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Food Processing Sector in India Creating Enabling Environment to Harness the Potential

Dr. Amrit Patel
Self-employed consultant Ahmedabad, Retired Deputy General Manager, Bank of Baroda, Mumbai, India.
*Corresponding author email id: dramritpatel@yahoo.com

Abstract — **Farmers' socio-economic welfare in India [more importantly growing number of small and marginal farmers] can get a significant boost if appropriate enabling environment is created to expand and accelerate growth of food processing sector [FPS] to face challenges within India and international markets. Focused attention to harness the full potential of the FPS can favourably impact upon the much needed crop diversification, cropping intensity, reduction in losses due to wastage of farm produce at various stages, enhance value addition and generate employment ultimately leading to increase in sales in India & exports and higher income to farmers. In the current context of dismal growth rate of agriculture as compared to manufacturing and services sector, the added significance to assign target &achieve higher growth rate of FPS lies in ensuring the livelihood of millions of rural households depending upon agriculture [agricultural labourers, tenant farmers, oral lessees, share croppers and those living in drought-prone, desert, tribal and hilly areas], country's food & nutritional security, containing food inflation and reducing pressure on agricultural land. Productivity, production and profitability of farming enterprise and economic viability of a number of small and marginal farms can be improved through initiating a series of agricultural reforms including policy and programs relating to FPS, contract farming system, cold storages and supply chain to source a variety of farm produce of better quality in adequate quantity.**

India ranks first in the world in the production of 18 agricultural commodities and second in20 commodities. Food processing technology enables farmers to convert their seasonal and perishable farm produce into several forms of food products that are ready to eat, easy to carry in attractive packets, marketable and having increased shelf-life. The FPS has been growing at a faster rate than agricultural sector. However, according to the Institute of Economic Growth overall level of food processing in India was 6.62% in 2010-11 which needs considerable expansion. This article briefly highlights the significance, current status, Government initiatives, performance of the FPS and suggests the aspects of creating the enabling environment to harness the potential of the promising FPS.

Keywords — **Farmer, Food, Production, Processing, Harness the Potential.**

I. INTRODUCTION

India produces about 450 million tons of raw food materials of plant and animal origin which are refined, stored and transformed into various usable products using conventional and modern post-harvest and food processing technology. It involves a series of operations like cleaning, grading, drying, storage, milling, packaging, transport and marketing. At the end of each operation, it adds value to the product. The food processing sector [FPS] serves as a vital link between agriculture and manufacturing sector. In this relationship, the raw material being produced by farmers provides assured backward linkage for the FPS and an assured source to supply healthy foods to the consumers in easy to carry packets throughout the country. The Agricultural Processing Sector [APS] in India offers tremendous scope for development of micro & small industries/enterprises utilizing produce of agriculture, horticulture, livestock and fisheries sectors, viz. processing of rice, wheat, coarse cereals, maize, pulses, oilseeds, fruits and vegetables, sugarcane, tea, coffee, spices, condiments, cotton, jute, silk under agriculture; milk, meat under livestock; inland & marine fish under fisheries etc. The importance of the FPS, a vital component of Agro-processing industry in India's agriculture can be appreciated from the studies by McKinsey which reveal that food in India has an economic multiplier effect of 2.0 to 2.5 which means for every rupee of revenue generated from food the economy at large benefits by Rs2.0 to Rs.2.50. According to NABARD (2005-06) the share of agro-industries in rural industries was 83% of number of enterprises, 78% of employment generated and 72% of gross value addition. Field experiences suggest that programs to significantly enhance farmer's income and mitigate rural distress should focus institutional strengthening and capacity building of farmers accompanied by corresponding investment to develop FPS in the organized sector. Farmer's bargaining capacity and economic viability of farming enterprise can considerably be improved if programs are initiated to add value to his farm produce and motivate& train him to produce according to the market demand and of prescribed quality standards. Processors and retailers can meet the growing demand for agricultural produce by facilitating farmers to access the flow of market information, adopt cost efficient technology, use quality inputs, avail institutional credit & insurance cover so that farmer can tailor his output to match the needs of the market and in the process generate employment and raise his income.

II. CURRENT STATUS OF FPS

- Domestic expenditure on food and food products accounts for about 21% of the GDP in India and constitutes the largest portion of the Indian consumer spending [GOI,2 014]. In recent years the FPS, because of the abundant supply of raw materials, increase in demand for food products and incentives offered by the Government, has emerged as an important segment of the agricultural sector in terms of its contribution to GDP, growth rate and percentage share.
- GDP of FPS increased to Rs.1602.24 billion in 2014-

15 [at 2011-12 prices]. Growth rate of FPS increased to 7.13% as compared to 0.23 % of agriculture and its share in GDP of agriculture increased to 10.12 % and that of manufacturing to 9.02% in 2014-15 [GOI, 2015].

- Growth in index of industrial production for food processing industry in 2014-15 was 4.8 as compared to 2.8 for all industries and 2.3 for manufacturing sector [GOI, 2015].
- Despite specific policy initiatives to give a thrust to the FPS it still continues to be in its nascent stage with remarkably low penetration. It is highly fragmented and dominated by the unorganized sector. Unorganized sector employs 73.93% of the workforce. The unorganized segment varies across categories of food products and regions but nonetheless around 75% of the market is still in this segment.
- India's access to enormous natural resources and growing technical knowledgebase presents favourable comparative advantages over other developing economies in this industry. However, India's food export market accounts for a meagre share of only 1.4% of the world food trade.
- According to the Federation of Indian Chamber of Commerce &Industries [FICCI] report 2009, India has a food and food products market of US$ 181 billion. The Indian domestic food market was expected to grow by nearly 40% of the current market size to Rs12,900 billion by 2015 and Rs17,200 billion by 2025.[GOI, 2013[.
- For prospective investors the FPS in India is an attractive sector. Confederation of Indian Industry has estimated that the FPS has potential of attracting US$ 33 billion of investment in next ten years.
- Fruits and vegetables processing is highly unorganized enjoying a share of 70% in the total market size. Ready to eat foods, frozen vegetables, processed mushrooms, among others, have witnessed rapid growth in the recent past. However, processing of fruits and vegetables accounts for a meagre 2.2% of which 48% is in the organised sector. The major challenge faced by this sector is the inadequacy of cold chain, value addition & preservation infrastructure.
- The dairy sector accounts for the highest share of the processed food. While 35% of its total produce is processed, organised sector is processing as low as 15%.The dairy sector being highly unorganized its products do not conform Food Safety & Standards Authority of India [FSSAI standards, leave alone international standards of quality.
- Processed meat and poultry products account for around 21%.
- For augmenting export, Indian seafood processing industry needs value addition, expanding capacity of existing units, establishing new units and diversifying their current activities etc.
- The Indian snacks market is reported to be worth Rs.150 billion with the organized segment accounting for about 50% of the market share. Share of the potato chips and potato based products is almost 85% of the Indian snack market.

