (food availability, accessibility, utilization, and stability) among people of India on the other.

KEYWORDS: Food Processing, Nutritional Security, Availability, Accessibility, Utilization, Stability.



INTRODUCTION

The term food processing is quite a wide one consisting of all the edible items. It covers a wide spectrum of products, of which the fruit and vegetable-based products cover a unique position. This industry plays a vital role in the effective utilization of horticultural products. Besides, reducing wastage and losses, the fruit and vegetable-based units help in raising rural income by generating employment opportunities. The basic features of food processing units are that these units have seasonality in their production cycle. Food processing is the process of transforming of food items into a form that can be consumed. Food processing can cover the processing of raw materials into food. Various activities covered in this concern are mixing, chopping, cooking, canning, pickling, mixing, pasteurization, packaging etc. Almost every one of our foods can be processed in some form (Bhavani et al.,2006).

The various sectors in food processing Industry are fruits and vegetables processing, milk processing, edible oil and fat processing, meat and poultry processing, marine processing, sugar and Khandsari processing etc. Processing of food reduces the number of harmful bacteria in food that can cause diseases. For e.g., Drying and pickling dehydrates the food products and also improves the shelf-life of food products (MOFPI, 2022).

A strong and dynamic food processing sector plays a vital role in reduction in the wastage of perishable agricultural produce enhancing shelf life of food products ensuring value addition to agricultural produce, diversification and commercialization of agricultural produce, generation of employment, enhancing income of farmers and creating surplus for the export of agro and processed foods (Bhatia et al.,2020; David et al.,2001). Food is one of the most vital things in the world since no one can survive without it. As a result, there are several food processing enterprises around the world that serve consumers with high-quality, nutritious food. With \$7 trillion in yearly production, food processing is one of the major worldwide industries (Handbook of Farm, Dairy and Food Processing Machinery engineering, 2019). We discovered companies that make cold drinks, wafer chips, juice, and restaurant chains across the world. Pasta, pizza, burgers, and sandwiches from Italy are now eaten in practically every country. Food processing enterprises serve customers all over the world by processing and delivering food. These companies are not only earning profit but also providing the livelihood to millions of people who are working as the employees of these firms. Currently, less than 10 percent of India's vegetables and fruits production is processed. In comparison, the United States and China process 90% and 40% of their produce, respectively. Other emerging countries, such as Thailand, the Philippines, and Brazil, process up to 30%, 78 percent, and 70% of their product, respectively (Hailu, 2022). The top food processing companies in the world that are earning more than the entire earning of food processing companies in the world are Nestle, Pepsico, Kraft, Anheuser- Bosch in Bev, Cocacola, JBS S.A, Archer Daniels Midland company, Unilever etc. These companies are in



Switzerland, Newyork, U.S., Brazil, Atlanta, Sao Paulo, Decatur, London etc. Nestle company earns yearly the profit of CHF 10.61 billion, Pepsico gains the profit of US \$ 6.462 billion and vice versa (India Brand Equity Foundation, 2020).

