LINKAGE AND VALUE CHAIN ANALYSIS OF FOOD PROCESSING INDUSTRY : A SPECIAL REFERENCE TO FRUIT PROCESSING INDUSTRY IN KERALA

Thesis Submitted to the University of Calicut
For the award of the Degree of

Doctor of Philosophy in Economics

By

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CERTIFICATE

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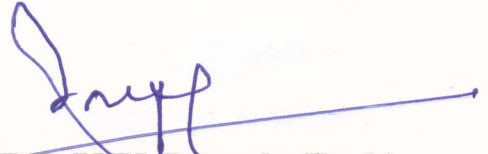
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DECLARATION

I, SMITHA ANTONY do here by affirms that the thesis entitled '**Linkage And Value Chain Analysis Of Food Processing Industry: A Special Reference To Fruit Processing Industry In Kerala'** submitted to the University of Calicut for the award of the Degree of Philosophy in Economics is a *bona fide* record of research work. I carry it out under the guidance and supervision of **Dr. K X Joseph** Retired Professor of Economics, University of Calicut and **Dr. Shyjan D**, Associate Professor (On Deputation), Department of Economics, Dr. John Matthai Centre, University of Calicut. I also declare that no part of this thesis has presented for the award of any degree, diploma, fellowship, or other similar title or recognition of any University /Institution before

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Words of Gratitude

First of all, I thank God Almighty for the blessings showered on me. I thank for his invisible hands over my head throw out my research work. I can never forget his powerful intersections with the ray of light which led me to reach this stage.

Since primary education, I have been blessed with gifted teachers. More than their way of teaching and academic efficiency I enjoyed their affection and friendship. Now for my Doctoral thesis too I am lucky to have two real teachers Dr.K X Joseph and Dr. D Shyjan an extremely successful combination.

With immense pleasure and deep respect first and foremost I would express my heartfelt gratitude to my guide and supervisor Dr. K X Joseph Retired Professor Department of Economics, University of Calicut, Arnatukara, Thrissur for giving me an opportunity to work under his guidance. I am extremely indebted to my supervising teacher for his academic support at every step from the formulation of the synopsis to the finalisation of the thesis. His mental and positive support encourages me a lot.

I extend my heartfelt thanks to the co-guide Dr. D Shyjan, Associate Professor Department of Economics, Dr John Matthai Center, University of Calicut.With his insights, sharp criticism and his thoughts provoking comments helped me to improve my work from the beginning to the last moment. This work would not have taken this shape without his concrete and meticulous direction. A few lines are too short to express my immense gratitude for his efforts despite his excruciating work pressure.

I place on record my sincere gratitude to Dr. Martin Patric Retired Professor Maharajas College Ernakulam for his thorough valuation and suggestions during my pre-submission. I am extreamly indebted to his complete evaluation of my work. .His comments and ingenuous questions helped a lot for the final form of my thesis.

Dr. K P Mani deserves a special mention not only for reading the chapters and offering essential comments but also for his moral support. In my academic ladder from Degree to Ph.D I have benefitted a lot from Dr. Chacko Jose P as my teacher, elder brother and mentor. I also extend my thanks to Dr. Muneer Babu Assistant Professor, Department of Economics, Dr. John Matthai Center, University of Calicut, Arnatukkara, Thrissur who motivated me to the new frontiers of methodology used in my research. I extent my sincere thanks to Dr. Zabeena Hameed P the Head

Department of Economics, Dr. John Matthai Centre University of Calicut ,Thrissur and retired faculties of Department Dr. Ramachandran and Dr. Rathnaraj for their immense support during each review seminar.

I placed on record my immense gratitude to all those who contributed directly or indirectly to complete my endeavour.

I use of this occasion to express my deep gratitude to Managing Director of Kinfra Park at Trivandrum and Kozhikode. I also express my heartfelt thanks to owners of food processing units for their hearted co-operation even during their busy business days.

I have visited many institutions and libraries as part of research and received a warm welcome from all the concerns. I express my thanks to the authorities of the Centre for Development studies (CDS) Trivandrum, Kerala Agriculture University Vellanikkara, Trissur, Indian Institute of Management, Kozhikode and Cochin University of Science and Technology, Kochi for their selfless assistance. I extend my sincere gratitude to the respective library staff for their spontaneous cooperation which I received at various phases of my research work. I want to express my special gratitude Ms. Sreeja and Mr. Rashik Librarian Dr. John Matthai Centre for their support. I wish to express thanks to all office of the Department of Economics Dr. John Matthai Centre for their support and help during my course work.

I wish to acknowledge with thanks the services rendered by Mr. Dinops Jose for the neat execution of the DTP work and support.

I also acknowledge the care and concern shared by all my fellow researchers both part time and full time during the course of my research work. MPhil scholars and P G students deserve special thanks for their company and support. In this context I gratefully remember and thank Sherin P S, Sarath Lal and Fawas

Since my childhood, I have been blessed with a lot of sincere friends. I enjoyed their friendship a lot. Nasria Fathima and Arly are gratefully acknowledged. My friends circle 'Sweet Sundharies' were a constant source of encouragement throughout my work. Ajitha R and Vini Valson were good company during my days at JMC. In this context I mention Athira K, Neeraja Rajendran, Shima K M and Vidya A K as

they are always ready to help me as my younger sisters in each stage of research. In this context I gratefully remember and thank Dr. Deep V D.

This thesis would not have cherished without the unconditional support of my family. From the day of joining my Appachan and Mummy have started asking me about the progress of my work and encouraged a lot for the completion of my work. In this context I gratefully remember the blessings of my father and mother in laws. My brother Binoy Anto and my sisters Laly George, Bijy Jose and Betsy Francy and also their family always extended warm love and support.

No words could ever express my sense of love and gratitude to my better half Mr. Bijoy Anto and my children Antonio Bijoy and Mariet Bijoy for their unconditional affection and mental support. I know a few word of thanks never express my indebtedness.

During this journey I had been getting splendid help from varied resources and personalities which empowered me one way or another, I remember all those....

CONTENTS

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LIST OF TABLES

LIST OF FIGURES

LIST OF CHARTS

LIST OF ABBREVIATIONS

FPI	Food Processing Industry
IOTT	Input Output Transaction Table
MoFPI	Ministry of Food Processing Industry
MSME	Micro Small Medium Enterprises
MSEs	Micro Small Enterprises
GDP	Gross Domestic Product
FDI	Foreign Direct Investment
ASI	Annual Survey of Industries
FAO	Food and Agricultural Organization
GCC	Global Commodity Chain

ABSTRACT

The present research is an attempt to find out the potentiality of food processing industry. The study first of all tries to understand the structure and characteristics of food processing industry in India. For that we analysed the secondary sources of information published from the various reputed departmental sources. As the number of food processing industry increases it has the ability to impact a large number of people by providing employment opportunities and increasing their income. It also stressed on the fact that the progress of the industry towards value addition can reduce post harvest wastage in agriculture sector and use of the seasonal surplus in a productive way. The main objective of this study are to identify the extent of linkage effect through backward and forward linkage calculation and to identify the whole activities in the value chain of food processing industry by understanding the various actors in the chain, their relative contribution and performance of processing units. This study has been carried out by two different angles ie. Leontief linkage coefficient and other Value Chain Analysis. Leontief linkage coefficient was calculated with the help of Input Output Transaction tables in India. In addition to this the study uses primary data collected from 26 sample fruit processing units and identified the whole activities in value chain of food processing industries. Apart from this, the study assessed the role of the state in upgrading and promoting Food Processing Industry during emergencies such as Covid 19 Pandemic. In order to collect the information from fruit cultivators and dealers, case studies have conducted.

The secondary data provided enough proof to display that Indian food processing industry is undergoing rapid transformation. This study focuses on the importance of food processing industry from the angle of inter industry linkage perspectives. The sectoral inter dependence of food processing industry reveals the importance of this study. The calculated values of forward linkage coefficient and backward linkage coefficient shows that food processing industry is a strong backward linkage sector or backward oriented sector or sections depend on their industry supply. From the primary survey we can observe that intra unit and inter unit relationships are strong in the case of fruit processing at the same time intra firm

interrelationship are rare. As a perishable input, vulnerability of fruit processing industry has also discussed. Value chain analysis plays a key role in understanding the need and scope for systematic value addition capacity of industry. The value chain analysis would enable the adoption of adequate measures for realizing the full potential of the fruit processing industry. Hence the study summarises that there are high value chain activities which benefit various actors like farmers, manufacturers, agents, traders etc. in the fruit value chain.

Keywords: Input Output Transaction Table, Backward and Forward Linkage effect, Value Chain Analysis, Inter Relationship and Intra Relationship

CHAPTER 1

INTRODUCTION

Review of Literature

Research Gap

Research Questions

Problem Focus

Objectives

Methodology

Chapter Scheme

1.1 INTRODUCTION

Importance of Food Processing sector was first realised after the Bengal Famine during 1870s. The famine Commission (1880) appointed by the British Government, reported the importance of developments in agriculture methods, and its post harvest management through modern infrastructure techniques. Royal Commission on Agriculture (1926) set up by the British Government stressed the scientific approach towards the sector and development of rural industries and cooperation. Also, after the Green Revolution, the importance of post harvest management increased widely. Business community in India realised the importance of this sector and began to concentrate in the diversification of processing After attaining independence, India has been striving to develop its food industrial sector through successive five-year plans. A vibrant agriculture processing industry would contribute to high employment generation, rural development and rapid economic growth Hence a Ministry was set up with a view to develop food processing industry and to open up export possibilities.

The declaration in agriculture growth if not arrested will have serious consequences on the livelihood of 60 per cent of the country's population, that depends on agriculture and also on the growth of other economic sectors particularly manufacturing that has strong backward and forward linkages with agriculture. Demand for agricultural products is an important parameter for agricultural development and position, especially in the case of food products. Up scaling of food processing industry has given considerable scope not only to strengthen the synergy between agriculture and food processing but also to arrest the fall in agricultural growth through diversification and commercialization of agriculture. Food processing industry marked as one of the selected industries has revealed comparative advantage. Food processing is one of the 25 sectors included in the Make in India campaign launched by central Government in 2014 to transform India in to a manufacturing hub and also in Kerala Perspective Plan 2030.

The condition of Kerala economy such as good infrastructure facilities, high level of literacy increasing proportion of working women, fast urbanization, economic and cultural transformation in life style, highest youth population etc. are favourable for the development of food processing industries. Rich agricultural resources, strong and vibrant consumer market, competent human resources wide network of research bodies and developmental organisations and enabling environment for industrial growth by the government are also the

plus factors for the development of food processing industries in Kerala. An innate trait high sense of hygiene in Kerala is a distinct head start in terms of advantage in food processing. Unique processing skill of Kerala's women workforce is also a favourable factor.

1.2 REVIEW OF LITERATURE

A brief recommences of precedent researches relevant to the present study has been incorporated in this chapter. Here an attempt has been done in order to understand the various concepts, research methodologies, analytical tools and findings of the past studies to develop clarity and comprehension in this study. The pertinent literature has been reviewed under the following subheads.

A. Studies on food processing industries in general

B. Studies on linkage effect

C. Studies on value chain analysis.

A.   Studies on Food Processing Industry in General

The Review starts with the works related with Agriculture that is the backbone of food processing industry. The studies such as S. B Maini J.C. Anand (1996), Mahidra Dev et.al, Sidhu (2005), Nair and D' Melo (2007), Shukla and Patil (2010) analyses the Indian agricultural scenario and focuses the importance of Horticulture crops. It can found that the agriculture & allied activities in several states is in a state of decline and its share in Net State Domestic Products (NSDP) also declined, even though the horticulture crops seemed to be in a good condition in several states. These studies found that these states has several advantages with the development of horticulture crops and can help to nurse ailing agriculture sector. These papers found that crop diversification and high yield varieties are the primary factors for accelerate the ideal agricultural growth engine. However the important observation is that, post harvest loss are very huge in our country. Due to various economic, technological, institutional and other reasons the supply chain in India cannot be at par with a strong developed link. The studies such as Negi S et.al (2015) Singhal R et.al (2019) explains the weak link in the fruits and vegetables supply chain and the factors responsible for skewed distribution of cold store across the country. It is an urgent need to develop cold chain infrastructure such as cold storage, processing facilities, refrigerated transportation system etc. in order to reduce the huge post harvest losses and wastage, increasing income and improving livelihood of farmers, generating employment opportunities, increasing revenue

from export providing much better economic returns and a good source of foreign exchange leading to the development of the economy and finally helping India to emerge as a global leader in the food sector.

Mahatma Gandhi emphasized importance of village based agro industry during Indian's independent movement and it becomes the core of National Devt. movement. The studies such as Khosla R et.al (2000), Gandhi V et.al (2003), Kachru (2008) and Dhiman et.al (2011) examines the importance of agro industry in India. Some of agro processing industries are food processing, spinning & weaving, furniture manufacturing, manufacturing of paper, manufacturing of starch, manufacturing of Leather and foot wear, printing, Dyeing and Bleaching of Textiles etc. Most of the agro based industries are located in rural areas. It helps to increase the income of the farmer and remove the poverty particularly among the landless poor. It creates rural employment and promotes rural development. However rural concentration of these industries creates several problems in these industries itself. It faces various problems such as disturbans in the collection of input for processing, lack of financial assistance, improper marketing channels, high degree of breakdown of finished products, high requirement of working capital, problems in transporting the final industrial product to their destination (low availability of better equipment and instruments) non availability of research lab for quality control etc. Since a number of agro processing activities indicates bright prospects and a good scope of their contribution in the Net State Product (NSP). These studies suggests a major effort from the part of govt. as well as the private sector. By providing critical infrastructure in order to overcome the treats such as shortage of skilled man power and rapid technological development, it can complete with global players and thus a new revolution in agro industry become possible.

Gopalakrishnan V.S. (2002) Potty V.H. (2003), Barty I (2006) Rao et.al (2009) Dhiresh K et.al (2013) stresses on the fact that Food Processing Industry is an important to the nation.

On the base of production, India occupies second position in fruits and vegetable production in the world and has achieved self sufficiency. Only 2.2% of the horticulture produce in India is processed and approximately 35% of fruit and vegetable of total production are being wasted, after these huge losses we are not able to achieve proper per capita availability of fruit and vegetables. Inadequate knowledge about pre harvest and post harvest leads to these type of huge amount of wastage. Due to such an inscientific approach,

the sectoral contribution of agriculture to GDP has declined drastically. In this context the importance of FPI arises. These papers suggest that "the problem of agricultural development needs to be tackled from two different angles, first to increase productivity of agriculture and delivery system and second to increase the farmer's earning through efficient effective value addition and processing of agricultural commodities". Processing would take care of both farmers and processors. There is a vast potential in FPI to manage both the seasonal surplus supply and the fluctuating demand of agricultural production and can become an integral part of agricultural development. These evidence stresses on the importance of FPI to the nation. There are several favorable situations such as large quantity of farm production and its large variety, best man power, congenial climatic conditions, vast market etc. for the expansion of food sector in India. The installed capacity of processing industry has increased in the last year, the capacity utilization continues to remain low.

There is an advances happened in the field of food processing. This may be due to shift in the demand for processed food. Corner J (1982), Wilkison J (1987) Kinsey J et.al (1988) Rama R (1992) Gopalan C (1994) Mikinsey (1997) Ranjiny S, Kala A and Jamuna Prakash (2000) Sharma R. K et.al (2006) Punjati (2007), these all are conducted studies with regard to the factors determining the demand for processed food. Increased disposable income, changes in the life style of households, increasing urbanization, increasing number of working women, migration of rural population to urban areas, rising literacy, increased health awareness are some of the factors that have contributed to the brightening of the prospects of processed food. These studies show that with regard to the factors determining selection and purchase of processed foods, consumer considered colour, flavor, texture etc. The role of mass media appeared to be a very important factor. Time was also considered.

The result of these studies exhibit that there are some changes in the pattern of demand for different food items. In rural areas, major portion of consumer expenditure was spent on food items, mainly on cereals. But it had shown a decreasing trend over the years. Its results through light to the economic theory that the food expenditures are income (expenditure) inelastic. That means beyond a critical level of income consumer expenditure was not much dependent on income.

Bhatnagar P.S. (2000) Askan et.al (2003) Dev M and et.al (2005) examined the role of contract farming in the agro processing industry. One of the important difficulties faced by the processing units is it lacks raw materials in the right quantity and right quality. It is the

major reason for the low level of value addition less than 2% compared to 25-60 percent in the developed countries. The important reasons for the difficulty in procuring quality raw materials are poor infrastructure for marketing of agricultural products, the dearth spoiling middle man between the producers and the processors, lack of efficient and cost effective supplies of raw materials, dependence on the normal trade channel for their raw materials etc. use of poor raw materials lead to the poorer quality of the end products.

Self production is not the appropriate solution for the firms to procure the required raw materials because of several issues related with acquiring or leasing sufficient land managing labour, using of fertilizers, irrigation facilities, grading, sorting etc. Due to high cost of production, firms distracts from its core activities. This postulates the need to enter into contracted arrangement with the farmers. Contract farming enables the firms to ensure a steady supply of the raw materials. It also provides process able varieties of raw materials. There are several constraints in contract farming. Sometime farmers breaks the contract by selling their products in the open market at high prices than the contract, Sometime growers are totally dependent on export demand of their agricultural products Sharing of the transition cost advantage between the firms and the farmers is the crux of contract farming. These leads to the failure of contract farming

There are several studies which speak about the development, growth, status of Food Processing Industry. Achaya A. T. (1194), Kachru K. P. (2002), Goyal S. K. (2006) Kumar P. (2010) Singh S. P. et.al (2012) Chatrapal et.al (2013) etc. are some of them. While discussing the historical as well as chronological development of FPI in India, we can understand that it was in a nascent stage during British rule. The first 2 food industries to attract engage the attention of British power was salt production and spices processing. It developed gradually and become a vibrant as well as modern in today.

These studies result reveal that the number of processing units has grown. Capacity utilization on was about 37% in 1992 which has now increased. Following economic liberalization foreign direct investment in the FPI has been increased as in the case of other industries. Globalization and Liberalization have brought unpredictable challenges and severe competition to the processing industry. When assessing the growth and perspectives of 15 subgroups of the food processing industries, we can identify two types of food processing sector ie traditional and emerging sector. The emerging sector become more factories, five

traditional sectors such as oil and fats, grain sugar, dairy and tea coffee and others still dominate the food processing industry.

Now a day's FPI regards as the sunrise sector of the Indian economy. FPI provides remunerative farm gate prices and income to farmers, reduces post harvest loss generate employment opportunities and provides convenience to consumers. There lies the answer to our major problem of proper agricultural development, agriculture diversification, disguised unemployment in the agricultural sector and unemployment in rural area, food insecurity etc. One of the biggest constraints is that this industry is capital intensive. It creates entry barriers and strong competition. It reduces efforts to improve quality standards.

Sultan A et.al (2015) Desrosier N. W. et.al (1971) Desai B. M. et.al (1988), Eipeson W. E et.al (1992), Ashok G. et.al (1994) Kejriwal N. M (1992), Mueller W. F. et.al (1986), these studies indicates the condition of technology in Food Processing Industry. Expansion of technology and diversified processing are integral parts of FPI because it has to keep pace with the changing consumers preference and requirements. Therefore we can say that FPI is very dynamic & not static. The most important feature of Indian food processing industry is the coexistence of small and large units. It was due to the differences in processing technologies. Large units uses modern technology which is more productive where as the small units made use of traditional or intermediate technology which creates more employment opportunities. These studies pointed out that as compared with developed countries the technology in Indian food processing firms are primitive in nature. Such technological inadequacy may lose competitive advantage in world markets. Other features of Indian food processing industries are lack of convergence of small industrial and entrepreneurial ventures, strategic alignment of enterprise, competition favourable internal environment and adequate economic policies.

Indigenous firms have to adopt modern technology to process quality product for global markets. This would bring in an opportunity for attracting and developing strategic alliances with foreign partners and capital to the state.