III. Growth Impediments

Recognising the significant potential of the FPS, the corporate/business/industrial houses preferred to invest in food processing industry to grain trading activity, making a beginning with rice processing followed closely by wheat milling, milk processing, jute industry, sugarcane processing and oil-extraction through solvent extraction plants. The food processing industry has been faced with several constraints ranging from inadequacy of infrastructure to human resources and to technological innovations. FICCI, considering the food processing industry as the sunrise industry and the need to systematically address the challenges faced by the sector, has through its well-researched surveys identified major factors becoming impediments to the growth of food processing sector. These include [i] lack of comprehensive national policy on food processing sector that, *inter alia,* focuses on inconsistency in central and State policies; inadequate infrastructural facilities; absence of specific plan to attract private sector in production and adequate and timely procurement of produce of field and plantation crops, fruits, vegetables, livestock and fish ; ineffective enforcement of food safety laws; absence/ineffective enforcement of laws and rules governing weights & measures and packaging commodities; absence of long-term conducive taxation policy [ii] inadequate investment in fundamental/basic and applied research covering processing plants with cost effective technologies, cost effective food machinery and packaging technologies; inadequate value addition and market intelligence. Now, when the demand for processed food has been growing these constraints need to be addressed on priority basis that can facilitate the country to exploit the existing opportunities of converting its substantial amount of food grains, fruits, vegetables, livestock& fish produce into value added products, rejuvenating agro-based rural industries, accelerating agricultural growth and generate rural employment on a larger scale throughout the year. It is, therefore, necessary to identify [i] a combination of controllable and uncontrollable factors that have adversely affected the growth of the sector and have acted as impediment to harness its potential and [ii] the diverse and demanding challenges of the FPS that need to be addressed on priority basis and in a effectively coordinated manner so that the sector can achieve maximum market benefits.

Harnessing the Potential

India can harness the substantial potential of FPS as it occupies a unique position in the production of food commodities in the World. But pre and post-harvest food losses have to be significantly minimized.

India's Share in World Production

According to the FAO statistics [2013]India ranked number 1 in the production of 18 commodities in the world with a share in production ranging from 25.8% to 97.0%; number 2 in 20 commodities with a share ranging from 5.2% to 35.4%; number 3 in six & 4 in one commodity. Besides, being number 1, India's share was quite

impressive in case of ghee of buffalo milk [97.0%] followed by castor seed [88.1%], okra [73.1%] and buffalo fresh whole milk [68.6%], chick pea [67.3%] and pigeon pea [64.6%] [GOI,2015]. This exhibits the abundant supply of raw material which can help India successfully harness the potential of the FPS and satisfy the rising demand for processed food products because of [i] increasing urbanization, changing lifestyles & aspirations of middle classes [ii] increasing nuclear families & working women [iii] rising demand for functional foods & nutraceuticals [iv] growth of organized private-label penetration.

Table 1. India's Rank & Share in production of commodities in the world [2013], Production [Metric Tons] & share [%]

Commodity & Rank	Production & % Share	Commodity & Rank	Production & %Share
Anise, Fennel & coriander [1]	546173[58.1]	Groundnut with shells [2]	9472000 [20.7]
Areca nut [1]	609000 [49.7]	Lentil [2]	1134000 [22.8]
Banana [1]	27575000[25.8]	Onion dry [2]	19299000 [22.5]
Castor seed [1]	1644000 [88.1]	Peas green [2]	4006200 [23.0]
Chick pea [1]	8832500 [67.3]	Potatoes [2]	45343600 [12.0]
Chillies & Peeperdry [1]	1376000 [39.8]	Pumpkin, squashes &Gourds [2]	4900000 [19.9]
Ginger [1]	683000 [31.9]	Rice & paddy [2]	159200000 [21.5]
Lemons & Limes [1]	2523500 [16.6]	Safflower seed [2]	109000 [16.3]
Mango, Mango pulp &Guava [1]	18002000 [41.6]	Sesame seed [2]	636000 [13.1]
Millet [1]	10910000 [36.5]	Sugarcane [2]	341200000 [17.9]
Okra [1]	6350000 [73.1]	Tea [2]	1208780 [22.6]
Papaya [1]	5544000 [44.6]	Tomatoes [2]	18227000 [11.1]
Pigeon pea [1]	3022700 [64.6]	Wheat [2]	93510000 [13.1]
Meat Buffalo [1]	1610000 [43.2]	Meat goat [2]	509000 [9.5]
Milk whole fresh Buffalo [1]	70000000 [68.6]	Milk whole fresh cow[2]	60600000 [9.5]
Milk Goat [1]	5000000 [27.8]	Cashew nut with shells[3]	753000 [17.0]
Ghee &butter of Cow milk [1]	137550 [60.6]	Coconut [3]	11930000 [19.1]
Ghee of buffalo milk [1]	2863000 [97.0]	Lettuce & chicory [3]	1080000 [4.3]
Beans dry [2]	3630000 [15.9]	Nutmeg, mace &cardamoms [3]	16565 [17.6]
Cabbage &other Brassicas [2]	8534000 [11.7]	Pepper [3	53000 [11.2]
Cauliflower &Broccoli [2]	7887000 [35.4]	Rape seed [3]	7820000 [10.8]
Eggplant [2]	13444000 [27.2]	Oranges [4]	6426200 [9.0]
Garlic [2]	1259000 [5.2]		

Source: Ministry of Food Processing Industry; Figures in parentheses indicate % share of production in the world.

Harvest & Post-harvest Losses

The Central Institute of Post-Harvest Engineering & Technology [CIPHET] carried out a nation-wide study on the quantitative assessment of harvest and post-harvest losses for 46 agricultural produces in 106 randomly selected districts in India. The study considered the quantitative loss as the material rendered "unfit for human consumption". The different stages considered for assessment of losses included harvesting, collection, threshing, grading/sorting, winnowing/cleaning, drying, packaging, transportation, and storage depending upon the commodity. The study in 2009 has estimated harvest and postharvest losses of major agricultural produces at national level of the order of Rs.441.43 billion per annum at 2009 wholesale prices Most wastages were in fruits & vegetables, pulses & cereals. At the instance of the Government the CIPHET has conducted a repeat study for 45 agricultural crops in 107 districts to assess the position. This study [2012-13] estimated annual value of harvest & post-harvest losses of major agriculture produce at national level of Rs.926.51 billion using production data of 2012-13 at 2014 wholesale prices [GOI,2015]. In cereals& fruits, major losses occur at farm level during harvest, collection & threshing. Storage losses are 0.75% to 1.21%. Adoption of scientific techniques at harvesting & post-harvest stages coupled with adequate processing facilities can significantly reduce losses/wastages and increase farmers' income and supply to consumers. Incidentally, in five years ended 2013-14, the average annual growth rate of horticulture & food grain production was 5.53% & 2.60%. This necessitates that policy & programs to increase food & fruit production should match with that of corresponding investment in creating processing facilities in order to avoid farmers' distress & decline in farmers' income. Improving farmers' bargaining power necessitates value addition to their produce. Farmers need to be trained to produce according to the market demand & quality standards. This exhibits immense scope for India to reduce the losses through organized FPS. Adequate food processing facilities accompanied by significant improvement in the existing Supply Chain & expanding it and efficient transportation and storage system can substantially minimize wastages in farm produce.