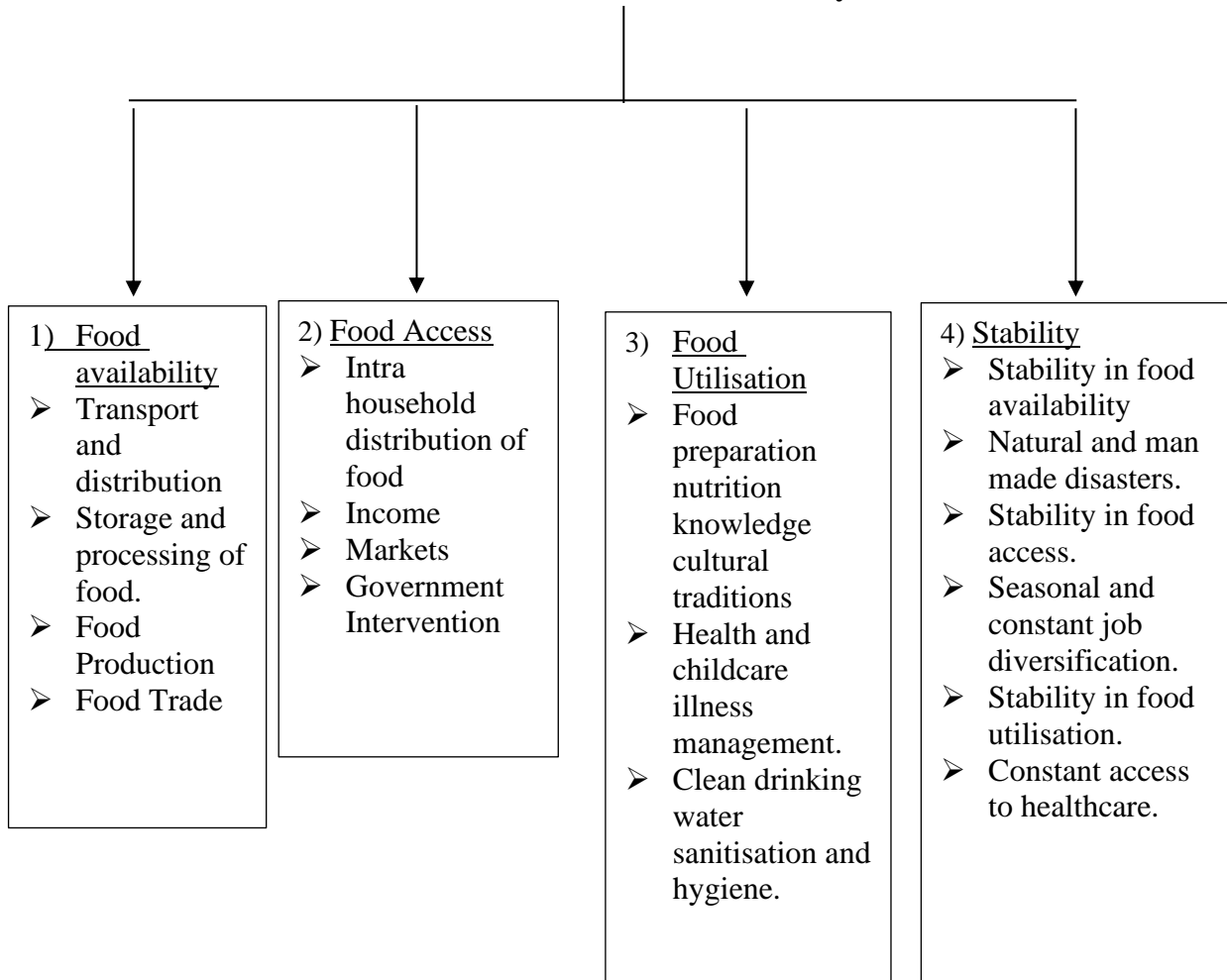
Modern food processing draws on scientific methods and is open to critical reviews and regulatory impositions. It assists in reducing negative food changes over time, pleasing customers with flavour, taste, and colour, catering to cultural beliefs, empowering women, and providing choice, knowledge, and convenience to health-conscious consumers. It is often a potent tool to scale back food wastage. In India, the growth of a food processing sector can be a symbol of a strong linkage between industry and agriculture so that investment in the industry may result in improved production and returns from horticulture (Invest India, 2020). The horticulture-based food processing value chain includes Input elements needed for production, seeds, fertilizers, agrochemicals, farm equipment, irrigation equipment etc. Production includes fruits and vegetables production, and everyone processes associated to growth and harvesting, planting, weeding, spraying, picking. Grading, washing, trimming, cutting, mixing, packaging, labelling, and blast chilling are all part of the packing and cold storage process. Dried, frozen, preserved, juices, and pulps are examples of processed fruits and vegetables, which are mostly used to extend the shelf life. Supermarkets, small-scale merchants, wholesalers, and food service are examples of distribution and marketing (Bhavani et al., 2006).

Now, food and nutritional security is a major global challenge for food processing Industry today and it relies on the adequate supply of safe, affordable, and nutritious fresh and processed food to all people.

The nutritional security of processed foods may be broken up into four basic issues, i.e., food availability, food accessibility, food utilization and food stability (Ali, 2003; Jain, 2016). Food safety is a shared responsibility and the paradigm of well performing food safety system needs to rely on three pillars:

- 1) Industry's responsibility.
- 2) Consumer's responsibility.
- 3) Government's responsibility.

Food and Nutrition Security



REVIEW OF LITERATURE:

To fulfill the objectives of the study in hand, findings of the previous research studies and methods adopted need to be considered. This chapter provides an overview of literature in the field of “Role of Food Processing Industry in Food and Nutritional Security in India”.

A brief review of literature on the topic selected for the study is as under:

The problem of selling and prospects of fruit processing industry with special relation to Konkan region - A case study of Ratnagiri District was studied by Gaikwad (2006). The study found that very limited agencies engaged in processing and export of fruits. Again, the study expects development of processing industries in konkan region which can generate income and employment in future (Patil, 2008). Sakal Agro one newspaper dated 25 March 2008 has published an article “Phale, Bhaji Pala



Prakriya Udyogat Bharatala Sandhi” provided information regarding a comparative production of milk, vegetables and fruits in India and additional nations of the globe and located that in fruit and vegetable processing, India is lagging far behind. Therefore, India should explore the chance to process fruits and vegetables to a large extent (Nath, 2004). Garnade (2007) in a study found that India has been producing processed products from fruits and vegetables to a very little extent, only 1 or 2 percent of fruits and vegetables are processed in India. Moreover, there are only a few processing industries in India which have been utilizing 50 percent of their production capacity.