The studies about the inter industry technology flows support Rosenberg's Theory of Industry technological interdependence (1979). Food manufacturing industries creates a large market for food machinery. This enables machinery manufactures to develop specialized technology. The result is that food machinery companies have a large potential inlet.

The nature of market that exist in FPI has been highlighted by a few research studies such as Veron R., et.al (1988) Donald M. C. et.al (1989) Rama R. (1992), Bernard B. (1994), Accessing the suitable type of market is a prerequisite for Food Processing Industry. Market rigidities, price demand and supply fluctuations, market flexibility ensures to meet any unforeseen adjustments on account of rapid fluctuations in market forces. The crucial questions are what kind of market or market regulation is needed or what kind of interrelation between markets are exist. A few research studies highlighted the emergencies of monopolies and oligopolies in certain food processing industries. This phenomena was due to the merging or acquisition of small medium food processing firms.

Advertising expenditure to Food Processing Industry becomes enormous to promote brand loyalties among the consumers. Such higher expenditure outlay badly affect small firms which leads to merging of such units and ultimately to the emergence of monopolies.

Regarding about location of food processing industries different opinions are exist among scholars. First argument is that ideal location for FPIs are near the source of supply of raw materials, Some studies Kannan K.P (1983) Raucod M Y et.al (1989), Sing D.K et.al (1989), Prakash R. (2000) support this view. As against above discussed view the study of Dhawan B. D (1969), points out that food processing industries are concentrated in urban area. Because of this practice, these industrial units can enjoy the while advantages of urban areas such as advanced infrastructure, road & transport facilities etc. According to agriculturists such practices helps to reduce the seasonal over supply and assures the grower remunerative prices for their crops.

Bhattacharya S. C. (1978), Iyyer S. K. (1978) Isaac G. (1978) Varghese G. I. (1978), Nagaraj N et.al (1989), Sinha S et.al (1992) have made an analytical study regarding the capacity utilization of FPI. The result is quite surprising to observe that even though there is growing demand for processed food in India these industries suffer from under utilization of installed capacity. These studies identify several principal factors leading to lesser capacity utilization of the industry. Seasonal available of raw materials, lack of working capital, fierce competition etc, are flew among them.

The principal feature of Indian food processing industry is the existence of organized and unorganized sector. Studies conducted by Potty (1992), Debory (1994), Varshney H. K. et.al (2015) focuses on this categorization. They studies reveals that organized sector specializes in certain processed foods while unorganized sector specializes in certain other

processed foods. Organized sector employed one third of total employment in the sector. Labour productivity exhibits a fluctuating trend whereas capital productivity has remained constant. The efficiency of food processing sector was found to be slightly less than that of total manufacturing. The amount of fixed capital and number of factories in food processing industries shows an upward tendency. The growth in the food processing sector in due to the contribution of industries in organized sector because it contributes two thirds of the Gross Value Added by the sector.

Studies such as Sharma (2003), Sekar (2010) Sinha S et.al (1992) discussed about the performance of small scale good processing firms. Irregular market, wide fluctuation in the price of inputs, quality, packing material cost, inadequate labour etc. are the several problem faced by the food processing industrial units. Due to the reason the majority of food processing units faced the problem of high production cost and low profit margin. The scope of establishing big industries is quite limited. Smaller units are outmoded and inappropriate since they prefer to function at low profit margin and consequently at low risk levels. Only few large scale firms upgraded the technology and depend upon imported technology therefore there is a widespread technology stagnation in the industry.

Timme et.al (1975), Subramanyam (1981) Baron C. G. (1989) Rais (2013) Rao C. et.al (2009) are few among them. These works has examined the employment potential of the food processing sector. Any industry in a under developed country is most welcoming in terms of employment generation. Employment generation ensure income generation. Unskilled unemployed people are found in masses in the developing countries. If the economy is to be self sufficient, the available industrial opening should provide many employment opportunities for the skilled unemployed as well as the unskilled laboures. Employment generation is the primary importance of the Food Processing Industry in the developing countries Food Processing Industry creates employment directly or indirectly in connection with transportation, storage etc. In developing economics, entrepreneurs of Food Processing Industries may be encouraged to adopt labour intensive technology to reduce cost of production and to increase employment opportunities. Time also revealed that labour intensive techniques of production generate twenty three times more employment than capital intensive technology. The employment generation capacity of the sector is huge, but the industry is not working at its potential.

Rao and Das Gupta's study's result reveals that this sector employs mostly 72% illiterate and 95% landless workers. The result from their field survey reveal that the average wage of these workers is only 48% of the statutory minimum. Women are working under poor conditions without any social security and earn one half of what male counter parts do. A 33% lower wages than the manufacturing average more than 60% of workers in the sector falling below even this low wage and worse strill 66% of all the workers' wages either absolutely declining or stagnating are the other hard realities revealed by these studies.

The studies such as Acharya B.T. et.al (1987), Beena. D (1988) highlight the fact that advances in the production process has not been make any benefits in the condition of women workers. There has not been any change in the work environment for female worker. However, Sharma (2003) Malathi R. (2004) examines the growth and performance of several organizations in area of food processing industry that become a welcome step to improve the socio economic conditions of women.

Smardhi Mahila Cooperative Society (SMCS) Women Processing Groups (WPGS) in Himachal Pradesh, Shri Mahila Udyog Lijjat Papad in South Mumbai are the example of an agro processing co-operative units. These organizations had grown day by day. The main significance of such institution are provide a solution to the high level distinguished unemployment and low earning opportunities for rural women. It provides a light to the lower class women in India, without any discrimination of their caste, religion or region.

Management of industry becomes a very important aspect in food processing industry as such as in all other manufacturing units. Good services in management provide a reasonable bargaining power of the manufacturers. Trained workforce is always an asset for a manufacturing unit. Krishnan R. (2000) deals with the role of management of food processing industry. According to him, management of food industry involves application of expertise in all activities of the industry like planning, procurement, processing quality control and assurance, storage facilities, recording of data accounting, selling distribution etc.

Desai B. M. et.al (1992) analyze the performance of working capital management for four food processing industries such as grain milling edible oil seed processing, sugar factories and dairy products.

There are several national international works are there which discusses the importance of total quality management in food processing industry. For a successful food processing industry various aspects such as quality control, quality system, quality assurance

and safety regulations are essential. Salunkhe D. K. et.al (1984) Dennis M. J. et.al (1999) Aiyer A. S. (2001) Jairath (2013) are few among such works.

Storage, processing & preservation are the main functions served by the Food Processing Industry. Nutritional preservation is an inevitable process in these all functions. These studies point out that textural sensations, colour, aroma, wholesomeness and nutritional quality has invariable importance in addition to safety concerns. If the nutrients are lost during preservation food will turn out to be a sheer waste. Problem of authenticity is inextricable in food processing industry. Food quality is ultimately judged by the wisdom of consumers. Therefore it is logical to organize the materials in accordance with the taste and preference of a consumer who is the ultimate judge. While dealing with quality of food products we should draw attention to that safety has to be assured even at form levels. There is a strong need to have a soft and hard infrastructure for healthy implementation of food safety laws which would lead to fostering quality assurance in food processing.

Vargarde S J (1992) Prakash V. (2001) and Madhav V. et.al (2013) have illustrated a variety of innovative techniques and methods which guarantee preservation of natural qualities during processing. Drying, Freezing, refrigerated storage, hurdle technology, Novel technologies like microwave heating pulsed electric field (PEF) Technology, High Pressure Processing (HPP) pulsed Light Technology, Ohmic Heating,, Ultra Sonics, pulsed X Rays are the methods applied for the preservation of food products. Non thermal methods also came into food industries to increase the production rate and profit without loss of colour, flavor, vitamins and other nutrients in food products. Because of high cost of equipments used in non thermal processing, these methods of food preservation are mainly possible with large scale production units. Utilization of residues and by products and wastes can contribute in a long way of profitability in food processing industry. Kurian V (2001) also postulates the need for physical, chemical and nutritional qualities conservation.

Deodhar (2001) George J.(2004) presented the role of WTO in food processing sector. Three agreements are there, they are Agreement on Agriculture (AOA) (1995), Sanitary and Phytosanitary (SPS) and Technical Barriers To Trade (TBT). Food processing sector also gets the impact of industrial sector agreements such as Nationally Appropriate Mitigation Action (NAMA), Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs), Global Multilateral Environmental Agreements (MEAs). The quality consciousness and standard uniformity in safety and quality have become mandatory for each country in

international trade. India's safety and quality norms are quite different from the international standards for the food products.

However, meeting standards are providing to be the major constraint in achieving the full potential. This impedes the healthy growth of the Indian food industries in a liberalized world. Therefore it is extremely important to focus attention on the implication of the SPS and TBT agreements for Indian food industries. Togyer T N (2013) Sadet Akrungor etal (2002), Martin K. A (2000) these articles throws light on the food safety norms imposed by European Union.

Role of Foreign Direct Investment (FDI) is an important issue in developing countries Rama R (1992), Majumdar K (2012) Makki S. et.al (2004) Saravanan et.al (2013) Kumar S (2013). These studies analyzed Foreign Direct Investment in Indian food processing industry. Since India is the second largest producer of food product, it has a vast potential to become a world number one food processing hut. The most important constraint is poor infrastructure due to shortage of capital. This can be fulfilled by Foreign Direct Investment. After economic reforms 1991 India govt. allow 100% Foreign Direct Investment in food processing sector with foreign assistance. Indian govt. has established fully equipped Agriculture export Zones and Mega Food parks to boost agriculture as well as food processing industry. From 2001-2011, the Foreign Direct Investment inflow in Food Processing Industry has increased and highest Foreign Direct Investment inflow was observed in 2009-10. These study states that there are several reasons for Foreign Direct Investment inflow in India such as vast source of raw material, technological factor, cheap labour, excise duty, de licencing policy, govt. assistance, changing life style, breakdown of the joint family system, increasing number of working wives western influence in the urban areas that increases the demand for processed food. Market size has also a positive influence in the flow of Foreign Direct Investment especially in developed countries. In the case of developing countries, market size is not a matter. Per capita income is a very significant factor in attracting Foreign Direct Investment in developed countries as well as developing countries.

More than profit maximization or sales maximization goals of the conventional domain of an industry FPI have a social welfare aspect too. Since poverty and food scarcity becomes a global phenomenon government. has a major role in the Food Processing Industry. Many studies such as Gidwani et.al (1978) have highlights the role of govt. in moderating the relationship among the various agents in the agro food chain. Various govt. policies have to

be managed in a congruous way in order to occupy its growth at its potential and its revenue at its maximum. Food Processing Industry belongs to concurrent list. Central and state governments should bring the development plans in order to bring continuous and self renovating improvements in processes and diversification of product varieties. Justice E.S Venkataramaiah Committee (1996) suggested freezing of the food processing industry from all kinds of arbitrary, irrational and draconian provisions of the prevention of food Adulteration Act of 1955.

The problems related with FPI are begins with the problem from agriculture itself i.e. low yield of crops and is largely been for subsistence. The problem of perishability of the product and non availability of raw material are also at there. The role of the middle man is not negligible, he exploit maximum share of consumer prices. Deepakumar V.S. (2000) Saigal O (2001) Devasahayam M. G. (2001) Dev et.al (2005) these studies list out several post harvest problems which will affect the Food Processing Industry ultimately. Lack of adequate storage facilities modern post harvest handling warehousing & go down facilities are the foremost among the problems faced by marketing of fruits & vegetables. Dissemination of marketing information, wholesale price trends, market arrivals are also limited. The excessive use of chemical during the cultivations period also affects this business. High inventory cost and packaging cost also creates some problems in its smooth functioning of FPI.

Now "producing globally" is the new criteria in manufacturing industry especially Food Processing Industry. The works such as O. P. Gera (1978) Jose Thomas (1978) David et.al (1990) Kejriwal N M (1992) Eipeson W.E & Bhomwnik S R (1992) Majumdar K (2013) Reddy M (2013) Ashok G (1994), Patnaik G (1995), Shiva et.al (2005) speak about globalization of food processing industry. India being one of the world's major food producers Out of eight processed food items most of the products shows a quite high growth rate. However, the contribution of this sector to the global trade is almost negligible; India's accounts in the world food trade are only 1.5%. In order to widen the capital base as well as the market prospects, export promotion is crucial to the food processing industry. Several studies have analyzed that processed fruits and vegetables enjoy great potentials for export. It was found that products like tomato paste, banana pulp, mango pulps/ juices, frozen potato are competitive in the world market. Study states that an onion is the major vegetable crop exported from India. Its important export destination for India is Bangladesh, Malaysia Srilanka & UAE. However its export is not stable.

The Food Processing Industry are badly affected by non availability of adequate infrastructural facilities, primitive old technology, lack of adequate quality control, inefficient supply chain, inadequate shortage facility high inventory cost and high packaging cost, capital intensity, and lack of funding. These papers suggests that India should have to receive a fillip from the central government in the form of various initiatives promotional activities. Effective supply chain technology up gradation, quality management, firm adherence to export commitments acquisition of appropriate negotiation skills etc. should be taken into consideration to give a fillip to this sector global trade.

B. Studies on Backward & Forward Linkages

Edward et.al (1980) speak about the need to develop the strategic industry, namely, the food industry and its irrevocable place in the whole economic structure of a country. The interdependence which exist between different segments of the economy with its base, so to say in the food industry, leading to a simultaneous development of the entire industrial structure of an economy as it has kept pace with the populations explosions of the past & present are dealt with in detail.

Banerjee G. D. (2011) studied Economies of Mango cultivation in an occasional paper in NABARD. In that paper he analyzed the post harvest management practices of mango in three states that are AndraPradesh , Maharashtra and West Bengal. He also specify the availability of infrastructure and backward and forward linkages. This analysis boost up the necessary of effective supply chain system for mango and processed mango products.

The methodology used in this study is profitability ratio analysis. Profitability ratios of various products of processed mango has been calculated, from this backward and forward linkages were estimated.

The mango processing industry should be supported as it has a number of forward and backward linkages benefiting the economy of the region. The unit value realization of mango pulp is more stable than that of raw mango.

A comprehensive view based on the criteria of area and production was taken to select 3 states viz. Andhra Pradesh, Maharashtra and west Bengal for this study. The forward and backward linkages are very important from the point of view of farmen processors and exporters. The mango processing industry is important for the economy of the Chittoor

district and that of the country as it has better backward and forward linkages. The processing industry has backward linkage with six marketing channels basically.

C. Studies on Value Chain Analysis

Kaplinsky et.al (2001) examines the concept of value chain in a broad sense by covering its full methodology and discussed relevant policy measures also. Their study shows how value chain analysis can be used as possible so as to allow research in relevant and appropriate way. In the opinion of et.al (2010) agricultural value chain includes the full range of activities and activators involved in moving agricultural products from farmers fields to consumers. Each participants are links with each others in a value chain and it helps to understand the performance of these participants. The study of Sahoo (2010) find out that small farmers can establish a link with global market through effective value chain system. Besides this had described the role of various players not only farmers but also the role of government and coporate sector also.

Reardan T (2013) studied the rice chains in India and Bangladesh and revealed in diminishing the intermediaries. The study emphasizes role of up stream ,midstream, and downstream activities in value chain

Kumar et.al (2012) the same methodology in the study of Maize in Value Chain Analysis. Their research attempts to cover the value chain of public and private system their study reported that level of concentration influences the pricing of the final product. Their study reports that it is also difficult to determine the pricing of the final product is influenced by the level of concentration at what stage in the value chain.

The study Kumar J G (2012) Reddy A A (2009) reports that an insufficient and underutilized processing seed sector leads to an uncompetitive performance of oil seed economy. Development of oilseed companies required the connectivity of cultivators to the value chain of oil seed. There is need of long term policy implications on value chain context.

Verma et.al (2010) examined the value chain of milk and milk products in Tamilnadu. They studied the performance of private and cooperative plants in organized sector. They reported that the product could earn higher value after passing through the value chain. The marketing margins and marketing efficiency were higher with full range of value chain activities.

Ramanathan (2010) studied the value chain of cashew processing in Tamilnadu and Andhar Pradesh. The study suggests improvements in value chain by adopting technology in production of cashew and high yield variety and replacing the outdated processing methods.

Kapoor K (2010) Sukumaran (2003) examined the value chains of coconut in Orissa and Kerala respectively. They tried to examine the flow of product through different intermediaries and governance of primary commodities is largely demand driven. Gulf Cooperation Council (GCC) is a powerful tool for economic upgrading of agricultural processing commodities.

The work done by Prasad et.al (2010) reveal that the direct linkages of producer and consumer and producers and wholesalers are weak in the case of sweet orange value chain. The reason for this is that producers in Andhra Pradesh of sweet orange preferred to involve preharvest contracts due to production and marketing risks even though short market chain was efficient.

Leize D K (2008) study focus on both ends of value chain and linkages and traces the links between two ends ie. the production and consumption through intermediaries.

The study done by Patric (2003) analyses the dynamics of grain mill products in Kerala. He identified the various actors in the grain mill value chain and estimated the relative share of various actors and extent of value addition .This study also identifies the linkage between the various actors through a commodity chain frame work and also focuses the competition and innovation within the chain.

1.3 RESEARCH GAP

The reviews of literature discussed above serve as a background for understanding the condition of food processing industry in India. It is evident from the review of literature that the food processing industry is highly prioritized at world level. Most of the research works done on food processing industry in social science research are focusing on economics of industries on either its production or processing. It is noteworthy that most of the studies in this field have been descriptive and empirical in nature and have failed to put forward an analysis of theoretical background. It is imperative to analyze the linkage effect of food processing industry in order to speed up the growth and development of these industries. Statistical calculation of linkage coefficient strengthen the nature and intensity of backward and forward linkage effect of food processing industry, The studies related with fruit

processing are also rare in obtained literature. Since, fruit are economically viable for processing, the review also ignited to think on the possibility of fruit processing. Each fruits and its potentiality in processing are in intented to evaluate in terms of its value addition. The value chain analysis is identified as a powerful framework for analyzing the various aspects of industry. None of the studies mentioned above covers the different aspects of fruit processing value chain that will further strengthen to identify the capabilities of this industry. All these lead to the need for the present study "Linkage and value chain Analysis of Food Processing Industry. A special reference to fruit Processing Industry in Kerala"

1.4 RESEARCH QUESTIONS

At this juncture a number of research questions come up

- Are there any linkages in food processing industry? If yes, what is the extent?
- Is agriculture is the most important source of linkages?
- Which of these linkages has the strongest developmental links with the rural sector?
- What is the exact nature of value chain of food processing industry?
- Who are the active players in the food processing value chain?
- How far such a value chain benefits the various actors like farmers, manufactures, traders etc. in the chain?
- Whether value chain is buyer driven or producer driven? And how does it help to upgrade?
- What are the value addition opportunities for fruits through processing?
- What are the value chain activities in fruit processing industry?

1.5 PROBLEM FOCUS

Agriculture is termed as backbone of a society as well as an economy, as far as substitutes to food have their limits. The economic growth of the country is directly linked to the growth in agriculture as far as majority of Indian population depends on agriculture for their livelihood. Indian agriculture is facing several challenges such as over production, post harvest losses and increased completion in food sector. Processing industry of food products have gained more importance in order to solve these challenges as well as the extent to which it can create rural income through employment. Information provided about food processing industry amply indicates the potential of the industry and the growth in the number of food

processing industry. Even though, wastage of agriculture products is still there and food processing industry in India is not at potential in global business.

In this context, it is imperative to analyze the performance of these processing units and examine the possibility of improving their performance. Further growth in food processing industry will generate much more benefits through forward and backward linkages with other sectors in the economy. The information about which are the sectors that has linkage effect with food processing industry and how strong are the rural links of the food processing industry in terms of labour, capital production and consumption linkages will benefit the boost up of food processing industry. Performance of food processing industry can be improved by introducing modern technology, efficient management in value addition and implementing measures to overcome constraints encountered in production and marketing etc. These practices are encountered only in medium and large-scale industries. Therefore, it is essential to assess the existing status of medium and large-scale industries with regard to value chain aspects. Therefore, the present study is undertaken to assess the potentiality of food processing industry through value chain analysis and linkage effect calculation.