Table 2. Percentage estimates of losses in Production of Major Commodities.

Commodity	2009-10	2012-13	Commodity	2009-10	2012-13
Cereals	3.9 to 6.0	4.65 to 5.99	Apple	12.3	10.39
Pulses	4.3 to 6.1	6.36 to 8.41	Grape	8.3	8.63
Wheat	6.0	4.93	Papaya	7.4	7.76
Paddy	5.2	5.53	Banana	6.6	6.70
Bajri	4.8	5.23	Milk	0.8	0.92
Maize	4.1	4.65	Fish-inland	6.9	5.23
Oilseeds	2.8 to 10.1	3.08 to 9.96	Fish-marine	2.9	10.52
Fruits & Vegetables	5.8 to 18.0	4.58 to 15.88	Meat	2.3	2.71
Guava	18.0	15.88	Poultry	3.7	6.74
Mango	12.7	9.16			

Source: Ministry of Food Processing Industries

IV. Horticulture

During the five years ending 2013-14 average annual growth rate of horticultural sector was 5.53% as compared to 2.64% in food grain production. Horticulture constitutes very important component of FPS [GOI, 2015]. Horticulture includes fruits, vegetables, root and tuber crops, nuts, spices, mushrooms, honey, floriculture, medicinal and aromatic plants, among others. These crops, though account for only 6% to 7% of the total area under cultivation, provide more than 25% of total agricultural GDP. Harvest & post-harvest losses of fruits & vegetables range between 4.58% and 15.88%. Even if, 10% losses are reduced by converting the produce into processed products India would have considerable savings which would benefit producers and consumers. Horticulture in India acquired its prominence in the last decade by implementing horticulture development program in a mission mode which significantly supported FPS. Prior to this most of the fruits and vegetables were indigenously processed and stored in the form of pickles, murabba and other homemade chutneys. Mostly the produce was heated, boiled or sun dried. The business in the form of fruit and vegetable processing was insignificant. However, with the entry of multi-national corporations and access to modern technologies in the recent past the scenario has changed as the fruit and vegetable processing is seen as a business opportunity and a sun rise industry. Horticulture produce is now supported by the integrated cold chain facilities. Following two supporting infrastructure in particular, currently being moderately developed, need to be expanded, and farmer-producers are encouraged and incentivised to use them so that FPS in horticulture sector can grow and become competitive.

V. Cold Storages

The critical infrastructure facility for growth & development of the FPS in rural India is the provision of adequate cold storage facilities. The challenges facing operating cold storages include [i] developing & expanding cost-efficient technologies [ii] designing technology to store multiple commodities according to location-specific fruits & vegetables instead existing single commodity [iii] facilities to control/regulate temperature, humidity, air circulation & fresh air requirements to suit to the needs of the stored commodities instead uniform [iv] cold storages can have pre-cooling facilities such as forced air evaporative cooling, package icing, and vacuum cooling [v] controlled atmosphere cold storages are in nascent stage [vi] over 90% of cold stores use old ammonia refrigeration compressor without any capacity control, which is inefficient and expensive [vii] managed by unskilled and untrained manpower, not aware of latest technology and techniques in handling and storing fresh perishable produce of international standards

VI. Cold Chains

Objectives of cold chain in the FPS are [i] to provide integrated infrastructure comprising complete cold chain, value addition and preservation facilities without any break from the farm gate to the consumers and [ii] to link producers to the processors and market through well-equipped supply chain. In the absence of on–farm cooling and grading arrangements and slow development of cold chain infrastructure, the farmer is compelled to sell his produce to the intermediaries/brokers and getting low price. If facilities are created to help farmers grade/sort out and store their farm produce as nearer to farms as possible farmers can be saved from exploitation by middlemen & brokers. Cold chain facility empowers them to demand and secure better price from the processors. The cold chain requires substantial financial investments to create grading and packing centres, storage facilities with controlled atmosphere, refrigerated vans, testing laboratories, among others. It is essential that corporate houses are incentivised to invest in creating a financially viable cold chain & operate on a commercial scale. Indeed, this itself is a Herculean task, but not impossible, for which a systematic roadmap indicating specified period, say five to eight years will need to be drawn involving considerable financial investment & human resources and implemented in public-private-partnership mode. Of course, Union & State Governments will have to take a lead by committing the estimated share of public investment.

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VII. Policy Initiatives & Programs

Recognizing the fact that India has been number 1& 2 in 38 agricultural commodities with fairly reasonable share in their production in the world on one hand and significant losses/wastages in the farm produce on the other the Government has initiated a number of policies & programs including providing financial incentives & creating infrastructure facilities that has been reflected in its faster rate of growth than agricultural sector itself. Government of India created Ministry of Food Processing Industries as back as [28 years ago] in July 1988 which, however, in 1999 [after 11 years] was made a Department of then existing Ministry of Agriculture [GOI,2015]. In 2001, Government of India recognized that the FPS is a knowledge-based industry that can add value to agricultural raw materials, enhance farm income and increase employment, among others. Accordingly, a full-fledged Ministry of Food Processing Industries was again created in 2001 to pay focused attention to FPS and effectively coordinate with other concerned union ministries and State Governments & Union Territories. The FPS has now been defined to include [i] Manufactured Processes: If any raw product of agriculture, animal husbandry and fishing is transformed through a process [involving employees, power, machines or money] in such a way that its original physical properties undergo a change & if the transformed product is edible or has commercial value and [ii] Other Value Added Processes: If there is significant value addition [increase in shelf life, shelled & ready for consumption etc.]. Efforts are being made to augment infrastructure that can make FPS most competitive and support country's millions of hard toiling small & marginal farmers to produce safe, hygienic and nutritious quality food products. During the eighth five year plan [1992-97] the food processing industry [FPI] was conceived to provide common infrastructure facilities and support to small& medium enterprises [SMEs] more or less on lines of industrial estates. During the eighth five year plan [1992-97] to Tenth plan [2002-07] period as many as 56 FPI projects were approved of which only 15 are currently under various stages of development [GOI,205]. On the recommendations of the Working Group on Food Processing Sector in the Twelfth Five Year Plan schemes to be implemented include [i] infrastructure development [a] Mega food parks [b] Cold chains, value addition and preservation infrastructure [c] Setting up and modernization of existing abattoirs [ii] Strengthening Institutions [a] National Institute of Food Technology Entrepreneurship & Management [b] Indian Institute of Crop Processing Technology [c] Indian Grapes Processing Board [d] National Meat & Poultry Processing Board [iii] Quality Assurance HACCP and R& D and Promotional Activities [GOI,2015].