Exploratory research during coastal district of kannada was conducted (Hejmadi, 1990) to judge the entrepreneurship in small scale industries. The study finds that this district has suitable small-scale sector for jobless youth, but industrial development has not fully benefitted at significant level (Punia, 2004). Again Chopra (2008) suggested different strategies to the entrepreneurs to line up more units either small or food processing which must be studied further within the light of various strategies suggested and role of subsidies, incentives to attract new entrepreneurs to line up new food processing units within the state of J&K. Mittal et al., (2004) identified the main factors determining the expansion and development of entrepreneurship in India. The study finds some factors like family background, religion, motivation having direct impact on the success of unit holders. But this study remains silent about the solutions to the issues examined. Thus, with such a target within the mind, a study is required to spot different problems, factors influencing, and impact of policies and incentives (Nair et al., 2006) on the food processing unit holders within the state of Jammu and Kashmir. Chopra (2008) finds dissatisfaction of entrepreneurs regarding non-availability of incentives and subsidies from state Government and reflected their disliking to avail them due to lengthy formalities in getting them. Moreover, the method of industrialization in Jammu districts has not been much effective because of various problems faced by them viz; non-availability of infrastructure, lengthy formalities of state govt. procedure etc. and also suggested different strategies viz; identification of trained and qualified people for setting units, upliftment of weaker section, motivation for higher investment, availability of intermediaries, liberal financial policy, awareness among unit holder regarding subsidies and incentives etc. to beat these problems.

Bathla et al. (2018) focused on the changes happening within the post- harvest food management system for crops livestock and fisheries-based food products. The extent of processing of major agricultural commodities (EPA) relies on the degree of individual commodities used as inputs in the post-harvest processing and food service industries. To push up food processing several schemes and programmes are being implemented by the Ministry of food processing industries (Satyasai et al., 2018). To deal with challenges, an umbrella programme, Sampada brings together several assorted old and new interventions catering the varied needs of the industry (Sen, 2005). The seven components of the scheme are mega food parks, integrated cold chain and value addition infrastructure, creation



of backward and forward linkages, food safety and quality assurance infrastructure and human resources and institutions (MOFPI, 2021). Again, the main role of food processing industry is highlighted for facilitating commercialization of agriculture and manufacturing sector by processing agricultural produce and offering employment opportunities (Rao et al., 2009).

The food processing industry (FPI) particularly is predicted to grow fast in sight of the fact that India is producing surplus food and horticultural crops, but a low level of processing (less than 10 percent) (Nithyashree, 2021). Several studies are meted out to review the use of people within the manufacturing sector indicating the expansion isn't enough to check the employment in 2000s). A few spillover benefits of adjusting the mindset of the private investors within the 1980s (Singh, 1993) and policy initiatives within the liberalized era in terms of relaxing the restrictions on technology imports, delicensing etc have led to a big increase within the capital investment, particularly after the 1990s (Nath, 2004). Further efforts to spice up the extent of competition through passing the competition Act, 2002 and micro, small and medium Enterprises Act, 2006 might have attained the amount of improved investment within the industrial sector. Rais et al., 2015 highlighted the requirement for efforts to specialize in the high value commodities like meat, fish, fruits, vegetables, and food industry to enhance the output level which has more potential to get value and employment.

According to MOFPI (2014), the food processing industry demands different skill sets on the idea of their relevance to numerous segments. The essential functional distribution of human resource within the industry is involved in operations stage with 10 percent of the workforce dedicated towards supply chain. By 2022, the food processing industry is predicted to get 4,40 million additional employment opportunities. According to National Industrial activity (NIA) classification lists, the food processing sector is primarily classified in five separate sub- groups, like fruits and vegetables, milk and milk products, grain and oilseeds, meat and marine processing and packaged foods. Liberalization and globalization created opportunities for several other products like horticulture and animal-based products and both to suit the perishable character of these products (Ghosh, 2013). Keeping with the spirit of reforms, a necessity was felt to evolve appropriate marketing systems by relaxing the prevailing regulations. MOFPI (2021) analyses the extent of food processing industries with the target of increase in processing level and to scale-back the post-harvest losses of fruits and vegetables.

Kumar et al., 2016 in a study named Food Security in India: Issues and challenges deals with the food availability, food management and food security act. In their study, they also give the trends related to Production (mt) of food grains in India upto the year 2014. The study also shows the performance on Global Hunger Index in India upto the year 2013. The food grain management is described as a large public distribution system with all possible efforts for achieving self-sufficiency in food grains. The food security and price policy include procurement prices/ minimum support prices (MSP), buffer



stocks and public distribution system (PDS). The study also highlights the problems in present public distribution system like non-viability of fair-price shops, Burden of food subsidy, low quality of food grains, Inefficiency of food corporation of India (FCI) etc. The study also suggests measures for reforms in distribution for better functioning of public distribution system like streamlining FCI's, computerization of records, opening of grievance cells, punishment for defaulters' systems storage, distribution, accountability, and monitoring, by making food security acts.