1.6 OBJECTIVES

1) To understand the structure and characteristics of food processing industry in India.
2) To examine the backward and forward linkage of food processing industry in India.
3) To analyse the value chain of fruit processing industry in Kerala.
4) To assess the role of the state in upgrading and promoting Food Processing Industry during emergencies such as Covid 19 Pandemic

1.7 Methodology

Methodology is an important component of a research process. In order to fulfill the objectives in a study an appropriate methodology is to be followed. This section of this chapter presents the methodology followed for selection of study area, research design sampling procedure, data collection and tools of analysis.

1.7.1 Research Designs

This research uses both analytical and descriptive research designs. Descriptive research design determines and describes "the way things are". Descriptive research is used to describe characteristics of a population or phenomenon being studied. In the present context descriptive analysis is used to evaluate the present status and structure of food processing industry. Descriptive statistics are used on different variables such as export of processed food, number of food processing units, number of persons employed in food processing industry etc. The study has utilized extensive secondary information to find out the linkage coefficient of food processing industry. Cost benefit analysis is used in the study to drown conclusion on the viability of value chain activities in the study area.

1.7.2 Sampling Procedure

A. Sample Size

Since food processing industry includes a large variety of industries, this study focuses on fruit processing industries only. In India the total numbers of food processing units are 38608. Out of these units 1133 units belong to fruit and vegetable description [NIC: 1030] that means only 2.9% of the total industries are processing fruits. The sample frame has obtained from this information. In Kerala, the numbers of food processing units registered are 879. Out of these foods processing units 2.9% industries have been selected as sample size. Thus 26 fruit processing units have been selected as sample units. These 26 sample units have been further stratified in to large and medium scale units. Data has been collected from 17 medium scale and 9 large scale units

B. Selection of Districts

A comprehensive view based on the criteria of highest number of production units was taken to select the districts for the present study. Taking into account the last few years' data on number of food processing industries, the share of Thiruvanthapuram is highest and followed by Ernakulam, Thrissur and Kozhikode. Therefore these four districts are selected as our study area. We selected purely fruit processing industries only.

Table 1.1 Distribution of Sample units in the Study Area

Sl. No	Name of Districts	Number of Sample Units		
		Large	Medium	Total
1	Thiruvananthapuram	3	5	8
2	Ernakulam	2	4	6
3	Thriisur	2	4	6
4	Kozhikode	2	4	6
	Total	9	17	26

Source: Estimated by the scholars

C. Selection of Fruit Processors

In the opinion of D.S Smith, J.N Cash and W.K Nip, Ruth Rama (1992) as rapid population growth into alarming proportions concerns to make efficient use of already available supply of fresh fruits and vegetables on a global basis is very important. Subramanyam (1981) S. B Maini and J. C Anand (1996) found that most of the fruits and vegetables give higher returns an compared to cereals through per hectare cost of cultivation is high. This paper examined the importance of horticulture crops in order to provide addition rural employment directly or indirectly as well as rural income through agricultural rural activities and non-agricultural rural activities. The important observation of this study is that because of high productivity and value, they provide much better economic returns per unit area compared to cereal crops and are hence a good source of foreign exchange earnings. Chantrapal et.al (2013) study that a very low value addition and a high harvest wastage with corresponding loss of business opportunities as well as losses in farm income has happens in fruit and vegetable sector as compared to organization sector such as milk or meat in food processing industry. Processing is only 2.2 per cent of total production of fruits and vegetables in India. The highlight finding of this study is every 1% reduction in wastage of fruits and vegetables would translate to savings of U S $ 0.13 billion. The paper written by Kumar P (2010) also stress the idea that fruits and vegetables are realizing a profit rate above the average for the food processing industry. This paper assesses the growth and perspectives of 15 subgroups of the food processing industry.

On the basis of these collective information from review of literature the fruit is selected in the study to identify the potentiality of processing through value chain analysis. It is selected on the basis of variety of fruits grown in the study area. Another base used is

viability of fruit for processing and producing high value-added products. Among the different food products units in this study area fruit is more economically viable for processing. Processed products of fruit are high demand in domestic as well as foreign market.

D. Selection of Medium and Large-scale units

The most important characteristics of Indian food processing industry is its dualism, simultaneous existence of large scale modern and a small scale traditional unorganized sector. India's food processing industry is highly fragmented and is dominated by unorganized sector. Mashimba et.al (2014) studied about the performance of MSME and their study result shows a low growth rate of micro and small-scale enterprises, that is, at 0.25% and 0.16 per cent per year for revenue and capital investment respectively. It has also been pointed out by scholars like Biswanath G (1980) that in a fairly large number of industries, small scale units are relatively inefficient compared to large scale units. The most important challenge faced by the Indian food processing industry is quality assurance which is possible only with modern advanced technology and high rate of capital investment. The National Productivity Council appointed a study team in 1960 to study the problems relating to the food processing industry in India. Their study report stressed the importance of modernization of the industry in order to have better production and productivity. A World Bank study by Mariluz C (1987) finds that a large- scale firms are relatively better equipped to manufacture quality food products than small scale firms. This observation is based on the evidence that smaller firms usually lack skills and equipment essential for quality control. Mahalanobis Committee (1949) have indicated "that the growth of big business as such does not necessarily mean the deliberate adoption of an anti-social policy. There is such a thing as the economy of scale which works in favour of big business, on purely economic grounds and economic considerations are certainly relevant especially in the context of our scarce resources and the imperative need of our making the most economic utilization of these resources". The growth of small-scale sector cannot be considered to be an alternative, to large scale enterprise. In fact, in the present global business conditions the establishment of more and more large-scale units with modern technology is essential in food processing industry as a pre condition to industrial progress. Large scale sector promotes social objective by securing the maximum benefit of technology, management and economy of indivisible factors. Therefore, large scale and medium scale industries are selected in this study.

1.7.3 Data collection

This study has used both secondary and primary data.

Primary Data: A pilot survey in the sample districts was undertaken to acquire firsthand knowledge about the scope of the study. Based on the survey, an interview schedule was designed and finalized after several suitable modifications. With this well structured and pretested interview schedule was used to collect primary data. Purpose of the survey was explained to the respondents to seek their co-operation and cross checks were made to minimize the error. The interview schedule for different firms covered aspects such as investment cost, input supply cost, output variety and market access. Primary information is collected from different respondent of large and medium scale fruit processing units. 26 fruit processing units are selected as sample unit from four districts in Kerala for collecting primary information.

Case Study is the other methods that used for the collection of primary data. The case studies have conducted in order to collect the information from fruit cultivators and dealers. From the primary survey at the 26 fruit processing units, we can recognize that the most commonly processed fruit in the units are pineapple, grapes, mango, papaya, jackfruit and banana. Among these fruits group, Jackfruit, Pine Apple, Mango and Banana are widely grown in Kerala. Therefore, we selected four farmers who cultivate these for fruits and two dealers for case studies. The case study conducted with as semi structured questionnaire. The interaction with the farmers is very significant for this study.

Secondary data: secondary data, an integral part of the study has collected from different sources. Secondary data on foreign direct investment inflow, contribution of food processing industry to GDP, export of processed food number of registered food processing units is collected from the various departmental sources.

The following are secondary sources of information used in the research.

a. Department of industrial policy and promotion
b. RBI reports
c. MOFPI Reports
d. Reports of Government of India Planning Commission
e. National Account Statistics
f. ASI Reports
g. DGCI&S Kolkata

Secondary data is also extracted from the Input Output Transaction Tables. Data for 2003-04 and 2013-14 is assessed to find out the linkage coefficient and make a comparison between 10 years. For this purpose, information was obtained from IOTT 2003-04 and IOTT 2013-04.

1.7.4 Analytical Techniques

Various tools of analysis in addition to tabular form, graphical, percentages, annual growth etc. were used to assess the feasibility of food processing industry. The linkage aspect is calculated with statistical equation. The important analytical techniques used in value chain analysis are tabular analysis and cost benefit analysis.

1.7.5 Profile of the study area

A detailed knowledge on the basic characteristics of the study area with respect to agro climate and socio-economic condition is imperative to understand the research problem in its proper perspective.

WHY KERALA? Kerala is situated between the Arabian Sea in the West and the Western Ghats in the East with a coastline of around 580 kms, Kerala region is a part of the South Indian Precambrian terrain. The state has the highest literacy rate (around 94%) in the country (Census 2011). The socio-economic profile and increasing education in Kerala have created a window of opportunity for the largest production base to be converted into innovative products through industrial intervention.

Leader in food production and consumption (20% share in country's food exports in 2014- 15 and highest per capita food consumption) - Rank 2 in the production of Pineapple, Pepper, Cocoa, Sweet potato, Tapioca, Coffee. Some of the food items in Kerala have been awarded geographical indication*

Kerala blessed with natural endowments. The state has 13 agro-climatic zones favouring cultivation of a multitude of crops, vegetables and fruits. Total area of land under cultivation are 25.84 lakh heactares. Major crops grown in Kerala include Spices, Cocoa, Seafood, Tea, Cashews, Ethnic food products and Coffee. The State is a major producer of: Spices (such as Pepper, Ginger, Garlic, Cardamom and Cloves), Fruits (including Pineapple, Banana, Citrus Fruits, Coconut and Cashew) and Vegetables (including Tomato, Tapioca, Sweet Potato and Ladyfinger). The major exports comprise of Spices, Marine Seafood, Cashews, Tea, Coffee.

A wide variety of fruits are grown in Kerala. According to the Report by 'National Statistical Office Ministry of Statistics and Programme Implementation Government of India", mango, banana, strawberry, pomegranate, plum, amla, jackfruit, pineapple, orange, papaya and passion fruit are cultivated in Kerala.

Key production highlights of Kerala

➢ Total production of 382.52 thousand tons of mango and its total value Rs. 56747 lakhs.

➢ Rank 2 in the production of Pineapple with 305.67 thousand tons and its total value of output is Rs. 36056 lakhs.

➢ Rank 4 in the production of Passion Fruit. Its value of output is Rs. 171 lakhs.

➢ One of a very few states of jackfruit producer. Its total production is 190.14 thousand tons and its total value is Rs. 35608 lakhs.

➢ Total production 2532.94 thousand tons of fruit and its total value of output is Rs. 587731 lakhs.

➢ Largest producers of Banana in the country. Its value of output is Rs. 140833 lakhs and total production 536155(MT)

The major production clusters of fruits in Kerala are

BANANA: Wayanad, Ernakulam, Palakkad, Malappuram, Kottayam, Pathanamthitta, Alappuzha, Idukki

MANGO: Kozhikode, Palakkad, Kannur, Kasaragod, Malappuram, Wayanad, Ernakulam, Alappuzha, Kottayam

PINEAPPLE: Kottayam, Ernakulam, Pathanamthitta, Idukki, Malappuram, Palakkad, Kasaragod

JACKFRUIT: Kannur, Kozhikode, Palakkad, Malappuram, Kasaragod, Ernakulam, Alappuzha, Idukki, Pathanamthitta, Wayanad, Kottayam

1.8 CHAPTER SCHEME

Chapter 1: Introduction

    The chapter highlights significance and scope of the study, research gap, statement of the problem, hypothesis, objectives and methodology. Also covers review of relevant literature.

Chapter 2: Theoretical Background

    Outlines the Macro economic theories related with this study

    Concepts and Definitions

Chapter 3: Structure and characteristics of Food Processing Industry.

    Presents an overview of present structure and characteristics of food Processing industry.

Chapter 4: Linkage effect of Food Processing Industry

    Backward and forward linkage coefficient have been worked out in this chapter.

Chapter 5: Value chain Analysis of Food Processing Industry

    Portrays an analysis of value chain in fruit processing industry.

Chapter 6: Government Initiatives

    Throws light on government support for the upgradation and promotion of food processing industry in India during emergencies such as Covid 19 Pandemic

Chapter 7: Summery and Conclusion

    Describes summery, findings, scope for further research, policy incentives, and conclusion

CHAPTER 2

THEORETICAL BACKGROUND

Input Output Method

Backward and Forward Linkage

Value Chain Analysis

Concepts and Definitions

2.1 INTRODUCTION

Build upon a research on the basis of theory gives a strong persistence for that research. This study also based on several macro economic theories. This chapter deals with the complete description of the theories that used in this study. They are

- Input Output Method
- Linkage Effect
- Value Chain Analysis

2.2 INPUT OUTPUT METHOD

Leontief W W (1906-1999), an American economist of Russian origin, is the founding father of Input Output Economics. Since his path breaking contribution in 1936, input–output analysis has become an important tool in quantitative economics. Indeed, Leontief always emphasized the importance of empirical foundations and verification of any economic theorizing and modeling which was and still is the inherent component of input-output accounting. Leontief was awarded the Sveriges Riksbank Prize in Economic Science in Memory of Alfread Nobel in 1973 "for the development of the input-output method and for its application to import economic problems". Nowadays input-output tables and techniques continue to be used widely to analyze all kinds of policy issues that are extensively investigated in such subfields of economics as international trade, economics of growth, development economics, energy and resource economics, environmental economics, regional science, labour economics and national accounting.

Input-output analysis is a method of systematically quantifying the mutual interrelationships among the various sectors of a complex economic system. In practical terms, the economic system to which it is applied may be as large as a nation or even the entire world economy, or as small as the economy of a metropolitan area or even a single enterprise.

"In all instances the approach is essentially the same. The structure of each sectors production process is represented by an appropriately defined vector of structural coefficient that describes in quantitative terms the relationship between the inputs it absorbs and the output it produces. The interdependence among the sectors of the given economy is described by a set of linear equations expressing the balances between the total input and the aggregate output of each commodity and service produced and used in the course of one or several periods of time."

"The technical structure of the entire system can accordingly be represented concisely by the matrix of technical input-output coefficients of all its sectors. It constitutes at the same time the set of parameters on which the balance equation is based".

INPUT OUTPUT TABLES: "An input-output table describes the flow of goods and services between all the individual sectors of a national economy over a stated period of time, say, a year".

TECHNICAL COEFFICIENTS: "Let the national economy be subdivided into $n+1$ sector; n industries, that is, producing sectors and the $n+1^{th}$ final demand sector, represented in input-output by the household. For purpose of mathematical manipulation, the physical output of sector i is usually represented by xi while the symbol xij stands for the amount of the product of sector i absorbed-as its input-by sector j. The quantity of the product of sector i delivered to the final demand sector X_{in+1} usually identified in short as y_1"

"The quantity of the output of sector i absorbed by sector j, per unit of its total output j is described by the symbol a_{ij} and is called the input coefficient of product of sector i into sector j.

$$a_{ij} = \frac{x_{ij}}{x_j}$$

A complete set of the input coefficient of all sectors of a given economy arranged in the form of are rectangular table-corresponding to the input-output table of the same economy-is called the structural matrix of that economy. In practice the structural matrices are usually computed from input-output tables described in value terms.

Static input-output system: The balance between the total output and combined inputs of the product of each sector, can be described by the following set of n equations:

$$X_1 - x_{11} - x_{12} - \ldots\ldots\ldots - x_{1n} \qquad = Y_1$$
$$-x_{21} + (x_2 - x_{22} - \ldots\ldots -x_{2n} \quad = Y_2$$
$$\ldots\ldots \qquad \ldots\ldots \quad \ldots\ldots.. \quad \ldots\ldots \qquad \ldots..$$
$$-x_{n1} - x_{n2} \quad -\ldots\ldots + (x_n - x_{nn}) = Y_n$$

A substantial of equation yields n general equilibrium relationships between the total outputs $x_1, x_2, \ldots\ldots x_n$ of all producing sectors and final bill of goods, $y_1, y_2 \ldots Y_n$, absorbed by household, government, and other final users. If the final demand $Y_1, Y_2, \ldots\ldots Y_n$, that is, the quantities of all the different kinds of goods absorbed by household and all other sectors

whose outputs are not represented by the variables appearing on the left hand side of equation, are assured to be given, the system can be solved for the n total outputs,$x_1, x_2, \ldots x_n$.

The general solution of these equilibrium equations for the "unknown" x's in terms of the given y's can be presented in the following form:

$$X_1 = A_{11}Y_1 + A_{12}Y_2 + \ldots + A_{1n}Y_n$$

$$X_2 = A_{21}Y_1 + A_{22}Y_2 + \ldots + A_{2n}Y_n$$

$$\ldots \quad \ldots\ldots\ldots \quad \ldots\ldots$$

$$X_n = A_{n1}Y_1 + A_{n2}Y_2 + \ldots\ldots + A_{nn}Y_n$$

The constant Ay indicates by how much the output x_1 of the ith sector would increase if Y_j, that is, the quantity of good j absorbed by households (or any other final users), had been increased by one unit. Such an increase would affect sector i directly (and also indirectly) if $i = j$, but when i is not equal to j the output X_1 is affected only indirectly, since sector i has to provide additional inputs to all other sectors which in their turn − directly or indirectly – must contribute to the increase in the delivery $Y1$ made by sector j to the final users".

2.3 BACKWARD AND FORWARD LINKAGE

The concept of Linkage effect was first discussed by Hirschman A O (1915-2012). He was an economist and the author of several books on political economy and political ideology. His first major contribution was in the area of development economics. In his book "Strategy of Economic Development", he defined Backward and forward linkage in Chapter 6 – Inter-dependence and industrialization

"In close analogy to the alternative between development via shortage and development via excess capacity which we described for the SOC-DPA (Social Overhead Capital – Directly Productive Activities) situation; two inducement mechanisms may be considered to be at work within the DPA sector:

1. The input provision, derived demand, or backward linkage effects.ie every nonprimary economic activity, will induce attempts to supply through domestic production the inputs needed in that activity.

2. The output-utilization or forward linkage effects, i.e., every activity that does not by its nature cater exclusively to final demands, will induce attempts to utilize its outputs as inputs in some new activities".

Development policy must attempt to enlist these well-known backward and forward effects; but it can do so only if there is some knowledge s to how different economic activities "score" with respect to these effects. Ordinarily, economists have been content with general references to the advantage of external economies, complementarities, cumulative causation, etc. But no systematic effort has been made to describe how the development path ought to be modified so as to maximize these advantages even though the existence of input-output statistics supplies us with a few tools for an analysis of this kind..

"First, a further note on the linkage concept itself. What do we imply when we speak of the linkage effects emanating from industry A toward industry B. Language can be quite ambiguous here, for we may have in mind the potential importance of, say, the net output of the new industries that might be called further; or we may mean the strength of the effect, i.e., the probability that these industries will actually come into being. The total effect could be measured by the sum of the products of these two elements; in other words, if the establishment of industry W may lead, through linkage effects, to the establishments of n additional industries with net outputs equal to $x_1(i = 1,2…. n)$ and if the probability that each one of these industries will actually be set up as a result of the establishment of industry is $P_1(1=1,2…n)$, then the total linkage effect of industry W is equal to $X_iP"_i$.

"The probabilities can be interpreted as measuring the strength of the stimulus that is set up. For backward linkage, this strength can be roughly measured as follows; suppose industry W requires annual inputs of y_1, y_2, …y_n and suppose that the minimum economic size (in terms of annual productive capacity) of firms that would turn out of these inputs is equal to a_1, a_2….a_n; then the strength of the stimulus or the probability that the setting up of industry will lead to the setting up of industries producing the inputs is equal to the ratio of y's to the a's. Minimum economic size is not a technical concept, but is defined in economic terms relative to normal profits and efficient foreign suppliers. In other words, it is the size at which the domestic firm will be able both to secure normal profits and to compete with existing foreign suppliers, taking into account locational advantages and disadvantages as well as, perhaps, some infant industry protection. In this way comparative cost conditions are automatically taken into account".