- *Mega Food Parks:* Mega food parks launched in 2008 aimed at facilitating the establishment of an integrated value chain with food processing at the core and supported by requisite forward and backward linkages. The central processing centre is networked with primary processing centres and collection centres located at farm gate in production areas. The scheme intends to bring together farmers, processors and retailers and link agricultural produce to the market so as to ensure maximum value addition and minimum wastages that can increase farmer's income. It provides modern infrastructure for food processing units in the country in selected clusters being identified in a demand driven manner, ensures value addition of agricultural commodities including poultry, meat, dairy, fisheries etc., establishes a sustainable raw material supply chain for each cluster. Mega parks can facilitate induction of sophisticated technology; address issues of small & medium enterprises [SME] through a cluster approach with stakeholders managing the supply chain
- *Cold chain, Value Addition and Preservation of Infrastructure:* This scheme was launched in 2008 to minimize post-harvest losses substantially by creation of uninterrupted cold chain infrastructure linking farm gate to retail outlets. Efficient and adequate transport and storage facilities can result in more income to farmers and steady supply to consumers at retail outlets.
- During 11th FYP [2007-12], 79 cold chain projects were approved out of which 55 are at various stages of development. In August 2013, 75 cold chain projects were approved out of which 56 are under implementation during 12th FYP. Facilities already created as on 31-10-2014 include [i] 2.46 tons of cold storage CA/MA, deep freezers [ii] 59.513 tons /hour IQF [iii] 84,56,500 litres of liquid milk storage [iv] 330 reefer vans. By the end of the twelfth plan period i.e. 2019 under the cold chain, facilities expected to be created include [i] 3,88,000 tons of cold storage [controlled atmosphere/modified atmosphere CA/MA] and deep freezers [ii] 94.05 tons per hour of individual quick freezers [IQF] [iii] 106.29 tons per day milk storage [iv] 624 reefer vans
- *Setting up of and Modernization of Abattoirs:* Establishment of abattoirs in the 11th FYP[2007-12] aimed at better utilization/value addition of bye-products, providing chilling facility to promote microbial activity in slaughtered animals, better hygiene, safety and retail cold chain management, better forward linkages for finished meat and products. In 2008-09, 10 projects were approved and targets under the upscaling scheme introduced during the 12th FYP [2012-17] are for 25 new abattoirs and modernization of 25 existing abattoirs. Already 29 abattoirs are approved.
- *Quality Assurance:* In globalized market raising quality & standards of food safety and hygiene complying with the FSAAI norms & implementation of HACCP/ISO 22000; ISO 19000/GHP/GMP has become the competitive edge for FPS. For this Quality Assurance scheme is under implementation which includes R&D in FPS, Setting up/upgradation of quality control/food testing labs; assistance & support is provided to facilitate FPI to adopt HACCP and ISO certification norms; supply chain logistics, storage and processing capacity, to provide support system to orga-

-nized FPS

- *R & D Projects :* R&D projects are under implementation for reduction in wastage and spoilage; development of technology and innovative methods for preservation of food products; identification of new eco-friendly and better packing materials fortification of staple food to improve nutritional quality; increasing share in global trade; standardization of processes of preparation, handling, packing, storage, transport, distribution of traditional/ethnic food products with focus on safety;

Following Table exhibits State-wise position of projects already completed/under implementation in respect of mega food parks [22], cold chain[111], abattoirs [39], food testing laboratories [59] and R&D [39]. Cold chain projects include fruits & vegetables [78], dairy [15], irradiations [4], fish & meat two each.

Table 3. State-wise Mega Food Parks, Cold Chain, Abattoirs, Technology Labs & R&D Projects

State	MFP	CC	A	FTL	R%D	State	MFP	CC	A	FTL	R&D
Andhra	2	3	2	4	4	Karnataka	1	4	2	1	4
Kerala	0	3	1	3	2	Tamil Nadu	0	1	2	6	9
Telangana	1	1	0	0	0	Puducherry	0	0	1	0	1
Gujarat	2	8	0	9	1	Maharashtra	2	27	2	10	1
Goa	0	0	1	0	0	Rajasthan	1	3	1	0	1
Punjab	1	7	1	3	2	Haryana	0	4	1	4	2
Himachal	1	8	1	0	0	J&K	1	4	2	0	0
Delhi	0	0	0	4	2	Chhattisgarh	2	2	1	0	1
MP	1	3	0	2	0	UP	0	6	2	5	2
Uttralkhand	2	11	0	0	0	Bihar	0	1	1	0	0
Odisha	1	1	0	0	0	West B	1	7	8	5	0
Jharkhand	1	0	1	1	0	Arunachal	0	1	1	0	0
Mizoram	0	3	1	0	0	Meghalaya	0	0	0	0	1
Manipur	0	0	0	1	0	Assam	1	2	0	0	6
Nagaland	0	0	2	1	0	Sikkim	0	1	3	0	0
Tripura	1	0	0	0	0	Total	22	111	39	59	39

Source: Ministry of Food Processing Industries

- *National Mission on Food Processing:* NMFP launched in 2012-13 focuses [i] local needs, decentralization of implementation by States/Union Territories, contemplates to establish similar missions at state/district levels for better planning, supervision and monitoring [ii] to promote post-harvest technology including setting up of FPI units [iii] to augment capacity of food processors working to upscale their operations through capital infusion, technology transfer, skill upgradation and handholding support [iv] to support SHGs working in FPS to help achieve SME status; capacity development and skill upgradation through institutional training to ensure sustainable employment opportunities and bridge gap between requirements and availability of skilled manpower. Under the NMFP eligible agencies including Self-Help-Groups, NGOs Farmer-Producers Organizations and Cooperative Societies are provided financial assistance for reefer vans, mobile precooling units, for transport of horticulture and non-horticulture produce, setting up primary processing centres, collection centres, minimal processing facilities at farm gate level including warehousing, cleaning, sorting, grading, packing, processing, CA/MA cold storage, dry warehouses and Individual Quick Freezers, ripening chamber at farm site.
- Policy reforms to facilitate and exploit the growth potential of the sector, viz.[i] efforts towards rationalization of food laws [ii] increasing the Foreign Direct Investment to the extent of 100% in the food processing and cold chain infrastructure in order to attract private sector and invite foreign investments in the sector.
- Specific schemes are formulated viz. scheme for [i] technology up-gradation, establishment and modernization of FPS [ii] quality assurance, codes standard and R&D [iii] up-gradation of quality of street foods [v] addressing the low scale of processing activity by setting up the mega food parks integrating facilities/services for procurement, processing, storage and transport.
- FPS envisages a network of food testing laboratories to help [i] establish a surveillance system for monitoring the quality and composition of food [ii]analyse samples received from processing industries and other stakeholders [iii] minimize time of analysis of samples by reducing transportation time of samples [iv] ensure compliance of international standards on food for exports and imports. This should guarantee safety and quality of food products as mandated by regulatory authorities and would benefit small and medium entrepreneurs of domestic industry and promote exports..
- Efforts are being made to [i] provide state of the art infrastructure for food processing in selected clusters being identified in a demand driven manner. [ii] ensure value addition of agricultural commodities and poultry, meat, dairy, fisheries products [iii] establish a

sustainable raw material supply chain for each cluster [iv] address the issues of small farm size and small and medium nature of processing industries through a cluster approach with stakeholders managing the supply chain[v] put in place an institutional mechanism for products, processes and retails to work together to build the supply chain.