Kundu et al. (2017) explains that Food security is not only supply side problem but also the demand side problem as lots of food grains have wasted by storage and warehousing as well as poor working of public distribution system. After the many couples of decades of independence, India is still suffering from problem of food insecurity that caused death of people due to starvation. Keeping in view the demand side problem, Govt. of India passed the Food security bill in 2013. In this bill the Govt. has achieved food security by looking into the condition of food security in India and it also promises that every person receives five kg of food grains per month at subsidized rates. The supply side problem can be stimulated by the increase in investments in irrigation and rural infrastructure, improving crop production practices etc. Now, India is successful in achieving self sufficiency by improvements in production levels. The study collected data from various published and unpublished sources. This study explains food security is closely related to limited household resources, low disposable income and poor socio-economic status (Cook and Frank, 2008; Rush and Rusk, 2009). Thus, Food security is strongly linked with issues like food prices, environmental changes, water, agricultural growth etc. (Henningsson et al., 2004; Gustafson, 2013). Ensuring food security and safe drinking water are the main challenges for Asia's development. Various studies have suggested measures like crop diversification, precision agriculture, water saving techniques, developing crop varieties with improved water use which are essential to maintain food security in state like Punjab (Khus, 2015). Self-sufficiency of localized production is the answer to the challenge of food security.

Another study by Jain (2016) examines performance, Issues, Challenges, and policies in food security in terms of availability, accessibility, and affordability. The objectives of this study revolve around these questions that 1) What is the advancement in supply side of food as far as accessibility at national level? 2) What are the policies that India is following as has followed in achieving food security and what ought to be done to acknowledge food security for all citizens of India? And 3) What ought to be done to acknowledge food security for all citizens of India? This study collected data from books, reports and unpublished data submitted by Food Corporation of India (FCI), Food Security Portal and Food & Agricultural Organization. There are some challenges that India faces to meet food security like climate changes, floods, natural hazards, crop diversification, water non-availability of quality seeds and planting material, poor marketing facilities, globalization etc. (Jha et al., 2014). To curb existing problems of food security, the government has made many programmes. Meanwhile, the govt.



Of India implemented a new Act named the National Food Security Act, 2013. This act tries to provide adequate Food, for all person in the country at all times with a thought that nutrition security and food is universal right to be enjoyed so that universal nutrition is achieved (Singh, 2014). The Government of India has also enacted various programs like Antodaya Ann Yojana, Mid-day meal (MDM) scheme, Integrated child development scheme (ICDS) to improve the food and nutritional security in India.

Objectives and Research Methodology:

Keeping in view the various parameters of nutritional security, this paper is going to highlight the status of food processing units in India in terms of their availability, accessibility, utilization, and stability with the following objectives:

- 1) To identify the status of food processing industries in terms of their production, employment and number of units established in India.
- 2) To study the extent to which food processing units playing a role in achieving nutritional security among people.

For identifying the role of Food Processing units in achieving Food and nutritional security in India, secondary information has gathered from various resources like different departmental reports (Dept. of Horticulture, MOFPI), booklets, magazines, Journals, e-books and other published and unpublished works. Further for creating exhaustiveness and objectivity of the study, the data collected on various parameters of food and nutritional security among food processing units in Indi viz. food availability, food accessibility, food utilization and food stability. The information gathered through secondary sources have analyzed by using appropriate statistical tools like chi-square test, regression equations and represented by using trend lines and bar graphs.

RESULTS AND DISCUSSION:

Overall Profile of Food Processing Units in India:

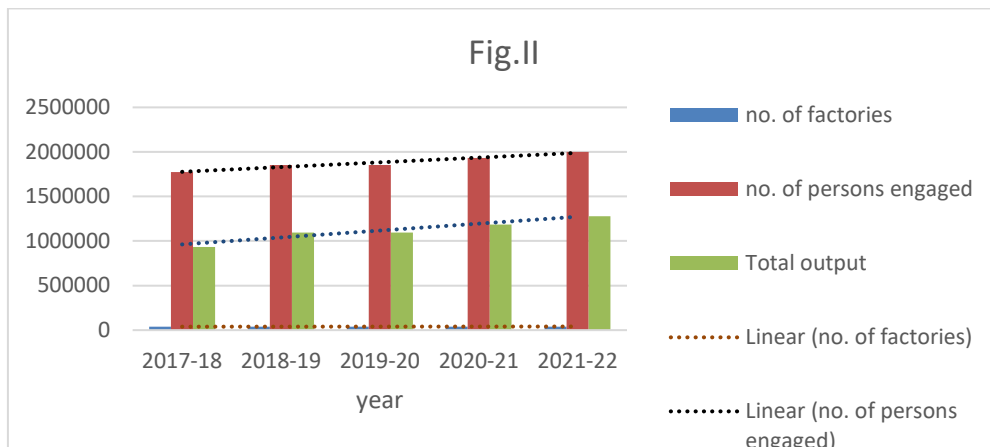
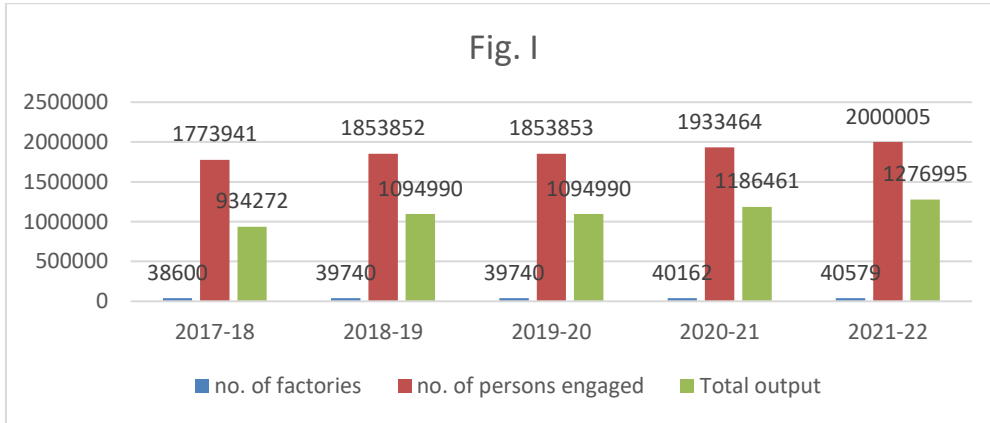
The concept of food security is the management of the food economy in a manner that the society does not depend on external assistance to meet the normal cyclical shortage that occurs in the agricultural economy. Availability of enough food for all can be attained through increasing agricultural production within the country. The status of India in terms of production, number of persons engaged, number of units in food processing sector is shown in Table I.