28

"In the case of forward linkage, an interpretation of the p's is less straight forward. The concept of economic size is not helpful here, since the size of the market for industries that might be brought into being through forward linkage does not depend on their suppliers. A clue can perhaps be found in the importance of the articles produced by industry W as inputs for the output of the to-be linked industry. If these inputs are a very small fraction of the industry's eventual output, then their domestic availability is not likely to be an important factor in calling forth that industry. If on the other hand, these articles are subjected to few further manufacturing operations, then the strength of the forward stimulus is likely to be substantial, provided demand is sufficient to justify domestic production".

The lack of inter dependence and linkage is of course one of the most typical characteristics of under developed economies. If we had homogeneous input-output statistics for all countries, it would certainly be instructive to rank countries according to the proportion of inter sectoral transactions to total output; it is likely that this ranking would exhibit a close correlation with both income per capita and with percentage of the population occupied in manufacturing.

Agriculture in general, and subsistence agriculture in particular, are of course characterized by the scarcity of linkage effects. By definition, all primary production should exclude any substantial degree of backward linkage although the introduction of modern methods does bring with it considerable outside purchases of seeds, fertilizers, insecticides, and other current inputs, not to speak of machines and vehicles. We may say that the more primitive the agricultural and mining activities, the more truly primary they are.

"Forward linkage effects are also weak in agriculture and mining. A large proportion of agriculture output is destined directly for consumption or export; another important part is subjected to some processing in industries that can be characterized as satellite in as much as the value added by them to the agricultural product (milling of wheat, rice, coffee, etc.) is small relative to the value of the product itself. Only a comparatively small fraction of total agricultural output of underdeveloped countries receives elaborate processing, which usually takes place abroad".

The case for inferiority of agriculture to manufacturing has most frequently been argued on grounds of comparative productivity. While this case has been shown not to be entirely convincing, agriculture certainly stands convicted on the count of its lack of direct stimulus to the setting up of new activities through linkage effects: the superiority of

manufacturing in this respect of crushing. This may yet be the most important reason militating against any complete specialization of underdeveloped countries in primary production.

2.4 VALUE CHAIN ANALYSIS

The term value chain was first developed by Micheal Eugene Porter (1985). Micheal Porter is an American academic known for his theories on economics, business strategy and social causes. He is the Bishop William Lawrence University Professor at Harward Business School, and he was one of the founders of the consulting firm The Monitor Group and FSG, a social impact consultancy. He defined value as the amount buyers are willing to pay for what a firm provides and he conceived the value chain as the combination of nine generic value-added activities operating within firm activities that work together to provide value to customers. After Porter M E et.al (1994), Hopkins et.al (1986), Raikes P (2000) etc. have developed value chain frameworks. The study makes use of the framework developed by Kaplinsky.

Definition: The Simple Value Chain

"The value chain describes the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use.. As can be seen that, production per se is only one of a number of value-added links. Moreover, there are ranges of activities within each link of the chain. Although often depicted as a vertical chain, intra-chain linkages are most often of a two-way nature – for example, specialized design agencies not only influence the nature of the production process and marketing, but are in turn influenced by the constraints in these downstream links in the chain".

Different concepts of value chain

There is a considerable overlap between the concept of a value chain and similar concepts used in other contexts. One important source of confusion – particularly in earlier years before the value chain as outlined above became increasingly widespread in the research and policy domain – was one of nomenclature and arose from the work of Michael Porter in the mid 1980s. Porter distinguished two important elements of modern value chain analysis:

The various activities which were performed in particular links in the chain. Here he drew the distinction between different stages of the process of supply (inbound logistics, operations, outbound logistics, marketing and sales, and after sales service), the transformation of these inputs into outputs (production, logistics, quality and continuous improvement processes), and the support services the firm marshals to accomplish this task (strategic planning, human resource management, technology development and procurement). Porter complements this discussion of intra-link functions with the concept of the multi-linked value chain itself, which he refers to as the value system.

"Another concept which is similar in some respects to the value chain is that of the *filiere* (whose literal meaning in French is that of a 'thread'). It is used to describe the flow of physical inputs and services in the production of a final product (a good or a service) and, in terms of its concern with quantitative technical relationships, is essentially no different from the from Porter and Womack and Jones' value stream. French scholars built on analyses of the value-added process in US agricultural research to analyses the processes of vertical integration and contract manufacturing in French agriculture during the 1960s. The early *filiere* analysis emphasized local economic multiplier effects of input-output relations between firms and focused on efficiency gains resulting from scale economies, transaction and transport costs etc. It was then applied in French colonial policy on the agricultural sector and, during the 1980s, to industrial policy, particularly in electronics and telecommunications. The later work gave the modern version of *filiere* analysis an additional political economy dimension insofar as it factored in the contributory role of public institutions into what were essentially technical quantitative relationships, thereby bringing it analytically closer to contemporary value chain analysis". However, a *filiere* tended to be viewed as having a static character, reflecting relations at a certain point in time. It does not indicate growing or shrinking flows either of commodity or knowledge, nor the rise and fall of actors. Although there is no conceptual reason why this should have been the case, in general *filiere* analysis has been applied to the domestic value chain, thus stopping at national boundaries.

"The next concept which has been used to describe the value chain is that of ***global commodity chains,*** introduced into the literature by Gereffi during the mid-1990s. Gereffi's contribution has enabled important advances to be made in the analytical and normative usage of the value chain concept, particularly because of its focus on the power relations which are imbedded in value chain analysis. By explicitly focusing on the coordination of

globally dispersed, but linked, production systems, Gereffi has shown that many chains are characterized by a dominant party (or sometimes parties) who determine the overall character of the chain, and as lead firm(s) becomes responsible for upgrading activities within individual links and coordinating interaction between the links. This is a role of 'governance', and here a distinction is made between two types of governance: those cases where the coordination is undertaken by buyers ('buyer-driven commodity chains') and those in which producers play the key role ('producer-driven commodity chains')".

Supply Chain Vs Value Chain

Oliver K is a British top logistician and consultant famous for coining the terms Supply chain and supply chain management. "Supply chain is a term now commonly used internationally to encompass every effort involved in producing and delivering a final product or service from the suppliers' supplier to the customers' customer (Supply Chain Council 2005). The sequence of processes involved in the production and distribution of a commodity is called supply chain. The central focus in supply chain is efficient supply or the flow of materials from different sources to a final destination". It is an integrated process where a number of various business entities all parties involved directly (i.e., suppliers, manufacturers, transporters, distributers, ware house and retailers) work together in an effort to acquire raw materials, convert these raw materials into specified final products and deliver the final products to retailers (Beamon, 1998). Supply chain focus upstream on integrating supplier and producer processes, improving efficiency and reducing waste, while value chain focus, dawn stream, on creating value in the eyes of the customer (Feller, 2006). In common parlance, the words supply chain and value chain are complementary uses and the distinction between these two is often lost in business and research literature. Global Supply Chain Forum (GSCF) in 1998 defined supply chain management as the integration of key business processes from end user through original suppliers that provides products, services and information that add value for customers and stakeholders (Lammbert, 1998). The value chain concept has become a staple idea in the management and research literature and is the focus for evolving strategies, enterprise models and numerous efforts at improving business performance (Eskew, 2005). "Creating a profitable value therefore requires alignment between what customers wants i.e., the demand chain and what produced via the supply chain while supply chain focuses primarily on reducing costs and attaining operational excellence, value chain focus more on innovation in product development and marketing".

WHY IS VALUE CHAIN ANALYSIS IMPORTANT? There are three main sets of reasons why value chain analysis is important in this era of rapid globalization.

They are:

1. With the growing division of labour and the global dispersion of the production of components, systemic competitiveness has become increasingly important

2. Efficiency in production is only a necessary condition for successfully penetrating global markets

3. Entry into global markets which allows for sustained income growth – that is, making the best of globalization - requires an understanding of dynamic factors within the whole value chain.

Three key elements of value chain analysis:

There are three important components of value chains which need to be recognized and which transform a heuristic device into an analytical tool:

- Value chains are repositories for rent, and these rents are dynamic
- Effectively functioning value chains involve some degree of 'governance'
- There are different types of value chains

1. Barriers to entry and rent: The value chain is an important construct for understanding the distribution of returns arising from design, production, marketing, coordination and recycling. Essentially, the primary returns accrue to those parties who are able to protect themselves from competition. This ability to insulate activities can be encapsulated by the concept of rent, which arises from the possession of scarce attributes and involves barriers to entry.

2. Governance: A second consideration which helps to transform the value chain from a heuristic to an analytical concept is that the various activities in the chain – within firms and in the division of labour between firms – are subject to what Gereffi has usefully termed 'governance' (Gereffi, 1994). Value chains imply repetitiveness of linkage interactions. Governance ensures that interactions between firms along a value chain exhibit some reflection of organisation rather than being simply random. Value chains are governed when parameters requiring product, process, and logistic qualification are set which have consequences up or down the value chain encompassing bundles of activities, actors, roles, and functions.

3. Different types of value chains: Building on this concept of governance, Gereffi has made the very useful distinction between two types of value chains. The first describes those chains where the critical governing role is played by a buyer at the apex of the chain. Buyer-driven chains are characteristic of labour-intensive industries (and therefore highly relevant to developing countries) such as footwear, clothing, furniture and toys. The second describes a world where key producers in the chain, generally commanding vital technologies, play the role of coordinating the various links – producer-driven chains. Here producers take responsibility for assisting the efficiency of both their suppliers and their customers. In more recent work, Gereffi has pointed out that producer driven chains are more likely to be characterised by foreign direct investment (FDI) than are buyer-driven chains (Gereffi, 1999b). He also argues that each of these different types of value chain is associated with different types of production systems. More contentious is the suggestion that producer driven chains are a reflection of the old "import substituting industrialisation order", whereas buyer driven chains are more attuned to the outward-oriented and networked production systems of the 21st century.

Value Chain Analysis and the Determinants of Income Distribution:

Value chain analysis can help to explain this growing disjuncture between the global spread of activities and incomes, particularly in a dynamic perspective. First, by mapping the range of activities in the chain it provides the capacity to decompose total value chain earnings into the rewards which are achieved by different parties in the chain. The value of this mapping exercise should not be underestimated, because no other form of analysis provides this synoptic overview of earnings (both international and intranational) in globally linked activities. Other ways of viewing global distributional patterns provide only partial insights into these phenomena. For example, trade statistics only provide data on aggregate, gross returns rather than on net earnings, and branch-specific analyses (agriculture, industry, services) only capture part of the story. Secondly, a value chain perspective analyses the way in which particular firms, regions and countries are linked to the global economy. This mode of insertion will determine to a large extent the distributional outcomes of global production systems and the capacity which individual producers have to upgrade their operations and thus to launch themselves onto a path of sustainable income growth. This is really important in understanding the dynamics of income distribution over time. And, thirdly, at the same time, by focusing on the institutions which drive international specialisation, value chain

analysis identifies the normative levers which can be used to alter these distributional patterns.

Value Chain Activities:

Value chain analysis is a means of segregating various activities of a business and identifies them with respect to their contribution towards value generation by identifying the cost i.e., inputs consumed by that activity and the output generated out of that activity. Traditionally, value chain consists of two kinds of activities classified as primary and secondary activities. The primary value chain analysis is a tool for identifying potential comparative advantages. The value chain provides the form with a comprehensive framework for systematically searching for ways to provide superior value to the customers. Every firm is a collection of activities that are performed to design, produce, market, deliver and support its products. The value chain can be desegregated into nine primary activities. Such a division can help a firm to understand existing and potential sources of advantages as also low value or redundant activities or processes. The nine activities consist of five primary activities and four supportive activities.

1. The primary Activities: They present the sequence of bringing materials into business, operating on them, sending them out, marketing them and servicing them. The primary activities comprise of the following:

   - Inbound logistics (sourcing and purchase)
   - Operations
   - Outbound logistics (distribution and logistics for product delivery)
   - Marketing and sales (Communicating and persuading customers)
   - Service (After sales service)

2. The support Activities: The secondary activities comprise of the following:

   - Firm infrastructure (Covering the overhead of general management, planning, finance, accounting, legal and government affairs borne by all primary and support activities).
   - Human resource management (Provides and manages human resources across the organization)
   - Technology development (Develops means to make the existing operations more efficient and also contributes to newer means to deliver customer value).

35

- Procurement (Involves procuring resources other than raw material and utilities to carry out primary and secondary activities).

Chart 2.1

Porters generic value chain model
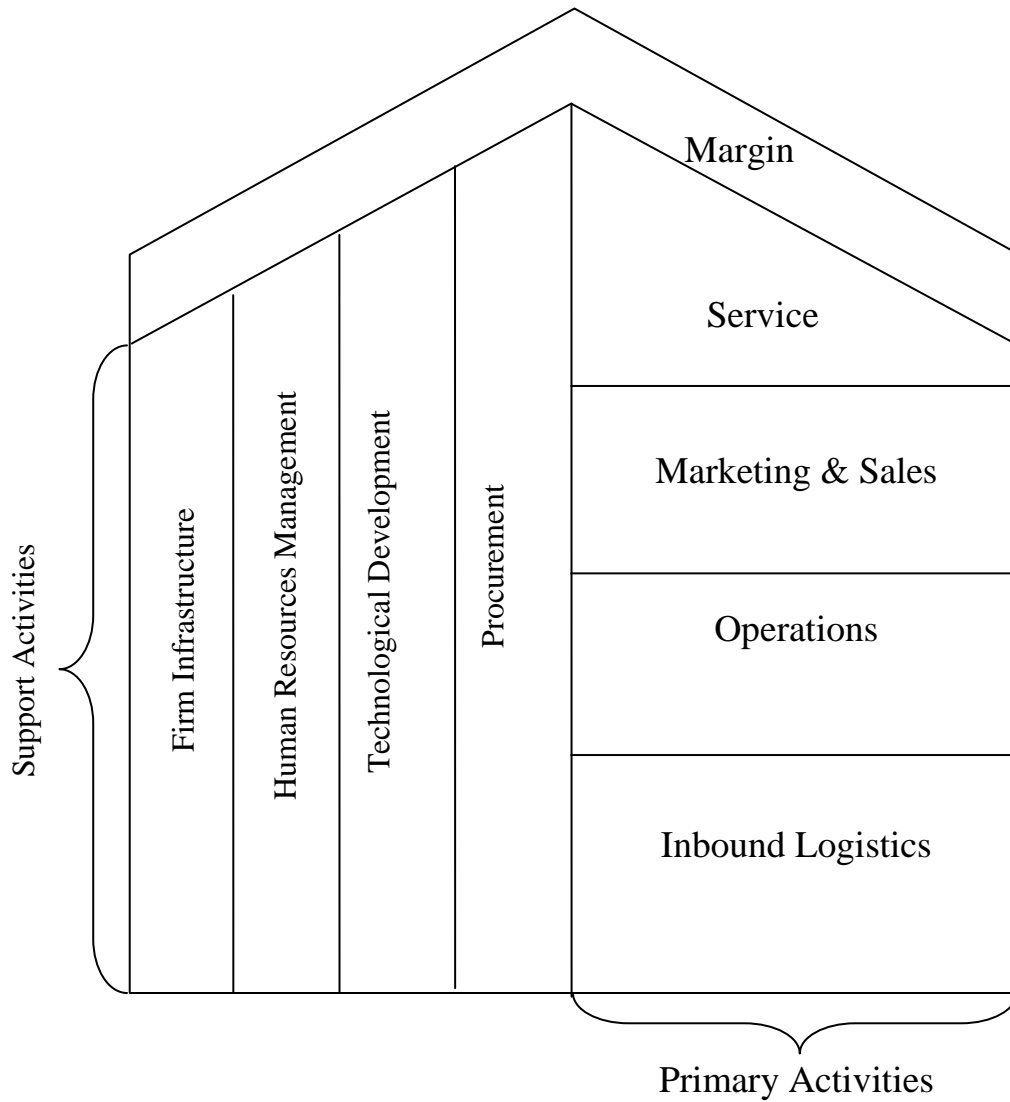
Source: Michael E Porter, Competitive Advantage: Creating and Sustaining Superior Performance (New York, Free Press, 1985, P:37)

Finance in Value Chain

As the lifeblood in the value chain, finance is often one of the critical constraints to economic growth. Understanding the financial structure both within and between firms in the value chain is necessary for the development of upgrading strategies that effectively increase competitiveness. The various aspects of finance in the value chain can be organized in three groups. First, Intra-firm Finance: there is a set of issues related to finance within the firms. Second, Finance service provision: There are supply –side finance issues which related to the nature of the different types of financial services provision that currently exist in the value chain. Third, Inter –firm Finance (Governance): There are finance issues that relate to the transactions between firms and how these transactions are governed

Analysing finance through the value chain lens allows the analyst to identify sustainable finance model that support the key upgrading opportunities distilled from the value chain analysis .It may be found that a conventional loan to an urban- based anchor firm in the value chain leads to faster growth of a particular sub-sector than micro-loans to poor rural household, or it may be found that both are needed simultaneously. Or it may be found that finance is not a binding constraint. For example, if a processor is advised(or already plans) to upgrade to more efficient equipment that can process larger volumes of raw material with certain product specifications, then it will also need more working capital to buy and inspect the increased volume. At the same time, middlemen and farmers will need more working capital and possibly investment capital to assure the supply of that increased volume and its compliance with new product and process standards. In turn, there may be a need for investment finance to establish or upgrade input or service providers who for example manufacture new packaging materials for traders or audit farms for compliance with standards.

Value chain finance refers to financial products and services that flow to or through any point in a value chain that enable investments that increase actors returns and the growth and competitiveness of the chain. Value chain actors themselves, banks, microfinance institutions, other non-bank financial institutions, or a combination of these actors can provide or facilitate financing to a value chain. These actors may participate in a value chain financing arrangement for different reasons, and these reasons determine the ways in which they are willing to facilitate financing for a value chain upgrading investment. Value chain finance is useful for ensuring that business have liquidity so they can meet market demands- whether that be to maintain over expend operations or invest in upgrading to access new market opportunities.

2.5 CONCEPTS AND DEFINITIONS

- **Fixed Capital**: "Fixed capital represents the depreciated value of fixed assets owned by the factory as on the closing day of the accounting year. Fixed assets are those that have a normal productive life of more than one year. Fixed capital includes land including lease hold land, buildings, plant and machinery, furniture and fixtures, transport equipment, water system and roadways and other fixed assets such as hospitals, schools etc. used for the benefit of factory personnel"

- **Physical Working Capital**: "Physical working capital is the total inventories comprising of raw materials and components, fuels, and lubricants, spares, stores, and others, semi finished goods and finished goods as on the closing day of the accounting year. However, it does not include the stock of the materials, fuels, stores etc. Supplied by others, to the factory for processing and finished goods processed by the factory from raw materials supplied by others. Report on Annual Survey of Industries 2008-09 Department of Economics & Statistics, Kerala 9"

- **Working Capital**: "Working capital is the sum total of Physical Working Capital as already defined above and the cash deposits in hand and at bank and the net balance receivable over amounts payable at the end of the accounting year. Working capital, however, excludes unused overdraft facility, fixed deposits irrespective of duration, advances for acquisition of fixed assets, loans and advances by proprietors and partners irrespective of their purpose and duration, long term loans including interest thereon and investments".

- **Productive Capital**: "Productive Capital is the total of fixed capital and Working capital as defined above".

- **Invested Capital**: "Invested Capital is the total of fixed capital and Physical working capital as defined above".

- **Gross value of Plant and Machinery**: "Gross value of Plant and Machinery represents the total original (un depreciated) value of installed plant and machinery at the end of the accounting year. It includes the book value of the newly installed plants and machinery and the approximate value of rented in plant and machinery at the time of rending in but exclude the value of rented out plants and machinery. Total value of all the plants and machinery acquired on hire-purchase basis is also included".

- **Outstanding Loans**: "Outstanding loans represents all loans whether short term or long term, whether interest bearing or not, outstanding according to the books of the factory as on the closing day of the accounting year".