- The XII Five Year Plan [2012-17] has specifically focused on key strategies, viz. [i] Setting up of National Mission on Food Processing to improve coordination and effective implementation of various schemes through decentralization seeking greater involvement of State Governments [ii] Expanding and modifying existing infrastructure development schemes, viz. Mega Food Parks Scheme, Integrated Cold Chain Scheme [iii] Establishment of additional abattoirs and modernization of existing abattoirs [iv] Developing and strengthening of existing institutions [v] Taking up a nation-wide skill development programme along the lines of special projects for skill development of rural youths [v] Expending the network of food testing labs (Government/Private) by providing incentives [vi] Encouraging larger participation in Codex deliberations and setting up/strengthening of Codex cell in Food Safety and Standards Authority of India (FSSAI) to promote, coordinate and monitor related initiatives at the level of stakeholders [vii] Setting up an Innovation Fund & Venture Capital Fund for food processing to promote innovations & technology development.
- With a view to augmenting the credit to food processing sector, loan for the sector is classified under Priority Sector provided the units satisfy investment criteria prescribed for Micro and Small Enterprises, under the Micro, Small and Medium Enterprises Development Act, 2006. In other words, food processing units with an investment in Plant & machinery not exceeding Rs.5o million are covered under priority sector lending.
- In order to make available affordable credit to agro-processing units being designated as food parks, Government has set up a special fund of Rs.20billion in NABARD. Under this fund, loan is extended to individual entrepreneurs, corporates, farmer-producers organizations, corporates joint venture, SPV and entities promoted by the Government for setting up, modernization, expansion of food processing units and development of infrastructure in designated food parks.
- *Fruit & Vegetable Availability Maps of India:* Entrepreneurs need information relating to supply of raw materials, demand for processed foods, availability of infrastructure & land for setting up of units. For this purpose, as a first step towards preparing food grid, "Fruits & Vegetables Availability Maps of India" booklet was released on 18th December 2014. The booklet overviews the production, availability of key agricultural produces in the country and gives an insight on what is grown where as well as the surplus and deficit status of various commodities at the State & national level. It is a resource hand book for entrepreneurs to take informed decision on where & what food products to manufacture. It provides information on selection of land and raw material for establishing a food processing unit.

VIII. Growth & Development of FPS

The growth and development of the FPS was so far limited and constrained due to factors viz. consumers habitually accustomed preferring freshly prepared food including fruits, vegetables, milk to packed products, inadequate infrastructure and facilities to promote sustainable post-harvest management viz. storage, transport, processing etc. However, with the rising demand for processed products & nutraceuticals at faster rate a number of companies have commenced their operations in this sector which has impacted favourably on the growth of organized retail private sector & brand label penetration. Now the FPS has been an important segment of the Indian economy in terms of its contribution to GDP, employment and investment. During the last 5 years ending 2012-13, the FPS has been growing at an average annual growth rate (AAGR) of around 8.4% as compared to agriculture [3.3%] and manufacturing [6.6%]. Its share in GDP of agriculture increased from 10.3% to 12.2% and that of manufacturing from 9.2% to 9.8% during the period. Till 2009-10, the FPS was generally growing at a slower rate than manufacturing sector but in 2011-12 its performance improved substantially registering a record growth of 21.6%. Despite the growth of FPS decelerated [along with slow growth both in agriculture and manufacturing sectors] in 2012-13, the growth of the FPS was higher than both agriculture and manufacturing sector. As on 2012-13, the FPS had a total of 37,175 registered units with fixed capital of nearly Rs.1588.63 billion and aggregate output of around Rs.7490 billion in value terms. Food processing sector is highly labour absorptive and less capital intensive in nature. As per the latest provisional data for 2012-13 released by the Annual Survey of Industries, among all industries 'Food products' generated the highest employment (11.95%), followed by 'Textiles' (10.84%), 'Basic metals' (7.89%) and 'Wearing apparel' (7.13%). In terms of capital requirement, fixed capital to output ratio for Food Products is 5.20 implying food processing unit requires less capital for producing one unit of output, in value terms, as compared to other labour intensive industries. Similarly, fixed capital per employee is very favourable at Rs.8,66,180 per employee in "Food Product" industry as compared to average Rs.16,80,911 in overall industries sector [GOI, 2013].

IX. Share of FPS in Agriculture & Manufacturing Sector

The statistics presented in the following Table No.3 revealed that in recent years the FPS has emerged as an important segment of the agricultural sector in terms of its contribution to GDP, growth rate and percentage share. GDP of FPS increased by 39.99% from Rs.603.78 billion in 2008-09 to Rs.845.22 billion in 2012-13 [at 2004-05 prices]

as compared to by 17.30% of agricultural GDP during the period. Growth rate of FPS increased from 5.3% to 8.4% as compared to [-0.1%] & 3.3% of agriculture and 4.3% to 6.6% of manufacturing sector respectively during the period. Its share in GDP of agriculture increased from 10.3% to 12.2% and that of manufacturing from 9.2% to 9.8% during the period [GOI, 2015].

Table 4. Contribution of FPI to GDP [2011-12 Prices] 2011-12 to 2014-15 [Rs. Billion]

Indicator	2011-12	2012-13	2013-14	2014-15
GDP-All India	81955.46	85992.24	91697.87	98270.89
GDP-Manufacturing	14821.58	15744.71	16581.76	17764.69
GDP-Agri. Forestry &Fishing	15055.80	15234.70	15792.90	15828.51
GDP-FPI	1503.70	1433.64	1495.55	1602.24*
Percentage Growth Rate				
GDP-All India		4.93	6.64	7.17 [6.23]
GDP-Manufacturing		6.23	5,32	7.13 [6.23]
GDP-Agri. forestry &fishing		1.19	3.66	0.23 [1.69]
GDP-FPI		--4.66	4.32	7.13 [2.26]
Percentage Share of FPI				
GDP-All India	01.83	01.67	01.63	01.63
GDP-Manufacturing	10.15	09.11	09.62	09.02
GDP-Agri. Forestry &Fishing	09.99	09.41	09.42	10.12

*Source: National Accounts of Statistics,2015: * Central Statistical Organization : Figures in parentheses indicate average annual growth during the period 2012-13 to 2014-15.*

X. Segments of Registered Units

The FPI, as compared to others, has the largest number of factories and engages largest number of persons. It is reported that every unit of capital invested in FPI employs largest number of persons as compared to other industries while generating almost as high as the output and value addition levels to other industries. In 2012-13, it constituted 13.04% of employments generated in all registered factory sector. Unregistered FPS supports employments to 47.9 lakh workers as per NSSO 67th Round [2010-11] and constitutes 13.73% of employments in the unregistered manufacturing sector. As per 2012-13 data for 18 sub-sectors of the FPI, the fixed capital per registered factory on an average is Rs.4.27crore indicating that most of factories are micro & small [MSEs]. The lowest fixed capital per registered factory is Rs.1.17crore for grain milled products and above Rs.3.00crore is for bakery products, tea, coffee, edible nuts, infant foods, spices etc.