Table-I: Total number of units employment, production in various subsectors of food processing Industries in India.

Year	No. of Factories	No. of Persons engaged	Total Output (Rs. In crore)
2017-18	38600	1,77,3,941	9342722
2018-19	39740	1,85,3,852	1094990
2019-20	39740	1,85,3,853	1094990
2020-21	40162	1,93,3,464	1186461
2021-22	40579	2,00,0,005	12,76,995

Source: MOFPI, 2022.

The table I depicts that the number of food processing industries in India in the year 2017-18 were 38,600 with employment of 1773941 people which increased to 39740 in the year 2018-19 with employment in number was 1853852 people and remains constant upto 2020. Now, at present the food processing industries in India in the year 2021-22 are increased upto 40579 with employment of 2000005 people and output level of 1276995 crores which are depicted in the bar graph given below in Fig. I. The trend line also showed in Fig. II pointed the fluctuations in increase of number of units, their employment and their output level in crores for the last five years.



Analysis I

From the table I it is depicted that with the increase in the number of units of food processing units in India and the number of persons engaged, the output levels are also increasing. It shows that there is a strong relationship between number of units & output and employment & output. Increased output is the result of increased number of food processing units and persons engaged in these units. Hence, the impact of increased number of units and employment on output levels has been established with the help of regression equations as under:

No. of Factories(X)	$X-\bar{X}(x)$	$x*x$	Total Output (Rs. In crore) (Y)	$Y-\bar{Y}(y)$	$y*y$	xy
38600	-1110	1232100	9342722	-183270	33587892900	203429700
39740	+30	900	1094990	-22552	508592704	-676560
39740	+30	900	1094990	-22552	508592704	-676560
40162	+452	204304	1186461	+68919	4749828561	31151388
40579	+869	755161	12,76,995	+159453	25425259209	138564657
$\sum X=198551$	$\sum x=271$	$\sum x*x=962$ 497	$\sum Y=5587708$	$\sum y=-2$	$\sum y*y=64780$ 166078	$\sum xy=3717$ 92625

Regression Equation of Y on X

$$Y = -15221597.1 + 386.279X$$

The Regression equation indicates that growth of food processing units in India are positively related with growth in output levels of Food processing units in India. This shows positive relationship between them.

Analysis II

From Table I, it is also depicted that with the increase of number of persons engaged in food processing industries in India, the output also increases.



No. of Persons Engaged(X)	$X-\bar{X}(x)$	$x \times x$	Total Output (Rs. In crore) (Y)	$Y-\bar{Y}(y)$	$y \times y$	xy
1773941	-1090	118988	9342722	-183270	33587892900	1999145
	82	8272724				8140
1853852	-29171	850947241	1094990	-22552	508592704	657864392
1853853	-29170	850888900	1094990	-22552	508592704	657841840
1933464	50441	25442944	1186461	+68919	4749828561	34763432
		81				79
2000005	116982	136847883	12,76,995	+159453	25425259209	18653130
		24				846
$\sum X=9415$	$\sum x=-1$	$\sum x*x=2982$	$\sum Y=5587708$	$\sum y=-2$	$\sum y*y=64780$	$\sum xy=4343$
115		9801670			166078	6638497

Regression Equation of Y on X

$$Y = -1624140 + 1.456 X$$

This regression equation indicates that growth of employment in food processing units in India is

Import/ Export	Observed(O)	Expected(E)	(O-E)*(O-E)	(O-E)*(O-E)/E
	2310	2212	9604	4.34
	3547	3645	9604	2.63
	1932	2063	17161	8.32
	3530	3399	17161	5.05
	1964	1978	196	0.09
	3274	3260	196	0.06
	2101	2253	23104	10.25
	3865	3712	23409	6.31
	3122	2921	40401	13.83
	4611	4812	40401	8.39
				$\sum(O-E)*(O-E)/E=59.27$

Calculated value=59.27.