- **Rent Paid**: "Rent paid represents the amount of royalty paid in the nature of rent for the use of the fixed assets in the factory. Report on Annual Survey of Industries 2008-09 Department of Economics & Statistics, Kerala 10"

- **Interest paid**: "Interest paid includes all interest paid on factory account on loans, whether short term or long term, irrespective of the duration and the nature of agency from which the loan was taken. Interest paid to partners and proprietors on capital or loan are excluded".

- **Workers**: "Workers are defined to include all persons employed directly or through any agency whether for wages or not and engaged in any manufacturing process or in cleaning any part of the machinery or premises used for manufacturing process or in any other kind of work incidental to or connected with the manufacturing process or the subject of the manufacturing process. Labour engaged in the repair and maintenance or production of fixed assets for factory's own use or labour employed for generating electricity or producing coal, gas etc. are included".

- **Employees**: "Employees include all workers defined above and persons receiving wages and holding supervisory or managerial positions engaged in administrative office, store keeping section and welfare section, sales department as also those engaged in purchase of raw materials etc. or purchase of fixed assets for the factory and watch and ward staff".

- **Total Persons Engaged**: "Total Persons engaged includes the employees as defined above and all working proprietors and their family members who are actively engaged in the work of the factory even without any pay and the unpaid members of the co-operative societies who worked in or for the factory in any direct or productive capacity. The number of workers or employees is an average number obtained by dividing man-days worked by the number of days the factory had worked during the reference year". Report on Annual Survey of Industries 2008-09 Department of Economics & Statistics, Kerala 11

- **Man days**: "Man-days represent the total number of days worked and the number of days paid for during the accounting year. It is obtained by summing up the number of

persons of specified categories attending in each shift over all the shifts worked on all days".

- **Wages and Salaries**: "Wages and Salaries are defined to include all remuneration in monitory terms and also payable more or less regularly in each pay period to workers as compensation for work done during the accounting year. It includes: a) Direct wages and salaries (i.e., basic wages/salaries, payment of overtime, dearness, compensatory, house rent and other allowances) b) Remuneration for the period not worked (i.e., basic wages/salaries and allowances payable for leave period, paid holiday, lay-off, payments and compensation for unemployment, if not paid from sources other than employers) c) Bonus and ex-gratia payment paid both at regular and less frequent intervals (i.e., incentive bonuses, productive bonuses, profit sharing bonuses, festival or year-end bonuses etc.) It excludes lay off payments that are made from trust or other special funds set up exclusively for this purpose, i.e., Payments not made by the employer". It also excludes imputed value of benefits in kind, employer's contribution to old age benefits and other social security charges, direct expenditure on maturity benefits, crèches and other group benefits, traveling and other expenditure incurred for business purposes and reimbursed by the employer are excluded. The wages are expressed in terms of gross value i.e., before deduction for fines, damages, taxes, provident fund, employee's state insurance contribution etc.

- **Fuels Consumed**: "Fuels consumed represents total purchase value of all items of fuels such as coal liquefied petroleum gas, petrol, diesel, electricity lubricants, water etc. Consumed by the factory during the accounting year but excluding the items, which directly enter into the manufacturing process".

- **Materials consumed**: "Materials consumed represents the total delivered value of all items of raw materials, components, chemicals, packing materials, and stores which actually enter into the production process of the factory during the accounting year. It also includes the cost of all materials used for the construction of building etc. for the factory's own use. It however, excludes all intermediate products consumed during the accounting year. Intermediate products are those products, which are produced by the factory but are subject to further manufacturing".

- **Total Input**: "Total input comprises of total value of fuels, materials consumed as well as expenditures such as cost of contract and commission work done by others on materials supplied by the factory, cost of materials consumed for repair and

maintenances work done by others to the factory's fixed assets, inward freight and transport charges, rates and taxes, (excluding income tax) postage, telephone and telex expenses, insurance charges, banking charges, cost of printing and stationery and purchase value of goods sold in the same condition as purchased. Rent paid and interest paid is not included".

- **Total Output**: "Total output comprises of total ex-factory value of products and by-products manufactured as well as other receipts from non-industrial services rendered to others, work done for others on materials supplied by them, value of electricity produced and sold, sale value of goods sold in the same conditions purchased, addition in stock of semi-finished goods and value of own construction. Rent received and interest received is not being included from Annual Survey of Industries 2001-'02".

- **Depreciation**: "Depreciation is consumption of fixed capital due to wear and tear and obsolescence during the accounting year and is taken as provided by the factory owner or is estimated on the basis of cost of installation and working life of fixed assets".

- **Net Value Added**: "Net value added is arrived by deducting total input and depreciation from total output".

Source: Report on Annual Survey of Industries 2008-09 and Department of Economics & Statistics, Kerala

CHAPTER 3

STRUCTURE AND CHARACTERESTICS OF FOOD PROCESSIG INDUSTRY

Present Status of Food Processing Industry

Classification of Food Processing Industry

Types of Food Processing Industry

Structure of Food Processing Industry

Area Production and Productivity of Fresh Fruits

Characteristics of Food Processing Industry

Conclusion

3.1 INTRODUCTION

The food processing or food manufacturing industry includes all those companies which transform livestock and agricultural products into products used for intermediate or final consumption. Indian food processing industry consist the following categories namely fruits and vegetables products, dairy products, meat and poultry products marine fisheries, alcoholic beverages, bakery and confectionary. The fruit and vegetable processing place the fourth position after dairy products, marine products and meat products.

The main purpose of this chapter is to systematically portray and analyse the first objective of this study. Here we try to understand the structure and characterestics of food processing industry. This chapter has four segments

1. Present status of food processing industry
2. Types and classification of food processing industry
3. Structure of food processing industry
4. Growth of food processing industry

3.2 PRESENT STATUS OF FOOD PROCESSING INDUSTRY

3.2.1 Food Processing Industry: International Scenario

In fact, the world's four dominant food producing countries also rank in the top five for total geographical size. China is the world's biggest producer and consumer of food. India currently ranks second in terms of global food production. The United States has long been a superpower in food markets and it is still world's largest food exporter. China always out produces the U S, and in some years, India produces more food than the U S but China and India also end up consuming much more of their own products. These three countries the U S, China and India each produces more food than the entire European Union put together. In fourth place is Brazil, its food industry tilts heavily towards sugarcane, soyabeans and beef. China is also having the world's largest food workforce with some estimates as high as 315 million labourers. China is the most prolific producer of an impressive lists of food: rice, wheat, potatoes, lettuce, onions, cabbage, green beans, broccoli, egg plant, spinach, carrots, cucumbers, tomatoes, pumpkins, pears, grapes, apple, peaches, plums, watermelons, sheep milk, chicken, pork, sheep, goat, peanut, eggs, fish and honey. In terms of total calorie content, India is the second largest food producer in the world. When measured by the total value of agricultural production instead, India drops to fourth place and produces less than half of China's total output. By far United States of America leads rest of the world in food

manufacturing sector and a comparison to their status is always tempting. Globally US boosts of the largest food processing industry with an annual turnover of US $564 billion and worldwide operations through innumerable subsidiaries. The top six companies in USA account for a business of US $ 130 billion through their branded foods. The US manufactured food products are exported to more than sixty counties. Food production is spread across much of the country, but the largest food producing states include California, Lowa, Texas, Nebraska and Illinois. American companies dominate the food export market. Second place Netherlands exports 35 percent less than the US and is close to tenth place China in terms of international products. At last, 31 percent Brazil is used as cropland, largely to produce coffee, sugarcane, soybeans and corn. Brazil is also a major producer of oranges pineapple, papaya and coconuts. The country also ranks second (behind the US) in total beef output.

3.2.2 Food Processing Industry: Indian Scenario

India is the world's second most populous country with a population of 1.3 billion, of which, 62.3 percent is below the age of 35. India's GDP is expected to grow 7.8 percent in Indian Fiscal Year 2018-2019 and already exceeds $2.4 trillion. The economy is on track to become the world's third-largest economy by 2025. Food processors, importers, wholesalers, retailers, food service operators are all part of a developing agribusiness sector. Apart from being a large food producer, India's bulk, intermediate, consumer oriented, and agricultural related imports grew from $22.2 billion in 2013 to $30.2 billion in 2017 and exports went from $44.5 billion to $39.4 billion during the same period. The Indian food and grocery market is the world's sixth largest. The food processing industry accounts for 32 per cent of the country's total food market, one of the largest industries in India, and is ranked fifth in terms of production, consumption, export and expected growth. It contributes around 8.8 and 8.4 per cent of Gross Value Added (GVA) in manufacturing and agriculture respectively. Food processing accounts for 13 percent of India's exports and six percent of total industrial investment. As per the 2016-2017 Annual Survey of Industries, there are 37,175 registered food processing units in the country that employ approximately 1.7 million people in food and beverage manufacturing. According to an Assocham Grant Thorton study, the Indian food processing sector has the potential to attract $33 billion in investment and generate employment for 9 million persons by 2024 [Global Agricultural Information Network Report: Number IN8032]

3.2.3 Food Processing Industry: Kerala Scenario

The growth of food processing industry is expected to generate employment, reduce post-harvest losses, increase farm income, contribute substantially to the gross domestic product etc. Kerala economy also realised the growing perception of its importance. Therefore, it always tries to traces the growth of the industry, analyses the constraints and opportunities, discusses the prospects for growth and assess the future of the industry. The structure of the industry is mainly dominated by the small-scale units. In Kerala during 2016-17 Rs.3246 crores value added came from food processing industry. The number of factories in food processing sector have increased from 1171 in 2006-07 to 1629 in 2016-17. It accounts for nearly 4.10 percent of all total industries. The direct employment dimensions with about 97541 people during 2016-17 accounted for nearly 5.26 percent of the total industrial work force. The investment in fixed capital has shown fluctuating trends in Kerala. The fixed capital in food processing industries has declined and it is worth Rs. 4024 crores in 2016-17. The proportion of fixed capital invested in food processing industries to that total fixed capital invested in manufacturing is only 1.78 percent in Kerala. In the food processing industries, the fixed capital per factory has decreased from Rs 3.05 crores in 2015-16 to Rs. 2.47 crore in 2016-17. The employment per crore of fixed capital is almost stable and it is 24.24 in 2016-17. The cost of input in food processing sector is worth Rs.27816 crore in 2016-17. It can be realised that food processing industries has a crucial role to pay in order to boost up agriculture. During the period 2016-17, the output of food processing industry is Rs. 31062 crores.

3.3 CLASSIFICATION OF FOOD PROCESSING INDUSTRY IN INDIA

The Food Industry in India is grouped into the following categories:

From annual survey of Industry 2008-09, NIC 2008 has been introduced. It classifies all the factories in the ASI frame in their appropriate industry group on the basis of the principal product manufactured. For ASI 2009-10, the results are released at 4-digit level of NIC 2008 by All India and at 2/3-digit level of NIC 2008 by states /UTs. In ASI 2009-10, processed food belongs to Section C: Division 10 [Manufacture of food products]. This division includes eight groups. Each group includes several subgroups.

DIVISION 10: Manufacture of Food Products

      101: processing and preserving of meat

      102: processing and preserving of fish crustaceans and molluscs

      103: processing and preserving of fruits and vegetables

      104: manufacture of vegetable and animal oils and fats

      105: manufacture of dairy products

      106: manufacture of grain mill products

      107: starches and starch products

      108: manufacture of other food products [manufacture of prepared animal feeds]

3.4 TYPES OF FOOD PROCESSING INDUSTRY

Food processing is a set of methods and techniques used to transform raw ingredients into the food or to transform food into other food for consumption by human beings or animals in the home or by the food processing industries. In other words, Food Processing encompasses all the steps that food goes through from the time it is harvested to the time it arrives to the consumer's plate as stated by Food & Agriculture Organization (FAO).

In their study Knapik W et.al classified food processing industry into primary processing and industrial processing. Primary processing is asset of basic operations run on small scale within agricultural firms or within a buyer's company in order to prepare their produce for trading. On the other hand, industrial processing is usually run on much larger scale focused on transforming a physical form of fruits during a technological process. The main elements of industrial processing include so called core processing, which focuses on delivering various preparations. A different kind of processing is so called trade processing, which in run in retail chains that trade fruits on large scale usually in logistics centers.

Arnold Tynobee [1972, A study of History, University press London] and R.P. Kachru [2006 Agro Processing Industries in India - Growth, Status and Prospect 1 1.1 (a)] suggested that processed foods can be classified into three types based on the nature and output of the processing.

Primary processing: Primary processing would encompass cleaning, powdering and refining of agricultural produce as in the case of the transformation of wheat-to-wheat flour.

Secondary processing: Secondary processing would include the modification of a basic product to a stage where it requires some value addition to the kitchen. Tomato puree, cleaning and processing of meat products, are all processed to a secondary stage.

Tertiary processing: There are high value branded products like jam, sauces, biscuits and other bakery products. It includes all food items that have been through the final of the tertiary stage of processing and are ready for consumption at the point of sale.

The levels of food processing are;

1. Primary processing.
2. Secondary processing.
3. Tertiary processing

Primary: Cleaning, Grading, Packaging

Secondary: Modification of basic product just before the final   preparation

Tertiary: High value added ready to eat product (Bakery / Instant food)

Another way of classifying food-processing industry (Greig, 1971) on the basis of orientation of the industry is as follows:

Agricultural oriented industries - that process food raw materials into a state for further manufacture. For example, flour milling and sugar refining preserve the commodity in 'near fresh' form; for example, bottling canning and freezing of fruits and vegetables.

Consumer oriented industries - this industry manufactures more highly processed convenience foods. For e.g., Breakfast cereals, biscuits, chocolates and sugar confectionary and typically use output from the agriculturally oriented industries as inputs.

3.5 STRUCTURE OF FOOD PROCESSING INDUSTRY IN INDIA

The most important characteristics of Indian food processing industry is its dualism, simultaneous existence of large scale modern and a small scale traditional unorganised sector. The organised sector comprises "Directory manufacturing establishments" that employ ten or more workers and use power and those that employ 20 or more workers without using power. The organised sector is one that is incorporated with the government and follows its rules and regulations. In this sector the employment terms are fixed and regular and employees get assured work. On the contrary unorganised sector is not incorporated with the government, and thus no rules are required to be followed. In unorganised sector the employment terms are not fixed and regular as well as the enterprises are not registered with the government.

On the whole the importance of food processing industry can be seen from the fact that both the organised and the unorganised segments of this sector contributes the same level of output as well as the same level of employment in the total manufacturing sector. The major constraint for the growth of Indian food processing industry is the presence of large number of industries in this type of unorganised sector. The unorganised sector is largely engaged in manufacturing of traditional products like pickle, ghee and sweetmeats for domestic markets, while the organised sector manufactures jams, jellies, pulps, juices, milk powder, malted milk, baby foods etc. for the high-end domestic market and export. Processing of fish and meat, milk and fruits and vegetables are largely in the domain of organised sector.

3.6 AREA, PRODUCTION AND PRODUCTIVITY OF TOTAL FRUITS IN INDIA

Fig 3.1: Area, Production and Productivity of Total Fruits in India
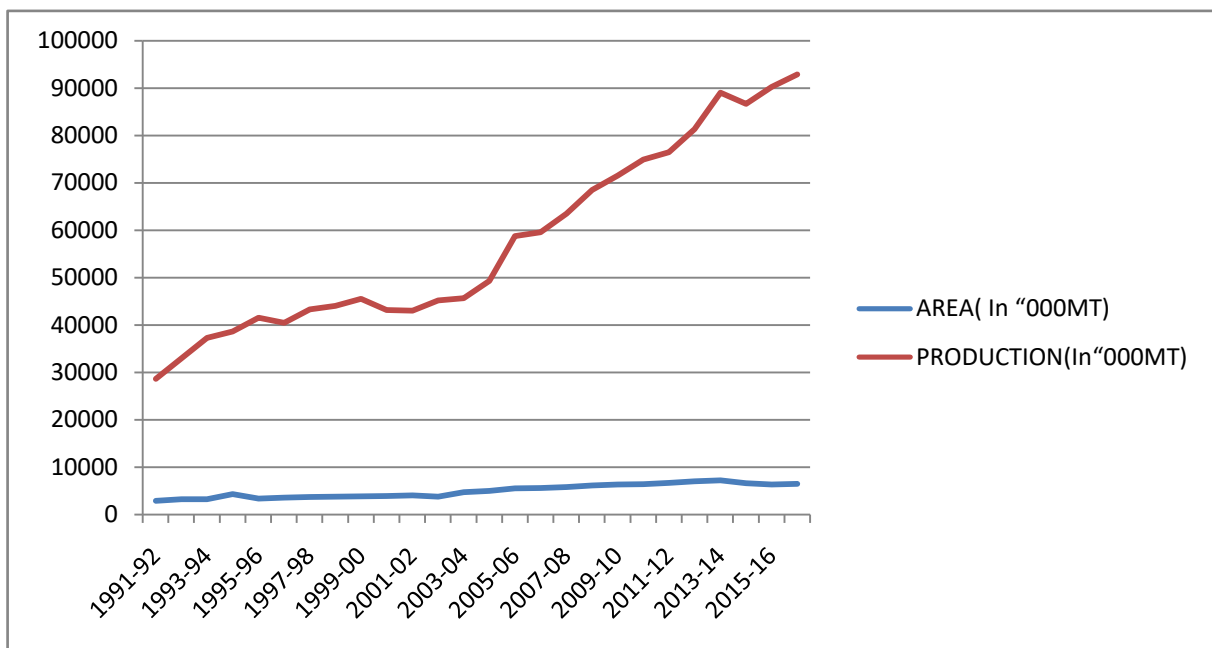
Source: Ministry of Agriculture and Farmers welfare Government of India (Year 1991-92 to 2015-16)

Before discussing the characteristics of food processing industry, first of all we have to consider the present scenario of fruit production in India. The indices the area, production, and productivity has been given in the above diagram. The statistics regarding the area, production and productivity of total fruits in India is maintained by the Ministry of Agriculture and farmers welfare Government of India. The area under fresh fruits in the country increased constantly during the last 20 years. Sudden increment was notices in 1994-95 and also shows a declining tendency during 2014-17. From the production data it can be

noticed that till 2016-17 the production registered constant increase thereafter production seems to be normal in alternative years. The fluctuations in agriculture production, a well-known phenomenon, is dependent on weather conditions and change in acreage under fruits. Productivity also increased. Wide fluctuations are noticed in the productivity during 1994-95, 2003-04 and 2004-05. In the case of 2007-2013 productivity of total fruits fluctuated in a narrow range. As shown in the table, growth rates of production and productivity per hectare have accelerated rather phenomenally.
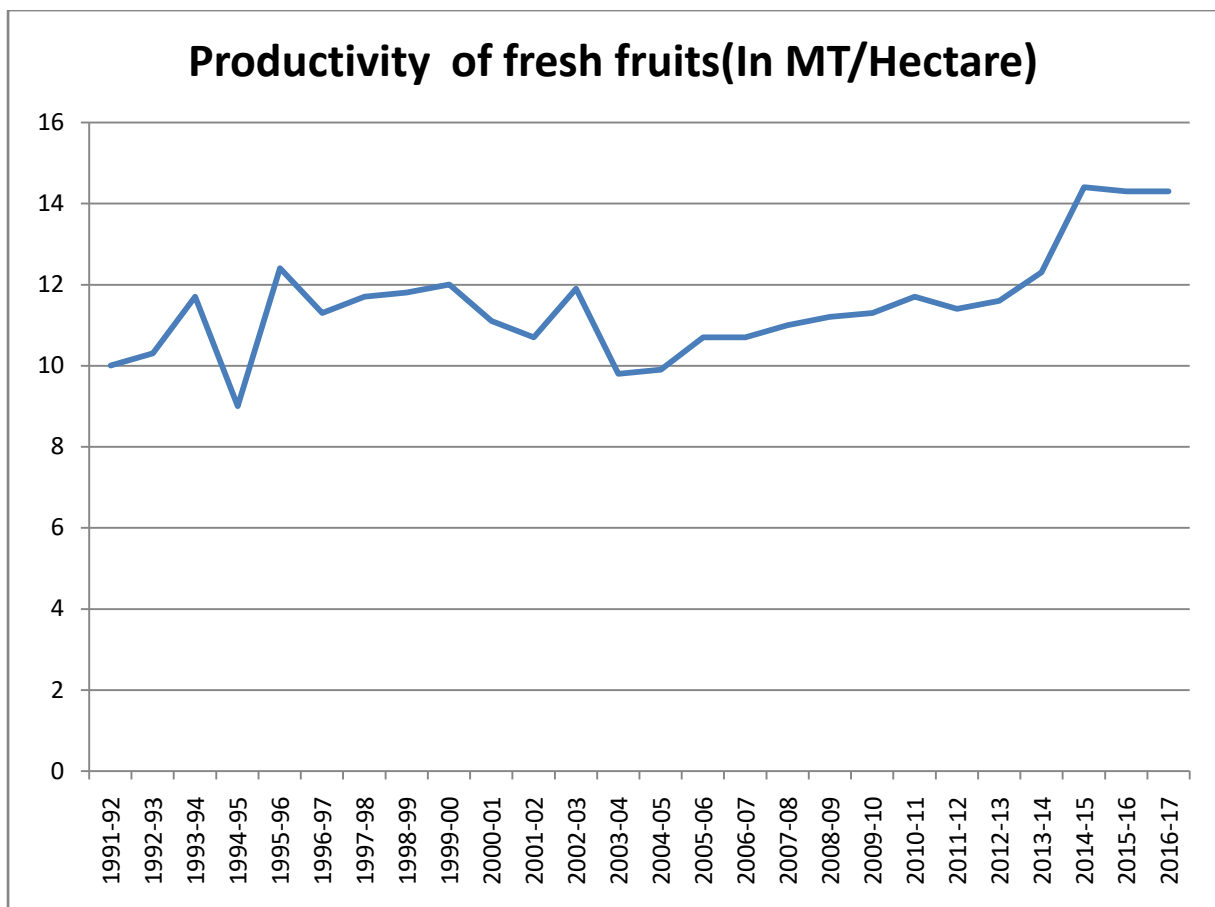
Fig 3.2: Productivity of Fresh Fruits

Source: Ministry of Agriculture and Farmers Welfare, Government of India (year 1991-92 to 2016-17)

3.7 CHARACTERESTICS OF FOOD PROCESSING INDUSTRY IN INDIA

The characterestics of food processing industry is analysed by using the following economic indicators:

- Contribution to Gross Domestic Product
- Employment
- Number of factories
- Fixed Capital
- Foreign Direct Investment
- Export
- Import
- Gross value added

Secondary data Sources: Secondary data, an integral part of the study, has collected from different sources. Secondary data on foreign direct investment inflow, contribution of food processing industry to GDP, export of processed food number of registered food processing units is collected from the various departmental sources.