Process and product innovations driven by technology infusion is required to increase value addition in low value added sub-sector viz. vegetable & animal oils & fat products [5.49%], dairy products [8.96%], grain mill [10.0%], fish & meat products [10.0%]. Sub-sectors with higher employees per unit of investment but low GVA% require staff to be trained to increase productivity/efficiency which together with technology infusion would increase value addition.

Table 5. Number of factories, persons employed, output, fixed capital etc. [2012-13] of few FPIs

Particulars	P& P Of meat	P&P of fish, crustacean	P&P of fruits& vegetables	Manufacture Of veg.& anim. oils	Manufacture of dairy products	Manufacture of grain milled products
Factories	140	462	1110	3312	1695	18131
Persons	22130	36773	55090	111218	135108	302934
Output [M]	168944.10	167966.30	109051.40	1654715.00	824592.10	1739465.00
Fixed capital [M]	18849.10	21809.70	50157.40	1444466.30	106106.90	194513.80
GVA [M]	14111.30	15412.50	24729.70	86143.50	67807.10	160593.00
Fixed capital/factory [M]	134.60	47.20	45.20	43.60	62.60	10.70
GVA%	9.11	10.10	29.33	5.49	8.96	10.17
Employment/Million	1.174	1.696	01.91	07.70	1.273	1.557

Source: Annual Survey of Industries;

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XI. State-wise Number of Registered Units

According to ASI data, there were 37,175 registered FPI units as on 2012-13 in 28 States and five Union Territories. While five States & one UT in southern zone had a share of 49.02% of which 15.42% [5735] were in Andhra Pradesh followed by Tamil Nadu [13.88%], Telangana [9.99%] and Maharashtra [8.28%], whereas Punjab [2792], Uttar Pradesh [2097] and Karnataka [2038] had together 18.60% and West Bengal, Assam and Chhattisgarh together accounted for 10.46% of the total.

Table 6. State-wise Number of Registered FPS Units in 2012-13

State [No. of units]	State [No. of units]	State [No. of units]	State [No. of units]
Andhra [5735]	Bihar [736]	Rajasthan [795]	M P [738]
Karnataka [2038]	Chhattisgarh [1008]	Northern zone [4514]	Uttrakhand [383]
Kerala [1501]	Odisha [931]	Assam [1256]	UP [2097]
Tamil Nadu [5159]	West Bengal [1624]	Manipur [19]	Central zone [4226]
Telangana [3716]	Eastern zone [3497]	Meghalaya [18]	A&N [06]
Southern [18149]	Delhi [159]	Nagaland [15]	Chandigarh [14]
Gujarat [1923]	Haryana [608]]	Sikkim [21]	D &D [37]
Goa [90]	Himachal P [163]	Tripura [68]	D&NH [11]
Maharashtra[3077]	J&K [156]	North- east z[1397]	UTs [58]
Western zone [5090]	Punjab [2792]	Chhattisgarh [1008]	Total [37175]

Source: Annual Survey of Industries.

XII. Employment Generation

The employment under registered FPS units in 2012-13 accounted for 13.04% in the total employment under the overall industrial sector whereas employment under unregistered FPS units in the total in 2010-11 was marginally higher [13.72%]. Assuming the number of employments generated under unregistered industrial units & those of FPS the same in 2012-13, the share of number of employments under registered industrial units and those of FPS in the total was 27.06% & 26.11% respectively. This exhibited significantly high proportion of employment under unregistered industrial units & those of FPS, which may be due to proliferation of unregistered units. This necessitates a policy& procedure to make registration requirements simple & entrepreneur-friendly and launching a massive campaign to create awareness for registration.

Table 7. Employment generated under FPS Registered & Unregistered Unite

Units	FPI	Overall Industry	% Share
Registered [2012-13]	1689000	12947000	13.04
Unregistered[2010-11]	4790000	34888000	13.72

Source: Annual Survey of Industries

XIII. Fixed Capital Investments

Though fixed capital investment in FPS increased progressively by 95.75% during five years [2008-09 to 2012-13], the growth over the previous year marginally declined in 2010-11 & 2011-12 and significantly in 2012-13.Though the number of persons engaged in registered FPS units increased marginally by 8.20% during five years [2008-09 to 2012-13], it declined by 4.94% in 2012-13 over the previous year. Average number of persons engaged in a year during five years was 16,57,600. Interestingly, number of persons employed per billion Rupees gradually declined significantly to 55.27% from 1923.46 in 2008-09 to 1063.18 in 2012-13 which needs careful investigation through rigorous analysis of data and remedying the situation.

Table 8. Fixed Capital Investment & Number of persons engaged in FPS [2008-09 to 2012-13]

Year	Fixed Capital [Rs. Billion]	Persons Engaged in '000
2008-09	811.56 [18.76%]	1564[3.87%]
2009-10	994.82 [22.58%]	1606 [2.71%]
2010-11	1207.05 [21.33%]	1662 [3.46%]
2011-12	1450.38 [20.16%]	1770 [6.92%]
2012-13	1588.63 [09.33%]	1689 [-4.94%]

Source: Ministry of Food Processing Industries; Figures in parentheses indicate % change over the previous year

Analysis of data released by the ASI [2012-13] showed that among employment intensive industries total numbers of food product factories were the highest employing highest number of employees. However number of employees per food product factory was the least [44.07] as compared to beverages [68.30], leather [70.38], textiles [75.98] and apparels [99.51]. In terms of fixed capital investment per factory, leather factory had the least capital amount [Rs.17.95 million] followed by the apparel factory [Rs.26.00 million] & food products [Rs.38.17 million] as compared to textiles [Rs.63.25 million] and beverages [119.67 million]. However, in terms of output per factory, beverages had the maximum output [Rs.250.80 million] followed by food products [Rs.198.57 million] as compared to textiles [Rs.166.30 million], leather [101.70 million] & apparels [Rs.97.50 million]. Food products factories in respect of structural ratios viz. fixed capital per employee [Rs.8,66,180], output per employee [Rs.45,05,319], capital-output ratio [5.20] & input-output ratio [1.10] are fairly comparable to that of other factories.

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Table 9. Comparison among Employment Intensive Industries.