Table Value of χ^2 at 5% level for v=4 is 9.49.

So, calculated value is greater than the Table value.

Hence, our hypothesis is rejected. This means that there is a strong association between two attributes

Viz. Exports and Imports of processed products in India. The results by applying χ^2 test shows that India is self-sufficient in making processed products from all subsectors of food processing and is successfully achieving the nutritional security of people at large at one side and on the other side helping Indian Government to achieve the nutritional security among people.

Stability calls for undertaking pre-emptive steps through which harmful suspended and inter-annual instability of supplies of food can be reduced. Built in stability needs to be installed in the production, demand, supply, prices, marketing and distribution system of processed food products. Table III shows demand, supply, total units, employment, investment, production, import, export of processed products from fruits and vegetables in India for the last 5 years are as under:

Table III: - Showing total number of units, their investment, employment, supply, demand of processed F/V products among food processing sector in India.

S. No.	Year	No. of factories	No. of persons engaged	Total Investment (Rs in crore)	Demand of F/V processed products (Rs. in crore)	Supply of F/V processed products (Rs. in crore)	Imports (Rs. in crore)	Exports (Rs. In crore)
1	2016-17	1101	58331	11530.60	12001.6741	13893.02	2083.085	1700.098
2	2017-18	1153	60803	12629.34	14095.9254	14933.10	2020.384	1677.917
3	2018-19	1254	80440	17070	15650.5050	21830.00	1671.445	1951.80
4	2019-20	1254	80440	17070	17237.3037	21830.00	1703.952	1780.926



5	2020-21	1256	77989	15068	18703.2800	19318.00	1826.28	2255.33
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Source: 1) MOFPI, Annual Report, 2022 2) Statista.com, Research department site, 2022

From the table III, it is concluded that India is self-sufficient in supplying processed F/V products to meet the growing demand of these products among people. Hence, here we can say that stability is achieved by our Indian government through planned and focused distribution system of processed products.

Accessibility to and utilization of the adequate and safe food to all may be made possible by carefully taking into consideration the important factors, followed by sound governmental interventions and policies (Ghosh, 2000).

The Indian ministry of food processing industries has a clear goal of attaining the following objectives by facilitating and acting as a catalyst to attract quality investment from within India and abroad into this sector with the aim of making food processing a national initiative. With the overall objective, the ministry aims to: -

- Enhance farmer's income by better utilization and value addition of agricultural produce.
- Minimize wastage at all stages of production in the food processing chain by the development of infrastructure to storage, transportation, and processing of agro-food produce.
- Introduce of modern technology into the food processing industries form both domestic and external sources.
- Encourage R &D in food processing for product and process development and improved packaging.

Policies and schemes by Government of India in Food Processing Industry.

1) PMKSY:

Objective: Ist scheme is PMKSY (Pradhan Mantri Kissan Sampada yojana). It is a scheme for Agro - marine processing and development of agro - processing clusters. It is a comprehensive package which will result in creation of modem infrastructure with efficient supply chain management from farm gate to retail outlet. It will not only provide a big boost to the growth of food processing sector



in the country but also help in providing better returns to farmers and is a big step towards doubling farmer income creating huge employment opportunities especially in the rural area, reducing wastage of agricultural produce, increasing the processing level and enhancing the export of the processed foods.

The following schemes will be implemented under PMKSY yojana: -

- Mega food parks.
- Integrated cold chain and value addition infrastructure.
- Creation / expansion of food processing and preservation capacities (Units scheme)
- Infrastructure for Agro processing clusters.
- Food safety and quality assurance infrastructure.
- Human resources and institutions - Research and development.
- Operations Green

2) PRODUCTION LINKED INCENTIVE SCHEME FOR FOOD PROCESSING INDUSTRY (PLISFPI):

Objective:

- 1) Support food manufacturing entities with stipulated minimum sales and willing to make minimum stipulated investment for expansion of processing capacity and branding abroad to incentivize emergence of strong Indian brands.
- 2) Support creation of global food manufacturing champions.
- 3) Strengthen select Indian brand of food products for global visibility and wider acceptance in the international markets.
- 4) Increase employment opportunities of off-farm job.
- 5) Ensuring remunerative prices of farm produce and higher income to farmers.