The following are secondary sources of information used in the research.

a) Department of Industrial Policy and Promotion

b) RBI reports

c) MOFPI Reports

d) Reports of Government of India Planning Commission

e) National Account Statistics

f) ASI Reports

g) DGCI&S Kolkata

3.7.1 Food Processing Industry And GDP

Fig 3.3: Food Processing Industry and GDP
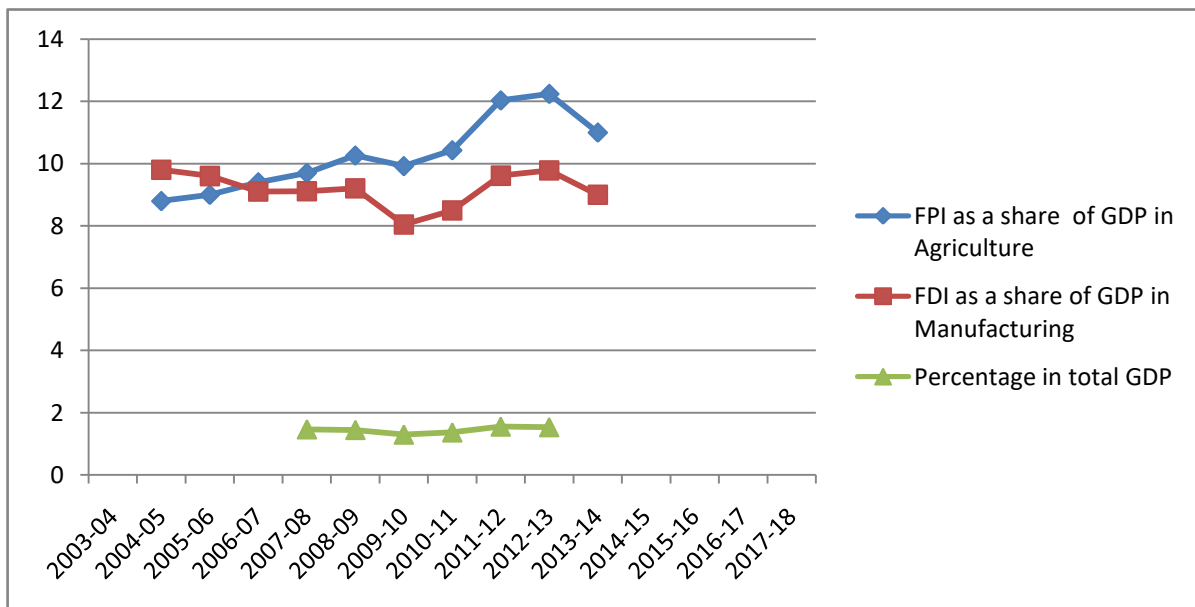
Source: National Account Statistics (year 2003-04 to 2017-18)

We observe from the figure (figure 3.3) that contribution of food processing industry to Gross Domestic Product as in agriculture and manufacturing. Food Processing Industry as a share of GDP in agriculture is slightly higher than its share of GDP in manufacturing in the last seven years. The percentage share of Food Processing Industry to total GDP is always less than 2 percent in all these years. From the table we can understand that during the period 2004-05 to 2014-15, the year 2012-13 produces highest contribution to GDP in agriculture as well as in Manufacturing. The share of Food Processing Industry to total GDP in that year is 1.67 per cent. During the last twelve years from 2004 to 2015 the percentage share of food processing industries to the total GDP is almost constant and it is less than two percentage per annum.

3.7.2 Employment

The following diagram shows the details about the number of persons engaged in food processing sector from 2004-05 to 2014-15. The unorganised segment dominates the food processing sector in terms of number of enterprises and employment, whereas the organized segment produces the maximum share of output. It can be observed from the table, the share of food processing Industry the organize manufacturing in respect of number of workers and total employees showed a rise till 2012 and a decline in its share in continuous two years 2012-13 and 2013-14. In the year 2014-15, there has an improvement in its share. The emphasis on the value addition for agro products and incentive policy framework done by MOFPI might have been responsible for this recovery. Demand side factors are also important. From the data published by the ASI we can observed a large disparity between the share of food processing sector in total wages and salaries and the number of total work force in this sector. This wide gap indicates the quality of employment in this sector in our country may be low.

Another feature we can observed that the number of persons employed in Food Processing Industry shows a distribution unrelated with either the output or the number of plants. The tea, coffee and others emerged as a predominant sector and is followed by Grain, Sugar Oils and Fat and Dairy. These five sectors account for 79 percent of the total labour force employed in food processing industry and this traditional sector continue to dominate this industry. The number of persons per rupees lakh of value of output reveals that food processing industry as a whole employs 9 persons per lakh of output against 7 for all industries. In the case of traditional sectors two sectors Tea, Coffee and others and Sugar employ higher number of persons while Oils and Fats and Dairy Sectors employ very low

number of persons per unit of output. Four among the emerging sector namely Fruits and Vegetables, Bakery confectionary and fish employ a greater number of persons per lakh rupees worth of output than the average number of persons per lakh rupees worth of output than the average of food processing industry. This can be considered the most labour-intensive subsector. The low number of persons engaged in most of the emerging sectors is because of the   high value of commodities they are producing and the level of technology involved. The structure of employment in the unorganized segment presents a slightly different picture. Grain mill products providing bulk of employment. While the cocoa, sugar and confectionery, bakery products and meat products employ many people in the urban area, grain mill products, macaroni, noodles and other food products predominate employment in the unorganized segment in food processing of rural area.

Fig 3.4: Annual Growth Rate of Employment in Food Processing Industry
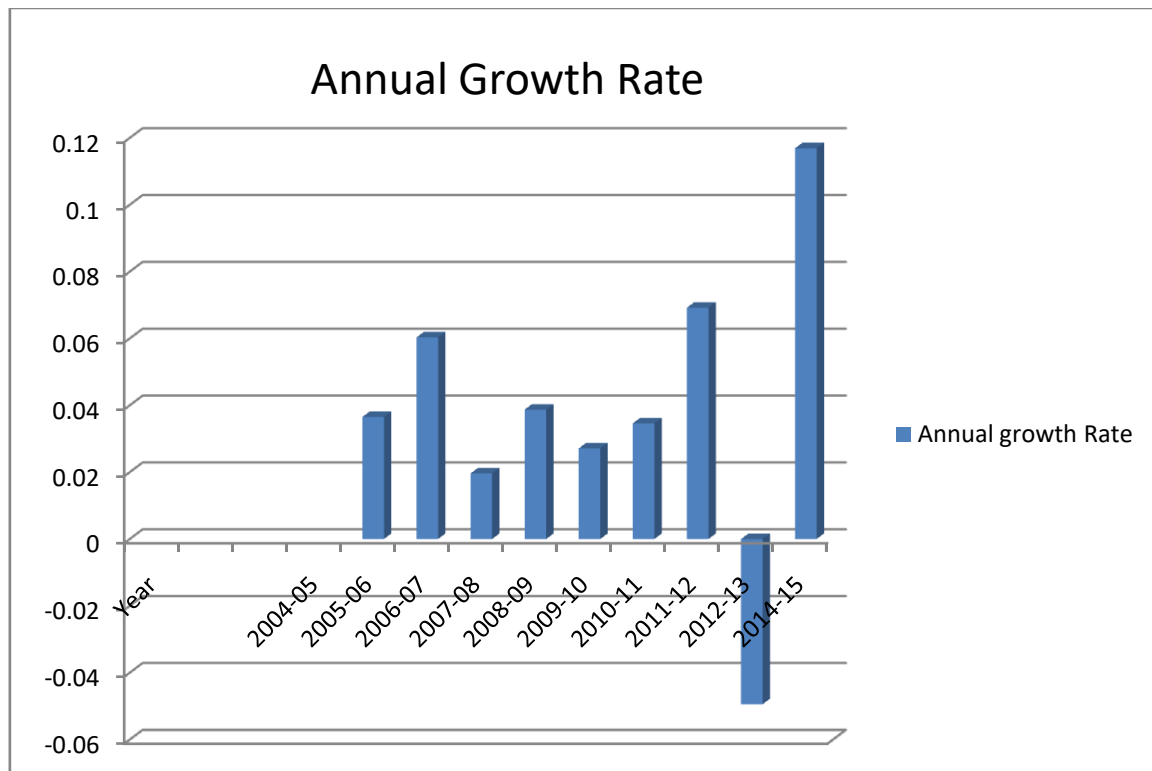
Source: Annual Growth Rate calculated using employment data from issues of Annual Surveys of Industries, MOFPI (year 2004-05 to 2014-15)

51

3.7.3   Number of Registered Food Processing Units in Kerala

Fig. 3.5 Number of Registered Food Processing Units in Kerala
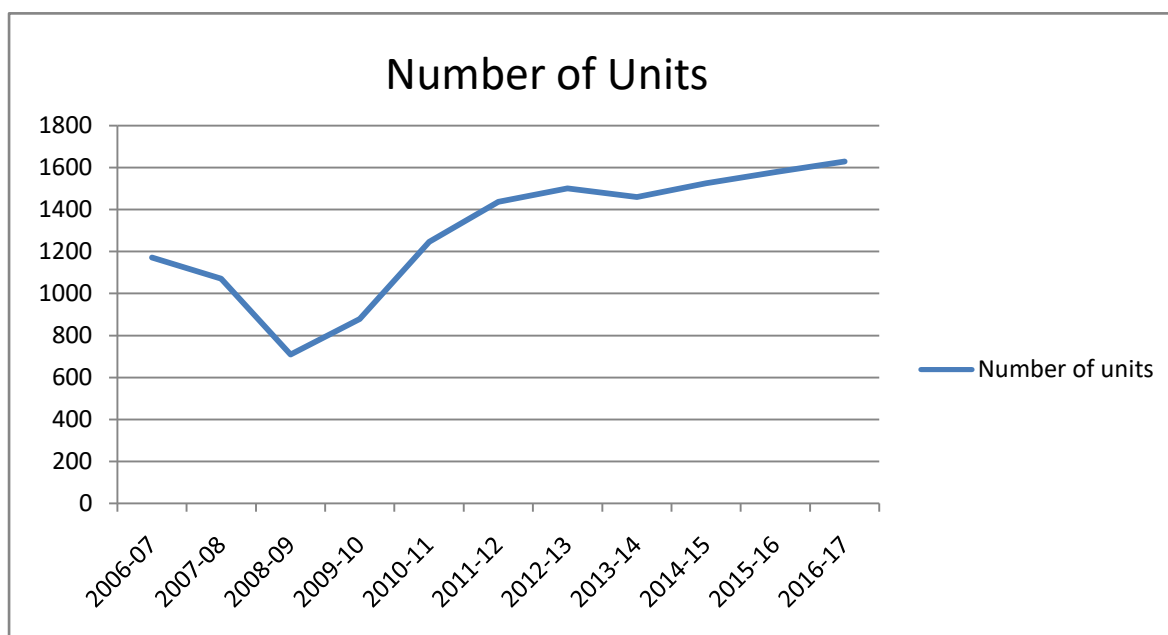
Source: Compiled from reports of Annual Survey of Industries and Economic Review

(year 2006-07 to 2016-17)

India's food processing industry is highly fragmented and is dominated by the unorganised sector in terms of number of manufacturing units and workers engaged but not in terms of output and capital. During the period 2014-15 the estimated number of registered enterprises in India is 38608 hence the number of unincorporated enterprises in the same time period is 2241192 in India. In the case of Kerala, the number of registered food processing units is 1525 and the number of unincorporated enterprises is 64223 in 2014-15. [Source; NSSO Report No.582 (73/2.34/2) on 73rd round July 2015-June 2016: Economic characteristics of unincorporated non agricultural enterprises excluding construction in India]. This is evident that the grain industry emerged to be the major sector with 50.3 per cent of the total and is followed by tea and coffee and others. The five 'traditional sectors', tea & coffee, grain, sugar, oils & fat and dairy account for 83.2 per cent of the total number of plants.

3.7.4 Total Fixed capital in Registered Food Processing Units and its Growth Rate

Fig 3.6: Total Fixed capital in Registered Food Processing Units and its Growth Rate
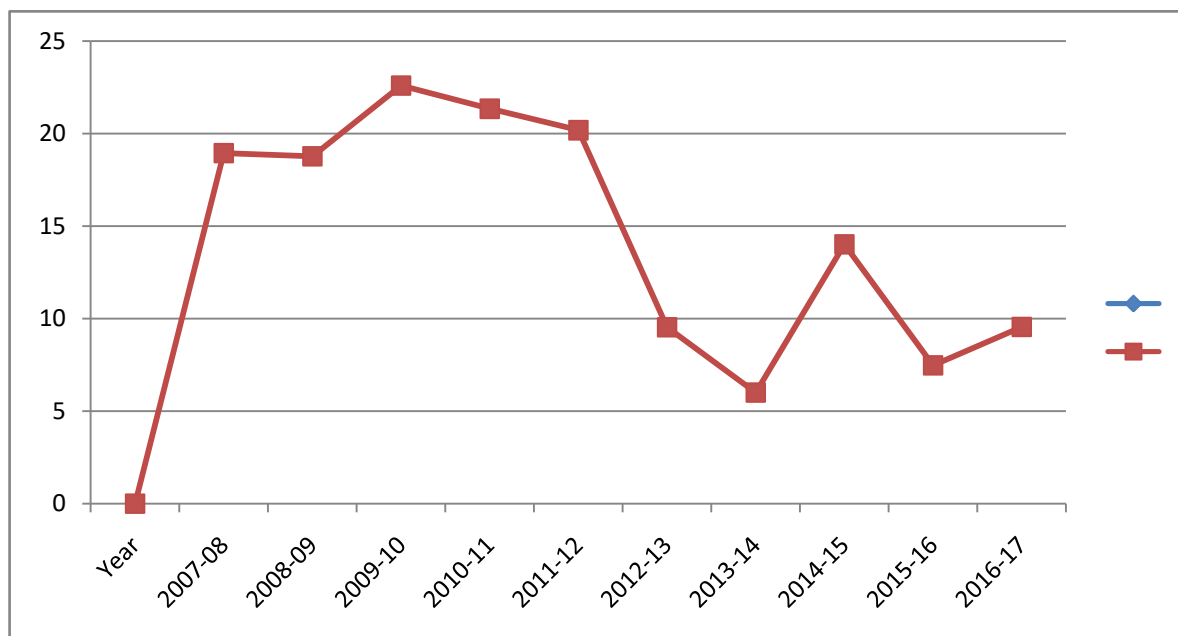
Source: Compiled from MOFPI Reports

Growth of food processing sector depends on capital investment and technological change. The table A.3.5 shows the amount of fixed capital in registered food processing units from 2007 to 2017. The calculated growth rate has been shown in the last row of the table. Till 2011 to 2012 the fixed capital input in the fixed manufacturing sector increased at a steeper rate but after that it shows declining trend. With the increasing price of the capital goods overtime this would make the industries with relatively greater investment in recent years appear relatively more capital intensive. The variation in fixed capital the production tool across food processing industry was also examined. Bulk of the investment has remained concentrated among the traditional sector in the sugar industry, oil and fat and grain milling industries. The traditional sector is predominantly labour intensive while the emerging sectors are capital intensive. Among the emerging sectors beverages, soft drinks, syrups have emerged as the most capital-intensive sector and has also grown faster in terms of the number of factories. There is a noticeable trend in the case dairy industry, the fixed capital is also higher. The paradox of Indian manufacturing is that a labour rich, capital poor economy using too little of the former and using the latter very inefficiently. This paradoxical nature is

observable in food processing industry also. The generation and availability of food processing technology plays an important role in enhancing the capital efficiency.