Particulars	Food Products	Beverages	Textiles	Apparels	Leather	All factories
Factories [Number].	35096	2079	18469	9275	4055	222120
Employment [No.]	1546838	141992	1403358	922950	285393	12946928
Fixed capital [Rs.]	1339840	248790	1168200	241210	72780	21762630
Output [Rs.]	6969000	521420	3071330	904280	412690	60423250
Input [Rs.]	6319730	378570	2498420	712810	348300	50269420
Structural Ratios						
Fixed capital Per Employee [Rs.]	866180	1752144	832429	261351	255006	1680911
Output Per Employee [Rs]	4505319	3672169	2188561	979770	1446039	4666995
Capital-output Ratio	5.20	2.09	2.63	3.75	5.67	2.78
Input-output Ratio	1.10	1.38	1.23	1.27	0.18	1.20

Source: ASI 2012-13: Fixed capital, Output & Input in Rs. Million

Exports: Exports of processed foods increased by 144.62% to US $ 36171.96 million between 2009-10 & 2014-15 An annual growth rate for five years [2010-11 to 2014-15] was 21.5%.Value of processed foods exports during 2014-15 was of the order of US $36171.96 million accounting for 11.63% of total exports of US 311billion.

Table 10. Export of Processed Foods & Related Products [2009-10 to 2014-15]

Year	Value[$Million]	Year	Value[$ Million]
2009-10	14787.00	2013-14	38052.88[06.0%]
2010-11	20277.60[37.3%]	2014-15	36171.96 [-4.9]
2011-12	31458.38 [55.1%]	2015 Apr-Dec	19337.4.0
2012-13	35897.47 [14.1%]	2010-11 to 2014-15	Annual Growth Rate 21.5%

Source: Ministry of Food Processing Industries

Exports of major food products which included following 11 out of 23 [Table 11] amounted to US $ 29568.62 million accounting for 81.74% of the total [US$ 36171.96]

Table 11. Major Food Exports during 2014-15 & 2015-16 [US $ Million]

Food products	Amount
Meat & edible meat offal	4929.7 [2793.26]
Fish &crustaceans, molluscs, other aquatic invertebra	5249.52 [3143.58]
Dairy produce, Birds' eggs, natural honey, edible products	379.03 [225.18]
Edible vegetables& certain roots & tubers	1180.81 [730.96]
Edible fruits& nuts, peels of citrus fruits or melons	1610.71 [912.03]
Coffee, Tea, Spices	2871.86 [1927.61]
Cereals	9550.98 [4274.52]
Oilseeds, oleaginous fruits,	2213.95 [1007.97]
Preparations of vegetables, fruits nuts	504.71 [314.23]
Preparation of cereals, flour, starch or milk pastry	489.85 [327.44]
Misc. edible oil preparations	587.50 [360.90]
Sub-total	29568.62 [16017.68]
Grand total	36171.96 [19337.44]

Source: Ministry of Food Processing Industries

Foreign direct investment in FPI significantly increased by 140.39% to Rs.31593.6 million between 2009-10 & 2014-15 Total FDI from 2009-10 to December 2015 was of the order of Rs.370.7849 billion

Table 12. Foreign Direct Investment in FPI [2009-10 to 2014-15] Rs. Million/US $ Million

Year	Amount	Year	Amount
2009-10	Rs.13142.3 [$278.89]	2013-14	Rs.251067.8 [$3982.88]
2010-11	Rs.8580.3 [$188.67]	2013-14	Rs.19194.3 [$317.24]
2011-12	Rs.8261.6 [$170.24]	2014-15	Rs.31593.6 [$515.86]
2012-13	Rs.21936.5 [$401.46]	April-Dec2015	Rs.25008.5 [$384.59]

Source: Ministry of Food Processing Industries

XIV. Enabling Environment

According to the vision document [2015], the FPS envisaged to increase processing of perishables from 6% to 20%, value addition from 20% to 35% and increase in share of global food trade from 1.5 % to 3.0%. However, the performance as on 2013-14 for which the latest data are available indicate the need to capitalise the available opportunities by creating an enabling environment for healthy growth of the FPS and formulating a strategic action plan to accomplish the Vision at least by 31st March 2020 focussing following areas.

- Despite the fact that the Ministry of Food Processing Industries [MFPI] has been functioning since July 1988 and has already completed 28 years the performance of the FPS has yet to make an impact. Immediate need is to [i] have a comprehensive evaluation in respect of each policy initiative of the Government viz. mega food parks ; cold chains, value addition & preservation infrastructure; setting up/modernization of abattoirs; strengthening of institutions; & quality assurance, HACCP, R&D and NMFP by an independent professional to identify the precise factors inhibiting the targeted performance envisioned in the Vision document 2015 and shortcomings/deficiencies in the framework of policy and implementation process and redesign the policy & programs accompanied by a robust monitoring, reviewing & management information system [ii] significant improve the system through adopting state-of-the-art-technology in collecting, compiling & placing on website latest data/statistics and information as even in the month of

November 2016 Annual Report available for the year 2014-15 provides data during 2012-13 instead 2015-16 and [iii] have a SWOT analysis of the MFPI itself in respect of identifying its strength & weaknesses to seize/capitalize opportunities presented during post-economic reforms period [particularly in 21st century] considering the threats of the multinationals & rapidly changing world's economic scenario.