Incentives under this Scheme:

- Incentives on Sales and Investment
- Incentives on Innovative / Organic Products to SME
- Incentives for Branding and Marketing

3) AATMANIRBHAR BHARAT:

a) PMFME Scheme:

Objective:

- 1) Micro-enterprises to get credit-linked subsidy @ 35% of the total eligible project cost with ceiling of Rs.10 lakh for upgradation of infrastructure and capacity addition.
- 2) SHGS to get seed capital for giving loans to members for working capital and small tools.
- On site skill training and handholding.



- Special focus on women entrepreneurs and aspirational districts.
- Transition from the unorganized sector to the formal sector.

The objectives of the Scheme are:

- 1) Increased access to credit by existing micro food processing enterprises, FPO's, self-help groups and cooperatives.
- 2) Integration with an organized supply chain by strengthening branding and marketing.
- 3) Support for the transition of existing 2,00,000 entrepreneurs into the formal framework.
- 4) Increased access to common services like common processing facility, laboratories, storage, packaging, marketing and incubation services.
- 5) Strengthening of institutions, research, and training in the F.P Sector.
- 6) Increased access for the enterprises, to professional and technical support.

Schemes under PMFME:

- 1) One district one product
- 2) Upgradation of Individual Micro-food Processing Units
- 3) Support to FPO's / SHGS / Producer Cooperatives
- 4) Seed Capital to SHGS
- 5) Common Infrastructure
- 6) Branding and Marketing Support
- 7) Capacity Building and Training

b) Operation Greens Short Term Intervention:

The objective of intervention is to protect the growers of fruits and vegetables from making distress sale due to lockdown and reduce the post-harvest losses. Ministry will provide subsidy @ 50% of the cost on the transportation of eligible crops from surplus production duster to consumption centre and on the hiring of appropriate storage facilities for eligible crops (for maximum period of 3 months).

The subsidies and incentives available /Implementation on food processing Industries in India up to March 2022 are shown in table IV.

Table IV: Table showing Subsidies and Incentives Available / Implementation by Food Processing Industries in India up the Year Ending March, 2022

S. No.	Main Scheme	Sub-Scheme	No. of Industries	Project Cost (Rs. in Crore)	Amount of Grant Approved (Rs. in Crore)	Amount of Grant Released (Rs. in Crore)
1.	PMKSY (Pradhan Mantri Kiran Sampada Yojana)	1) Mega Food Park	41	4624.174	1971.48	1443.50
		2) Cold Chain	356	9673.37	2682.04	2006.33
		3) Creation / Expansion of Food Processing Preservation Capacities (Units Scheme) (CEFPPC)	288	35% of the eligible project cost in general areas and 50% in hilly areas up to max. of 5 crores (3744.06)	-	749.13
		4) Agro-processing Clusters	100	35% of the eligible project cost in general areas and 50% in hilly areas upto max. of 10 crore (1934.10)	-	604.09
		5) Creation of Backward and Forward Linkages (Closed)	61	35% of the eligible project cost in general areas and 50% in hilly areas upto max. of 5 crores (689.34)	162.31	150.34

S. No.	Main Scheme	Sub-Scheme	No. of Industries	Project Cost (Rs. in Crore)	Amount of Grant Approved (Rs. in Crore)	Amount of Grant Released (Rs. in Crore)
		6) Food Safety & Quality Assurance Infrastructure	175	766.69765	349.1948	275.797
		7) Human Resources & Institutions				
		a) R&D	25	-	90.8	20.8
		b) Promotional activities	-	-	-	-
		c) Skill Development	27	180.050	90.05	80.10
		d) Strengthening of Institutions	-	-	-	-
		8) Operations Green	6	363.3	136.82	14.23
2.	PLISFPI (Production Linked Incentive Scheme for Food Processing Industry)	a) Incentive on Sales and Investment	56	-	-	-
		b) Incentive on Innovative / Organic Products to SME	13	-	-	-
		c) Incentive for Branding and Marketing	80	-	-	-

S. No.	Main Scheme	Sub-Scheme	No. of Industries	Project Cost (Rs. in Crore)	Amount of Grant Approved (Rs. in Crore)	Amount of Grant Released (Rs. in Crore)
--3.	Aatmanirbhar Bharat	1) PMFME Scheme	2,00,000	-	10000	-
		a) ODOP (One District One Product)	13,417	35% of the total project cost upto max. of 10 lakh	35% of the total project cost upto max. of 10 lakh	437.42
		b) Upgradation of Individual Micro Food Processing Units	-	35% of the project cost upto 10 lakh	-	-
		c) Support to FPO's / SHG's / Producer Cooperatives	-	35% of the project cost to FPO's, SHG's, producer cooperatives	-	-
		d) Seed Capital to SHGS	-	40000 per member of SHG for small tools and 35% of the project cost upto 10 lakhs.	-	-
		e) Common Infrastructure	-	-	-	-
		f) Branding and Marketing Support	-	50% for branding and marketing support to FPO's, SHG's	-	-
		g) Capacity Building and Training	-	-	-	-