3.7.5 Foreign Direct Investment in Food Processing Industry

Fig 3.7 Foreign Direct Investment in Food Processing Industry
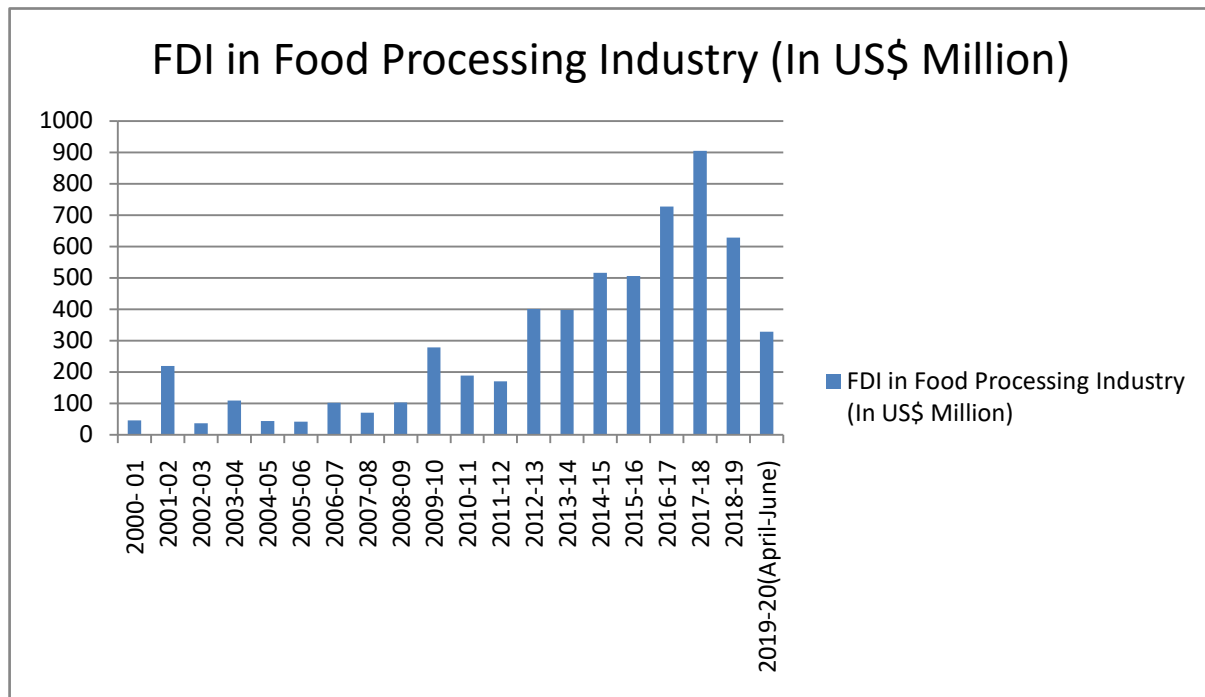
FDI in Food Processing Industry (In US$ Million)

Source: RBI Report, MOFPI Report, Department of Industrial Policy and Promotion, Department for Promotion of Industry and International Trade (year 2000-01 to 2018-19)

Foreign Direct Investments are considered to be an important fuel for every country's economic engine. Table A 3.6 shows the inflow of foreign direct investment towards food processing industry in US$. In India consumers are paying high price for processed end food product because of inefficiency of the industry. The cash and carry operation of Food Processing Industry in the retail sector has been improving the supply chain efficiency and thereby reducing the price of the products. The result of the study conducted by the Indian council for research on international economic relations (ICRIER) revealed that the prices of certain food products have reduced after the FDI in retailer sector. FDI in retail will further help companies in developing countries to export to the world. It is expected that FDI in retailing will also be permit to displace the complexion of the food and agriculture-based industry in India and a dramatical change in international market. Several studies also suggest that the opening of the retail sector to foreign direct investment may facilitate productivity growth in upstream manufacturing. Food Processing Industry in Indian Economy faces a

huge challenge to increase the processing of the perishables in order to realize the great potential of our agricultural resources to provide sufficient growth to global trade by adding increased value of the end products. Ministry of food processing industry has drawn up an agenda in the form of a document Vision 2015 which would mean tripling the size of the food processing industry from the current level. This will happen if we see huge investment in the industry and that can happen only if there is increased flow of FDI.

The table (table 3:12) shows the Foreign Direct Investment inflow to food processing industry in rupees. It is encouraging to note that the food processing sector is one of the sectors attracting a considerable share in FDI. The inflow of FDI has increased from Rs.198.13 crore in 2000-01 to Rs. 3159.36 crores in 2014-15. The development of Mega Food Park, Food Parks, Cold Chain etc. would surely help in attracting higher FDI for the sector. But the flow of FDI in the sector is still extremely small in comparison with the requirement. The FDI is an important source of fund, technology and management which would bring in efficiency in the food processing sector.

3.7.6 Export of Fresh and Processed Fruits and Vegetables From India

India is the second largest producer of fruits followed by China. All fruits are not consumed in our country. Excess production of fruits opens a door to international trade. The export of fresh fruits and vegetables and processed fruits and vegetable products from India is presented in table A 3. 7. The export data shows fluctuations in the case of fresh products as well as processed products. These fluctuations in export are attributed to the changing situation in the international market and buying mood of the importing country. The total value of export has increased from Rs.517639.48 lakh in 2006-07 to Rs.1414449.56 lakh in 2014-15. The strength of this sector lies in mango fruit only. Other fruits which attained significant position in exports are banana and grapes. Fruit juices and pulps followed by pickles and chutneys dominated the export list. The international trade in preserved fruits consist a largely of juices, nectars, juice concentrates, canned pineapple and canned pulps. India's major export destinations of fruits and processed fruits are Europe, middle east Japan, USA. There is vast scope for production and export of processed products with respect to tropical fruit juices pulps and their concentrates based on other fruits and vegetables like guava, pineapple and Bangalore grapes etc.

Fig 3.8: Export of Processed Food and Related Commodities

EXPORT OF PROCESSED FOOD AND RELATED COMMODITIES
EXPORT US$ Million
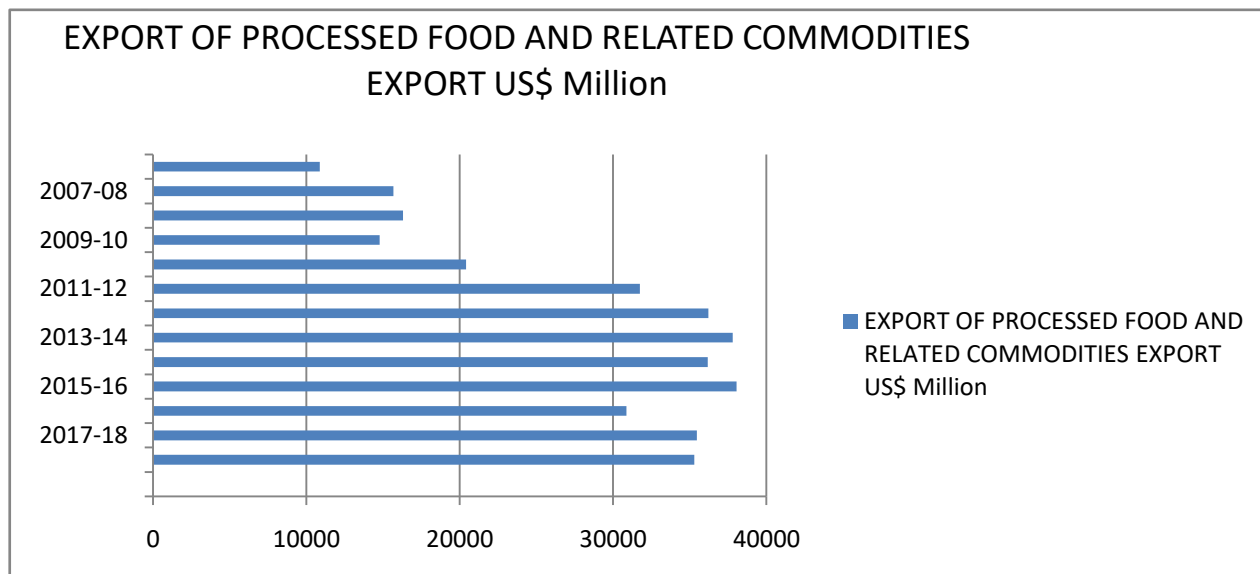
Source: Agricultural and Processed Food Export Development Authority (APEDA) (year 2007-08 to 2017-18)

Food export forms a sizeable part of the country's international trade though significant volume of food is also imported. The export of processed food and related commodities from India is presented in Table 8. The export of all food products taken together increased from US$ 10883.23 in 2006-07 to US$ 35302.46 in 2018-19. Tea, coffee, mate and spices have long been the most buoyant among Indian export lines. This trend continues today also. There has an increasing trend in export of both marine products and meat established product and occupies the second and third position in terms of quality and value. Beverages, spirits and vinegar and products of the milling industry, Malt starches, Insulin wheat gluten has the lowest position in export basket. The export of agricultural and processed food products in India are handled by two apex level bodies namely Agricultural and Processed Food Export Development Authority (APEDA) and the Marine products export development authority (MPEDA). These organisations provide various services to trade and industry. These include identification of new markets regular participation in both national and international trade fairs and also vigorous launching of promotional campaigns for processed food products.

Fig 3:9: Pattern of Processed Food Trade

Chart 1: Pattern of Processed Food Trade
(average percentage share 2016-18)

Others 13
Cocoa, Chocolate *etc* 6
Sugar 3
Bakery products 4
Prepared Animal Feed 3
Starches 2
Grain Mill Products 5
Dairy Products 10
Vegetable and Animal Oils and Fats 14
Fruit 9
Fish and Fish Products 13
Meat and Meat Products 18
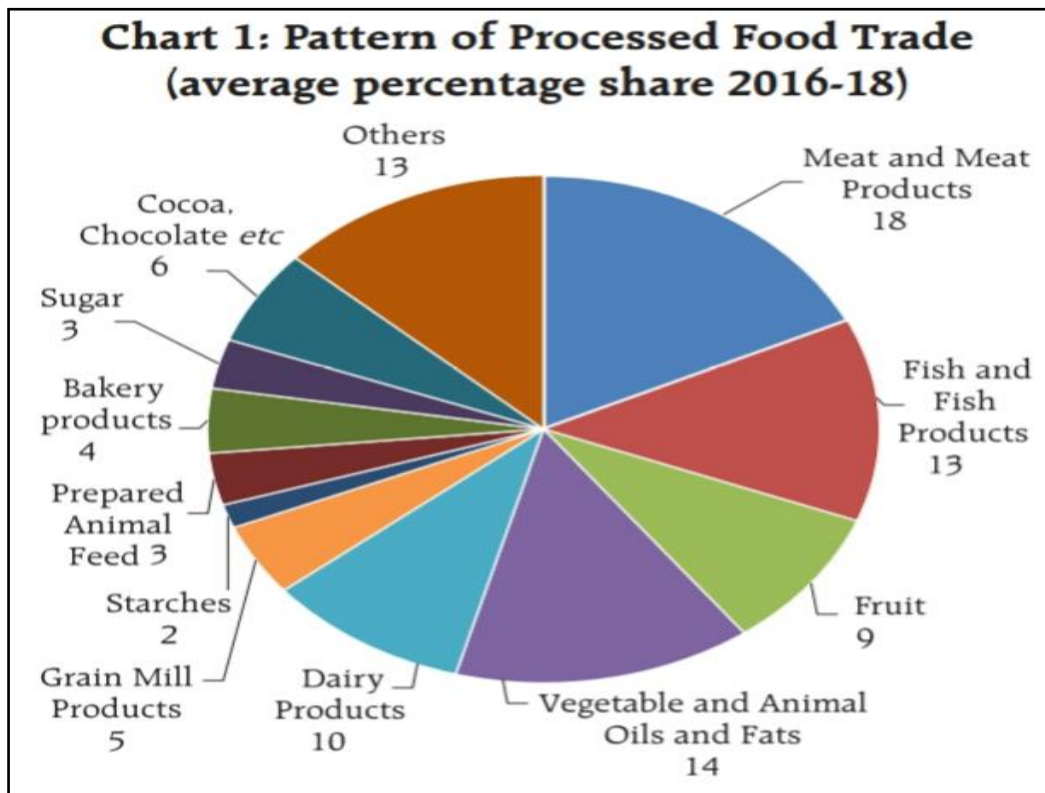
Source: DGCI&S, Kolkata

3.7.7 India's Import of Food Products

Fig 3 :10: India's Import of Food Products [Value in US$ Million]

Amount of Import
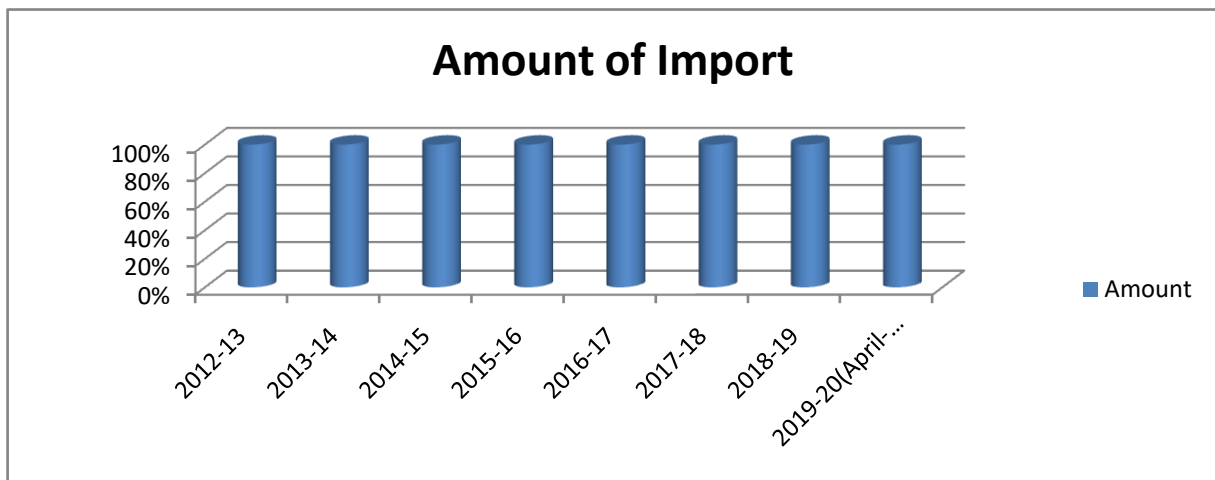
Source: Department of Commerce Reports (year 2012-13 to 2019-20)

Food export forms a sizeable chunk of the country's international trade though significant volume of food is also imported. Food imports constitute only 5 to 6 percent of our total imports. Amongst the imported foods worth US$ 19323.03 million, animal or vegetable fats and oils and their cleavage products, pre-edible fats, animal or vegetable waxes occupies the top position in import basket. Edible fruits and nuts, peel or citrus fruit or melons, edible vegetables and certain roots and tubers has also imported. Imported branded foods include snacks chocolate products, biscuits, cookies, dairy products fruit and vegetable products, sauces, flavoured tea, meat and fish products sourced from 30 different countries. There are reported to be about 553 registered importers, linked to agents, distributors, sub dea lers and retailers involved in marketing over 150 types of imported food products.

3.7.8 GROSS VALUE ADDED BY FOOD PROCESSING INDUSTRIES

Gross Value Added (GVA) measures the contribution of each sector of industry to the total economy. It measures the productivity of the economy and is a headline measure used to monitor economic performance. Value addition by food processing industries has change only at a very slight rate during the period under reference. During the last 3 years, the rate of growth in GVA by food processing sector has increased but analysis of different sub periods depicts a different picture as they exhibited a fluctuating trend. During 2015-16 GVA by food processing sector increased by 20.25 per cent per annum. During 2012-13 GVA by food processing sector declined sharply and reached worst position with negative trend at 11.72 percent. The contribution of food processing industries in total manufacturing in terms of gross value added declined from 10.42 percent in 2011-12 to 7.94 in 2014-15, but increased marginally to 8.33 percent in 2017-18. However, the contribution of food processing industries in agriculture, forestry and fishing increased from 9.78 percent in 2011-12 to 10.66 percent in 2017-18.

3.8 CONCLUSION

From the above discussion we can conclude that Indian Food Processing Industry is undergoing rapid transformation. On the supply side vast arable land and diversified agro climatic conditions, India has potential to be a food basket of the world. Processing would take care of seasonal supply and fluctuating demand of agriculture produce. It also stressed on the fact that the progress of the industry towards value addition can reduce post harvest wastage in agriculture sector and use of the seasonal surplus in a productive way. As the number of food processing industry increases it has the ability to impact a large number of

people by providing employment opportunities and increasing their income. There is a high potential demand in the export market. This sector has been given priority by the government of India and made several steps to uplift this sector by allowing 100 percent foreign direct investment. The study stressed on the fact that food processing industry is important to the nation as well as the uplifting of agriculture.

With the above detailed description, we can say that food processing sector has the potential to be the driver of economic growth and enhance rural incomes. It shows the need to study the extensive forward linkage effect of this industry in our economy. This study focuses on the importance of food processing industry from the angle of inter industry linkage perspectives. The sectoral inter dependence of food processing industry reveals the importance of this industry. The structural interdependence between various sectors has provided an analytical case to the understanding of the backward and forward linkage of the industry and it is the first step to identify the key sectors and its linkages. The underlying logic is that some sectors with powerful linkages with other sector stimulate growth of other sectors. Therefore, the next chapter provides a snapshot picture of inter dependence by measuring Hirschman's backward and forward linkage effect with make use of Leontief Input Output System.

CHAPTER 4
LINKAGE EFFECT: FORWARD AND BACKWARD LINKAGE ANALYSIS OF FOOD PROCESSING INDUSTRY

Input Output Transaction Table

Linkage Effect : Measurement Methodology

Linkage Effect of Food Processing Industry

Linkage Coefficient

Sector wise Classification of Linkage Effect of Food Processing Industry

Agricultural Inputs Used by Food Processing Industry

Classification of Forward and Backward Linkage Results

Top Sectors with HIGH Linkage Effects

4.1 INTRODUCTION

At present food Producing Industry constitutes a significant component of the county's industrial land space. The food processing industry is the vital link between the core sectors of the economy, viz, agriculture and industry. The growth of food processing industry is likely to accelerate agricultural growth through diversification and commercialisation of agriculture and also create new direct avenues of income and employment for rural people. Study of the backward and forward linkages of food processing industry will help for the up-scaling of food processing industry. It will give considerable scope not only to strengthen the synergy between agriculture and industry but also to arrest the fall in agriculture growth within the country.

The structural interdependence between various sectors has provided an analytical case to the understanding of the backward and forwarded linkage of the industry for that the first step to identify the key sectors and its linkages. The underlying logic is that some sectors with powerful linkage with other sector stimulate growth of other sectors.

The most common approach towards the measurement of linkages makes use of the Leontief Input Output System as an empirical tool. Input Output analysis is a form of macroeconomic analysis based on the interdependencies between economic sectors or industries. The Input Output Transaction Table [IOTT] given the inter-industry transactions in value terms. It provides a snapshot pictures of interdependencies between the input output table national and regional levels in showing Hirschman's backward and forward linkages of the economy.

Production activity of each sector demands input supplied from a large of production activities giving rise to interdependence of production activities. A sector linked with other sectors which supply inputs to it and also with those which use its output as their own inputs. Any increase in production in a sector induces a large demand for inputs from its input supplying sectors and also enables it to provide large input supply to other producing sectors. The former type of inter– linkages is called backward linkage the latter, forward linkage.

In this chapter the task is to estimate forward and backward linkages of the food processing industry and compare its performance of ten years.

In the case of food processing industry, it is quite possible that some sector might undertake secondary processing of already primary processed food commodities whereas the

other food processing industry sector might confine themselves mainly to primary processing of good products. In the case of the former category of food processing industries, they would be relatively less affected by the changes in the output of agricultural commodities. Similarly, the capacity of this type of food processing industries to stimulate growth impulse in the agricultural sector also gets diminished.