- Formulation of strategic action plan to [i] empower rural producers and consumers through creating better awareness, use of technology and training[ii] review existing policies of the Union Government which are mostly generic in nature. Evolve a single comprehensive policy on FPS reviewing policy currently governed by multiple Acts and laws [iii] help State Governments evolve their own policies, considering their agriculture, livestock and fisheries resource base and socio-economic needs.
- *Food Regulation:* Currently nine ministries are reported to administer food regulation laws comprising 13 central orders alone. Besides, States have their own control orders. This necessitates a comprehensive review of food regulation laws as they have been enacted at different points of time. There seems to be incoherence and inconsistency in the food sector regulatory scenario. Multiplicity of administering authorities at the central and State levels has resulted in a complex regulatory system that needs to be industry-friendly, simplified and well integrated.
- *Skilled and Trained Manpower:* FPS envisages value addition during its various stages which need specific types of skilled human resources. Production and processing stage requires around 55% human resources. Current status of human resources distributed across segments in the FPS shows that the industry has maximum work force with low level of education translating into low level of skill. FPS has been experiencing acute shortage of skilled and trained manpower, a critical factor impacting on the competitiveness of Indian food industry. Considerable degree of mismatch is observed between the demand for and supply of required skills. Studies exhibit that while around 58% of the employers observed this type of mismatch, about 72% employers were not satisfied with employees' ability to use modern tools, equipment, and technologies specific to jobs. Currently the FPS has huge demand for skilled workers at all the stages, especially for persons having education level up to minimum 12th standard and supported by short-term on the job training. The demand-supply gap has to be bridged in a time frame of two years so as to enable India capture a reasonable share in the world market.
- *Investment Plan:* The FPS needs huge Investments to create envisaged infrastructure including strengthening of existing institutions and R&D projects which call for formulating a time bound investment plan crystalizing the requirements of funds area-wise, year-wise & activity-wise and finding out sources of funds including qualified & trained human resources. Implementation would need to be crystalized by preparing activity-wise chart based on programme evaluation & review technique [PERT] or critical path method [CPM] technique indicating broadly who should do, what & when.
- All existing village level food product based industries need technology support, skill improvement and institutional credit and need to be brought under single registration authority.
- In order to have a desired impact on perishable food products [viz. fruits, vegetables, milk, meat and poultry products] an efficient supply chain that, *inter alia,* include cold storages, refrigerated vans, better road facilities, and uninterrupted power supply is a pre-requisite to facilitate perishable farm produce to reach processing centres promptly. Prepare a road-map to strengthen infrastructure facilities specifically for uninterrupted supply of electricity, road connectivity, and storage facilities.
- To boost domestic consumption and export trade of processed foods immediate need is to relook the existing framework of laws incorporated under the food safety standards authority of India [FSSAI] & effective implementation of the quality assurance, including HACCP & ISO.
- Time bound strengthening value addition centres & infrastructure facilities that include [i] processing/multi-line processing/collection centres etc. for produce of horticulture, marine, dairy and poultry etc. [ii] irradiation services with facilities of warehousing, cold storage for storage of raw material and finished products.
- The last few years have witnessed encouraging growth in ready to serve beverages, fruit juices &pulp, dehydrated &frozen fruits and vegetable products, tomato products, pickles, pastes, processed mushrooms and curried vegetables. However, the issues concerning the low level of domestic consumption of value added fruit and vegetable products need to be addressed viz. higher incidence of tax and duties including that of packaging material, lower capacity utilization, non-adoption of cost-effective technology, high cost of finance, infrastructure constraints, weak linkage between farmers and processors leading to dependence upon intermediaries and inability of smaller units to promote market.
- Policy to incentivize and encourage Public Private Partnership (PPP) to overcome constraints particularly creating facilities for cold chain, packaging & grading centres, quality control &testing, efficient supply chain, evolving processable varieties of farm produce, seasonality of raw material, reduction in high inventory carrying cost and high packaging cost,
- FPS in order to be sustainably viable should develop and implement a system approach integrating assured supply of quality raw material exclusive for processing, timely availability of quality production inputs, technology, credit, insurance, storage, warehousing, processing, packaging, transport, marketing facilities. System approach can focus enhancing cost advantages and competitiveness in the international export market.

Mega parks already established need to be evaluated & redesigned in this respect.

- Small & Marginal Farmers can improve their bargaining power & negotiating skill while selling their farm produce for which their products need value addition. For this farmers need to be made aware of and trained to produce farm products according to the standards & quality as being demanded in the markets in India & a broad. Private sectors and agricultural universities & research institutes established in varying agro-ecological regions have a significant role in this area.
- Bring progressively in two years the entire unorganized food processing sector into organized sector since not only the unorganized sector is very large but is also growing fast. This necessitates studies to identify factors responsible for continuing & mushrooming unregistered units and developing a policy framework to bring them under the umbrella of entrepreneur-friendly policy of registration.
- Effective inter-institutional coordination [vertical & horizontal] among ministries & departments of the Union & State Governments is required in areas of training, technology up-gradation and improvement in infrastructural facility.
- Put in place business-friendly administration and customer-oriented promotional measures.
- Policy and programmes to boost food and farm output in India have necessarily to match simultaneous investments in increasing need-based processing facilities.
- While research institutes in India are engaged in developing varieties of seeds & planting material that meet the needs of the processing units, the food processors and the retailers can create the required demand for the farm products.
- Sharing experiences of countries including Israel, Philippines & China in particular for better designing, planning and implementation of projects under the FPS.

XV. Conclusion

Growth of FPS depends upon the efforts put in to create extent of awareness among producers & consumers, developing innovative cost-minimizing technologies and strategies to attract private sector capital & entrepreneurs by incentivizing, training and providing capital subsidy accompanied by on time availability of short & long-term institutional credit & insurance cover on easy terms.

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Author's Profile

Name: **Dr. Amrit Patel**

- 20 Terrace Ave. Apt F6, Hasbrouck Hgts, NJ 07604 USA.
- Retired Deputy General Manager, Bank of Baroda, Mumbai, India.
- B.Sc. [Agri.], M.Sc.[Agri. Rural Economics] & Ph. D [Rural Studies], India.
- Worked as Research Officer for 10 years with Department of Agriculture, and two years as Assistant Professor with Gujarat Agricultural University. Junagarh, India and published seven research papers.
- Served international commercial Bank of Baroda for 25 Years and retired as Deputy General Manager [Rural Banking & Credit] and contributed to establish "Rural Banking and Rural Credit & Micro-finance Policy & System" for Agricultural & Rural Development
- Since 1996 working as international consultant on "Rural Credit & Micro-finance" in countries of India, Azerbaijan, Tajikistan, Kazakhstan, Bangladesh and Uganda, with projects funded by World Bank, Asian Development Bank, & International Fund for Agricultural Development.
- Received training in courses conducted by [1] Food & Agriculture Organization, Rome in "Agricultural & Rural Development Projects" &[2] World Bank Institute, Washington in "Financial Appraisal & Project Management".
- Toured to Philippines, Indonesia, Thailand & Malaysia for field studies of rural credit and micro-finance system under the auspices of Asia & Pacific Regional Rural & Agricultural Credit Association
- Published three books for students of Agricultural University viz [1] "Principles & Practices of Crop Production" [2]"Farm Planning, Budgeting & Management"; and [3] "Farm Implements, Equipment & Machinery"; Book on "Rural Economics" for Bank Officials for Then Indian Institute of Bankers' Examination; Four Occasional Papers published in then Commerce Research Bureau, Bombay viz." Bio-Gas as Renewable Source of Energy" "Farm Mechanization to Enhance Farm Productivity & Profitability " " Integrated Rural Development Program : Direct Attack on Rural Poverty " And " Agricultural Exports" Co-author of Bank Credit to Agriculture in India: Policy, Performance & Issues [ISBN 978-93-82032-00-7] February, 2012, retained in the Library of Microfinance Gateway and contributed 15 papers on rural finance to the library of Microfinance
- Had been the Chief Examiner & Moderator for three subjects with then Indian Institute of Bankers [now Indian Institute of Banking & Finance] on Rural Economics, Cooperation and Cooperative Institutions; Referee & Examiner for Ph. D students of Agricultural Universities in Gujarat, Rajasthan & Uttar Pradesh
- Guest Faculty for 10 years in "College of Agricultural Banking of Reserve Bank of India" Pune, "National Institute of Bank Management" Pune, "National Institute of Rural Development" Hyderabad
- Life Member of nine National level Professional Bodies concerned directly or indirectly with agriculture and rural credit, viz. Agricultural Economics, Economic Association, Cooperation, Dairy Science, Agronomy, Agricultural Extension Education, Horticulture, Plantation, & Indian Institute of Public Administration.
- Published & presented over 400 papers on "Agriculture", "Rural Development", "Rural Banking & Finance", "Micro-finance" in leading national financial dailies & journals in India.