S. No.	Main Scheme	Sub-Scheme	No. of Industries	Project Cost (Rs. in Crore)	Amount of Grant Approved (Rs. in Crore)	Amount of Grant Released (Rs. in Crore)
		2) Operations Greens Short Term Intervention	-	-	-	-

Source: MOFPI, 2022

Conclusion and Policy Implications:

The analysis of various parameters of food and nutritional security by applying different statistical tools shows that India is self- sufficient in achieving food and nutritional security of processed products among people. Various analysis also shows that India is self sufficient in terms of number of units established, employment in these units, production, demand, supply and utilization of processed products by proper accessibility. Thus, we can say that all food items, including milk, fruits, vegetables, meat as well as processed and fortified foods, etc. are directly related to health of the people. Food processing sector also enables the production at large to enjoy a various diet for healthy living. The concept of food security has undergone considerable modifications in the recent year. Though some were successful in achieving self-sufficiency by increasing their food production and increase their capacity to cope with year-to-year fluctuations in production. This necessitate a change in approach and as a result the food energy intake of vulnerable groups is now given prominent in assessing food security. It is concluded that the food security of the region depends on number of factors, i.e., stable, and secure production, import, if necessary, distribution system and price policy, buffer stocks, government policies, population policies and planning, over-all socio-economic development policies, especially related to income and employment generation, education, health care facilities, safe drinking water etc.

Results of this study possibly indicates the role of Food Processing Industry in Food and nutritional security in India by

- i) Possibly provide a model for managers providing institutional input to food processing unit holders of India to design and develop their best performance to achieve nutritional security of their products.
- ii) This study providing recommendations/strategies for future food processing unit holders to get benefitted from various incentives/schemes sponsored by centre govt. agencies.
- iii) This study is helpful to managers as well as unit holders in sustaining their business



development and expansion.

Limitations and Future Research Directions

The study is based on secondary information which needs to be understood in proper perspective before its findings are implemented. Though all possible efforts have been made to make the study exhaustive, objective, and transparent but following limitations need to be taken care of whenever the study is referred for implementation: -

- 1) Since, the present study is based on the information collected from secondary sources viz. published and unpublished books, journals of various Indian Government and non-Government agencies/departments, the biasness in the data collected cannot be ignored.
- 2) Due to time constraints, limited secondary sources used for collecting information.
- 3) The present study is limited only to examining for food and nutritional security of processed food products among Indian people, the other aspects benefitting the community is not taken out.

It is the responsibility of the Ministry of Food Processing Industries to create and carry out policies for the food processing sector that are in line with broader societal goals. The Ministry directs and assists the business, creating an environment that is conducive to the industry's healthy growth, and acting as a catalyst for increased investment in the current sector. The Ministry's objectives include creating crucial infrastructure to close gaps in the supply chain from farm to consumer, funding projects for agricultural produce value addition, funding projects to reduce waste in any way throughout the food processing chain through the development of infrastructure, funding projects to introduce cutting-edge technology within the food processing industries, and encouraging product and process research and development.

In the era of economic liberalisation, all sectors of the economy, including the private, public, and cooperative sectors, have specific roles to play, and the Ministry promotes their active engagement. The Ministry of Food Processing Industries' mission is to make food processing a national endeavour by facilitating and acting as a catalyst for good investments into this sector from both inside and outside of India. With this overarching objective in mind, the Ministry seeks to improve farmer income by more effectively utilising and adding value to agricultural products, decrease food processing chain waste by building infrastructure for storage, transportation, and processing of agro-food products, introduce new technology into the food processing industries from both domestic and external sources, encourage research and development in food processing for product, and offer policy support.

With their evolving lifestyles, India's young population and expanding middle class present a huge market opportunity for the food processing sector. Yet, this industry's expansion needs to be supported



by robust R&D. To offer consumers new, processed products that are more nutritious, research and innovation are required. They will have access to more options of higher quality and larger variety thanks to new processing and packaging technology. The government now funds research and development in the food processing industry through a network of institutions and labs run by the CSIR and the ICAR (Indian Council of Agricultural Research). A responsible food sector will operate in a proactive and preventative culture by adhering to food safety regulations across the supply chain from farm to gate.

Preventive behavior aims at the identification, anticipation, and control measures for potential risks. The second element for the paradigm for a well performing system relies on the educated consumers. An exemplary consumer is one who will keep him / herself aware of the risks and benefits of food, will seek information from reputable sources and will act on the advice given. A well performing system also relies on the robust food regulatory regime that uses of mix of Govt. interventions, both regulatory and non-regulatory. The food regulatory regime should be evolutionary and adequate to the innovation of science and technology. Identification, foresight, and mitigation of prospective dangers are the goals of preventive behavior. Consumer education is the second component in the paradigm for a system that works successfully. A model consumer is someone who seeks information from reliable sources, keeps themselves informed about the advantages and disadvantages of food, and acts on that information. A strong food regulation framework using a variety of governmental actions, both regulatory and non-regulatory, is also essential to a well-functioning system. The system of food regulation needs to be progressive and compatible with advances in science and technology.

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