Chart 4.1 BACKWARD AND FORWARD LINKAGE OF FPI
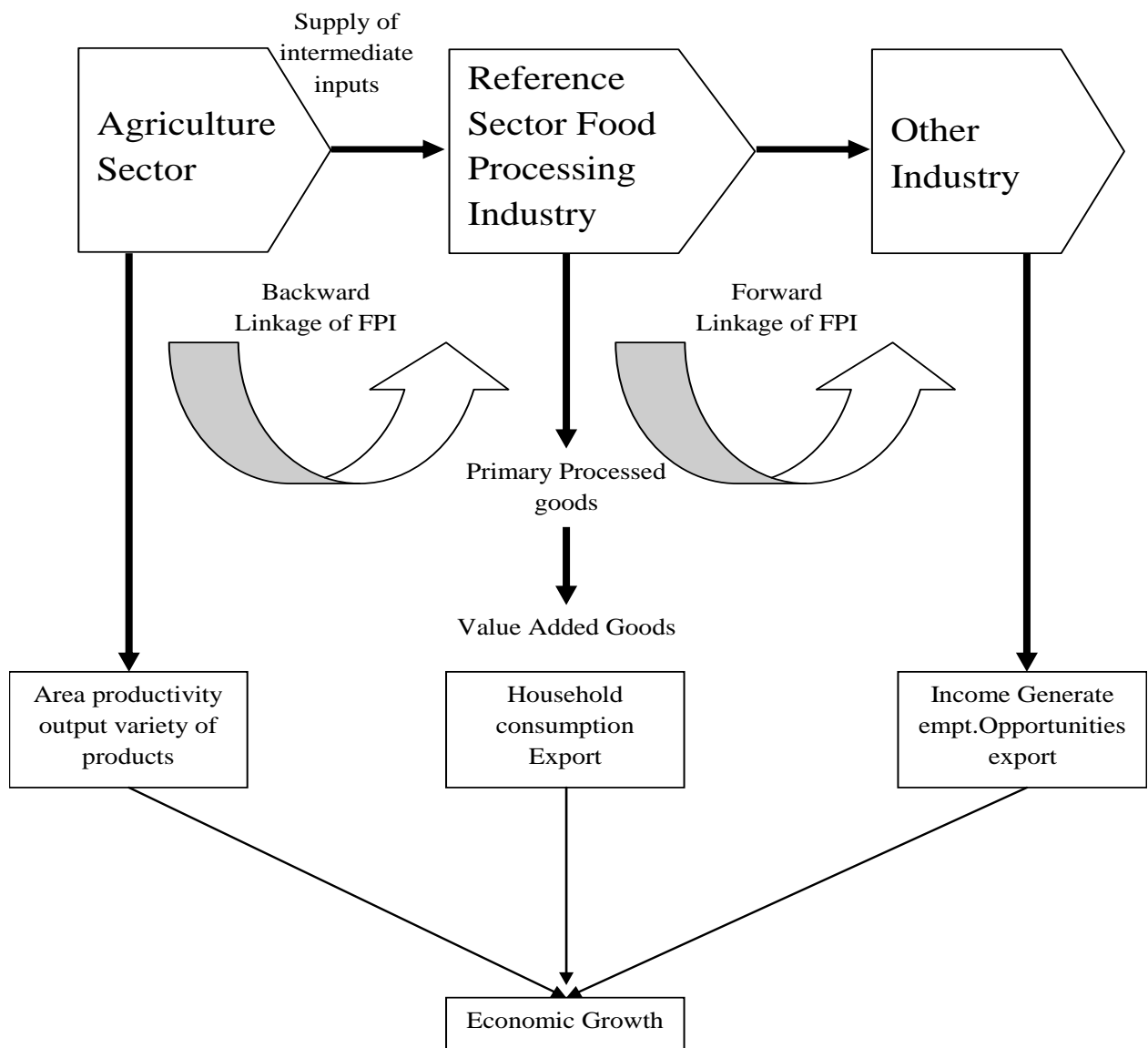
Source : Constructed by the scholar

4.2 BACKGROUND OF INPUT OUTPUT TRANSACTION MATRICS

The first input output transaction table consistent with the National Account Statistics [NAS] related to the year 1968-69 was published for the first time by the Central Statistical Organization [CSO] in the publication 'National Account Statistics 1978'- then IOTT for the year 1978-79, 1983-84, 1989-90, 1993-94, 1998-99, 2003-04 & 2007-08 were published. IOT for the year 1968-69 was published with 60 sectors and subsequently the tables consented of 115 sectors since 1973-74 till 1998-99. The IOT's for 2003-04 and 2007-08 contains 130 sectors and subsectors.

IOTT of India in a 130×130 matrix. Each raw of the matrix shows the deliveries of the total output of the commodities to the different industries for intermediate consumption and final use. The industry columns give the commodity inputs of raw material and services which are used to produce outputs of particular industries. Here the horizontal values represent the amount of goods which goes on different industries and vertical values represent amount of goods used by the industry for its final good production. In terms of input-output table the horizontal values represent forward linkage of a particular commodity while the vertical values represent backward linkages.

In the IOTT the CSO has not published IOTT tables after it published the 2007-08 tables. In a study, "Input Output Table for India 2013-14: Based on the New Series of National Accounts Statistics and Supply and the Use Table" Singh K et.al (2018) attempt to produce a more up-to-date Input Output Table for India based on the Supply and Use Table (SUT) of the economy and the new series of National Accounts Statistics (NAS). 130×130 matrix in the previous IOTT has been collapsed to a 25×25 matrix and they prepared a IOTT for the year 2013-14. The IOTs for 2003-04 and 2013-14 contain the same 130 sectors and same subsectors. Therefore, the comparisons between the tables become easy.

In the IOTT the commodities arranged on the basis of sectors, primary, secondary and tertiary. The first 37 sectors in the sector classification present primary production which include all the agricultural and allied activities, the next 68 sectors relate to manufacturing industries and remaining 25 sectors deals with tertiary activities which include all the services of the economy. Manufacturing sector comprising of 38 to 105 sectors of the IOTT is prepared separately for registered and unregistered manufacturing respectively. Data for registered manufacturing have been obtained from Annual survey of industries whereas the

data for unregistered manufacturing have been taken from survey conducted by NSSO for various years.

In the case of IOTT 2013-14, which include total 25 sectors, the first 6 sectors include the aggregated sectors in the primary production. Next 10 relates to the manufacturing industries and remaining 9 sectors deals with tertiary activities which include all the services of the economy.

In order to examine the backward and forward linkages of food processing industry, in this chapter, a comparative study have been done on the basis of IOTT of 2003-04 & IOTT of 2013-14.

4.3 ITEMS IN INPUT OUTPUT TRANSACTION TABLE

This study concentrates on the items of No:7 in the IOTT 2013-14. The items of section 38 to section 45, in the IOTT 2003-04 collapsed as a single item i.e., No:7. This Section includes the all items of section C, Division 10, Division 11 and Division 12 in 4 digit NIC 2008 Classification in ASI. The following are the different items in Group No:7 in the IOTT 2013-14.

038	Sugar Manufacture and refining of Sugar approach towards
039	Khandsari boora
040	Hydrogenated Oil
041	Edible oils other than vanaspati
042	Tea and Coffee Processing
043	Miscellaneous Food Product
044	Beverages
045	Tobacco Products

Miscellaneous food product includes preservation, processing and canning of meat milk foods and manufacture of dairy products, manufacture of fruit juice, jams, jellies, pickles, and canning and bottling of fruits and vegetables, canning preserving and processing of crustacean and similar foods manufacture of crustacean and similar foods, manufacture of bakery products, production of common salt, manufacture of cocoa, chocolate sugar confectionery and sweet meats, cashew nut, drying shelling, roasting, salting etc. Manufacture of ice preparation cattle, poultry and other animal feeds, starch processed from maize tapioca, tamarind, potato etc. Manufacture of malted foods grinding and processing of spices papads, appalam, egg powder, semi processed foods and instant foods, sago and sago

products, vitaminized high protein flour multipurpose foods, frying of dates, nuts and food residuary snacks other food processing activities.

4.4 Backward and Forward Linkage: Measurement Methodology

(I) The most common approach towards the measurement of linkages makes use of the Leontief's input out system as an empirical tool. Following Chenery and Wantanade (1958) the method estimates the backward linkage of sector j as the proportion of intermediate consumption by that sector to its total output

$$U_{ij} = \frac{\sum_{i=1}^{n} X_{ij}}{X_j}$$

Where X_{ij}'s are deliveries from the ith to the jth sector n is the number of sectors and X_j is the total output of the jth sector. The forward linkage of sector $'i'$ is estimated by computing the ratio of intermediate demand for the output of ith sector (inter industry deliveries) to the total demand for the ith sector

$$U_i = \frac{\sum_{j=1}^{n} X_{ij}}{D_i}$$

These measures are however average measures because they concentrate on the totals of the raw and column elements and do not give the distribution of input deliveries among the sectors.

(II) An alternative method suggested by Rasmussen (1957) considers both the direct and indirect industry floes to define the strength of linkages. This method, makes use of the inverse of the input output coefficient matrix to calculate the linkage effect.

$$Z = (Z_{ij}) = (I - A)^{-1}$$

(III) By taking the averages of the above measures and then relating them to the overall average Rasmussen (1957) derived an index of back ward linkage which is define as

$$U_j = \frac{1/n \; z.j}{1/n^2 \; \varepsilon \; z.j}$$

On the basis of the methodology discussed above, we have estimated the relevant linkage indices by using a Leontief input output system for the FPI. Te measurement of backward linkages as per the any j^{th} sector (L_{Bj}) can be measured as the ratio of purchased

intermediate inputs to total value of production. That is $B_{ij} = \varepsilon_n X_{ij}/X_j$. Here backward linkage of FPI is measured in terms of coefficient. The highest coefficient of given industry gives highest backward linkages. The forward linkage is the output of one industry goes to different industries input. The forward linkage of any i^{th} sector (L_{fi}) can be measured as the ratio of inter industry demand to total demand. That is $L_{fi} = \varepsilon_n X_{ij}/X_i$. It is measured in terms of coefficient. Highest coefficient will give highest forward linkages.

4.5 Backward Linkages of food processing Industry

Food processing industry demanded various industries output as input for the production of its output. That means some industry's forward linkage became the backward linkages of another industry. Here we analyses the backward linkage of food processing industry.

IOTT 2003-2004: The food processing industry has backward linkages from 77 industries. This means 77 industries output is used its input for the production of processed food. The whole economic activity is classified into 130 sections. Out of these 130 sections 77 industries has an interdependence with food processing industry. As the linkage effect increases the growth of those industries also increases. The underlying logic of this approach is that some sectors with powerful linkage with other sectors stimulate growth of other sector also.

The total demand by the food processing industry is the amount equal to 11482747 (Value terms). The largest among this are from fruit, milk and milk products, miscellaneous food products, wheat, land tpt including pipelines according to their ranks. This fruit is the most important key sector of food processing industry as its backward linkage, with the value of 1775303. It also emphasis the importance of fruit as its value addition process

The lowest contributor to the food processing industry is metal & metal products. Iron ore, Khadi, Cotton Textiles Tractors and agri-implements and other electrical machinery. Out of these 77 sectors 39 sectors has both forward and backward linkage effect. 38 sectors in the economy shows interdependence with FPI only as backward linkages.

IOTT 2013-2014: The Food Processing industry has backward linkages from 21 industries. This means 21 industries output is used its input for the production of processed food. The whole economic activity is classified into 130 sectors and merged into 25 sectors.

Out of these 25 sectors, 21industries has a interdependence with food processing industry. As the linkages effect increases the growth of that industries also increases. The underlying logic of this approach is that some sectors with powerful linkages with other sectors stimulate growth of other sectors also.

The total demand by the food processing industry is the amount equal to 8803(value terms in billion). The largest among this are from agriculture sector. This sector become the most important key sector of food processing industry as its backward linkage, with the value of 5359. It also emphasis the importance of agriculture products as its value addition process.

The lowest contributors to the food processing industry are metal and metal products. Out of these 21 sectors, 10 sectors have both forward and backward linkage effect.11 sectors in the economy shows the interdependence with food processing industry only as backward linkages.

4.6 Forward Linkages Food processing industry

Food processing industry supplies its output as the input for the production of outer various industries. That means its forward linkage became the backward linkage of another industry. Here we analyses the various sectors in which has a strong forward linkage from food processing industry.

IOTT 2003-2004: Food processing industry has forward linkages to 65 industries. From this, we can understand that it has a wide forward linkage in the economy. That means food processing industry stimulate the growth of other 65 industries. Out of these 65 industries, 38 industries have forward and backward linkages with FPI.

The total inter industrial use of food processing industry is 2028590. The value of export from food processing industry is 1039350 paddy, poultry & eggs, miscellaneous food products, Beverages, Drugs other chemicals and Tea and Coffee Hotels and Restaurants are the section with which have a strong forward linkage of food processing industry. Within these industries, miscellaneous food products, Hotel and restaurant and Beverage sectors have the largest forward linkage with the value of 867750, 590768 and 283151 respectively.

The lowest forward linkages of food processing industry are with furniture and fixtures, wooden, coal tar products and industrial machinery. Within these industries, coal products process the lowest value.

IOTT 2013-2014: Food processing industry has forward linkages to 10 industries. From this, we can understand that it has a wide forward linkage in the economy. That means food processing industry stimulate the growth of other 10 industries. The total inter industrial use of food processing industry is 1916 (value in billion). Paddy, Poultry, and eggs, miscellaneous food products, beverages, drugs other chemicals and tea and coffee, hotels and restaurants are the sectors which have a strong forward linkages of food processing industry. Within these industries, miscellaneous food products, hotels and restaurants and beverages sectors have the largest forward linkage.

The lowest forward linkage of food processing industry, are with furniture and fixtures, wooden, coal tar products, and industrial machinery. Within these industries, coal products pose the lowest value.

4.7 Leontief's Technical Coefficient

The method estimates the backward linkages of sector '*j*' as the proportion of intermediate consumption by that sector to its total output.

$$U_{ij} = \frac{\sum_{i=1}^{n} X_{ij}}{X_j}$$

Where X_{ij} are the deliveries from the ith to the jth sector

n is the number of sectors

X_j is the total output of the jth sector.

The forward linkage of sector '*i*' is estimated by computing the ratio of intermediate demand for the output of ith sector (inter industry deliveries) to the total demand for the ith sector

$$U_i = \frac{\sum_{j=1}^{n} X_{ij}}{D_i}$$

X_{ij} : deliveries from the ith to the jth sector

D_i : total demand for i^{th} sector

4.8 BACKWARD LINKAGE COEFFICIENTS: IOTT 2003 – 2004

The backward linkage captures the proportion of other industry output that goes as input into food processing industry. Now let us look at the coefficient of backward linkage of food processing industry i.e., the proportion of output of other industry that goes as input of food processing industry. This study calculated the linkage coefficient for the eight industries that belongs to food processing industry separately in the IOTT 2003-04.

Table 4.1 Backward Linkage Coefficients: IOTT 2003 – 2004

SI. NO.	No. of Industry in IOTT	Different Food Processing Industries	Backward Linkage Coefficient
1	38	Sugar	$U_{ij} = .827620$
2	39	Khandsari, boora	$U_{ij} = .850058$
3	40	Hydrogenated oil	$U_{ij} = .836156$
4	41	Edible Oil	$U_{ij} = .816211$
5	42	Tea and Coffee	$U_{ij} = .839319$
6	43	Miscellaneous food products	$U_{ij} = .879077$
7	44	Beverages'	$U_{ij} = .661268$
8	45	Tobacco products.	$U_{ij} = .505095$

Source : Calculated by the Scholar

The food processing industry as a whole has the direct backward production linkage with 96 industries. It is much higher because it includes the 74 percent of total industries. Among these 96 industries, 31 belongs to agriculture sector, 47 belongs to secondary sector and 18 belongs to tertiary sector. In value terms, more than half of all food processing industry, input originates from agriculture sector itself. It goes to show that among the 31 agricultural sectors with which food processing industry has direct backward linkage effect, sugarcane, Oilseeds, fruit, milk and milk products comes on the top. This exhibits the role of these agricultural sectors in value addition of the economy

Another important aspect is that, among the eight subgroups of food processing industry, the industries which have the highest backward linkage effect are miscellaneous food products, Beverages and sugar.

There is another important element to understand in the calculation of these backward linkages with respect to these certain sectors. In the case of number of total backward linkages of 130 industries in 1OTT, food processing industry occupies the fourth position.

4.9 Forward Linkage Coefficient: IOTT 2003-04

The forward linkage captures the proportion of food processing industry output that goes as input into other sectors of the economy. Now let us look at the coefficient of forward linkages of section of food processing industry separately.

Table 4.2 Forward Linkage Coefficient: IOTT 2003-04

SI. NO.	No. of Industry in IOTT	Name of the Industry	Forward Linkage Coefficient
1	38	Sugar	$U_i = .228341$
2	39	Khandsari, boora	$U_i = .532061$
3	40	Hydrogenated oil	$U_i = .226878$
4	41	Edible Oil	$U_i = .357927$
5	42	Tea and Coffee	$U_i = .186531$
6	43	Miscellaneous food products	$U_i = .146866$
7	44	Beverages'	$U_i = .167640$
8	45	Tobacco products.	$U_i = .092791$

Source : Calculated by the Scholar

The food processing industry as a whole has the direct forward linkage with 71 industries in the economy. As the case of backward linkage, a similar phenomenon can be seen in the case of forward linkage of miscellaneous food industry.

Among the eight subgroups of food processing industry the miscellaneous food processing industry has highest forward linkage effect. Another important aspect is that, highest forward linkage effect with miscellaneous food products, Beverages Drugs and Hotels.

The important element is that these four sectors in the food processing industry uses the output of other food industries and create more and more value addition. Its intra industry use in relatively substantial strongest and fully intra industry trade dominated industry groups is miscellaneous food processing industry which uses more than half of all output as input within the industry itself.

However, the fact is that an overwhelming share of food processing industry output is used in inter industry trade within from khandsari, boora industry. In fact, most of the food processing industry output goes into the final consumption basket.

4.10 BACKWARD LINKAGE COEFFICIENTS: IOTT 2013-14

In the case of IOTT 2013-14, we concentrate on the item No:7, the items of section 38 to section 45 in the IOTT 2003-04 collapsed as a single item No: 7. The backward linkage coefficient of manufacturing food and beverage and tobacco is U_{ij} = 0.807911. The food processing industry as a whole has direct backward production linkage with 21 industries (out of total 25 industries in IOTT 2013-14). It is much higher because it covers 84 percent of total industries.

Another important aspect is that more than half of all FPI inputs, in value terms, originates from agriculture sector itself. That means the food processing industry has highest backward linkage with agriculture with the value of 5359 billion. That is 60 percent of its total inputs.

There is another important element to understand in the calculation of the backward linkages with respect to this sector. In the case of gross value food processing industry added 2590 billion rupees. GVA is one among the most important indicators of financial health of enterprises. GVA per enterprises shows the productivity of the enterprises.

4.11 THE FORWARD LINKAGE COEFFICIENT: IOTT 2013-14

Forward Linkage captures the proportion of food processing industry output that goes as input into other sectors of the economy. The forward linkage coefficient of manufacturing of food, beverage and tobacco is U_i = .175844. The food processing industry has the direct forward linkage with ten industries. However, the fact is that an over whelming share of food processing industry output is used in inter industry trade worth Rs 1916 value in billion. In fact, the total final demand for the food processing industry is much greater than inter industrial use.

4.12 The Classification of Forward and Backward Linkages Results

On the basis of linkage coefficient value, we can classify each sector into different four groups.

Table 4.3 The interpretation of Linkage coefficient

Sectors	Backward Linkage	Forward Linkage
Weak linkage sector	Low (<1)	Low (<1)
Strong forward linkage sector	Low (<1)	High (>1)
Strong backward linkage sector	High (>1)	Low (<1)
Key sector	High (>1)	High (>1)

.

Weak Linkage Sectors or generally Independent Section: These are not strongly connected to other industries both along their input demand and output supply chains, and thus have both relative backward and forward linkages less than 1.

Strong Backward Linkage Sector: Backward oriented sectors or sectors 'dependent on inter industry supply': These are the sectors with relative backward linkages greater than the economy wide average of the corresponding backward linkages to all sectors, and with the reverse situation holding for their relative forward linkages.

Strong Forward Linkage Sectors: Forward oriented sectors or sectors "dependent on inter industry demand" (F). These are the sectors with relative forward linkage greater than the corresponding economy wide average of the forward linkage of all sectors and with the reverse situation holding for their relative backward linkages,

Key Sectors: Leading Sectors or generally dependent sectors: These are strongly connected to other industries both along their input demand and output supply chains and thus have both relative backward and forward linkages greater than 1.

STANTERDISATION

In order to interpret the value of technical coefficient we have done standardization procedure.

$$Z = \frac{x_j - a_{ij}}{\sigma a_j}$$

x_j = Technical Coefficient

a_{ij} = Mean of technical coefficient

σa_j = std. deviation of technical coefficient

.

The standardized value of backward coefficient values in both tables [IOTT 2003 and IOTT 2013-2014] are .8. That is nearest to one. Therefore, we can say that the Food Processing Industry is a strong backward linkage sector or backward oriented sectors or section dependent on their industry supply. We already found that food processing industry has highest backward linkage with agriculture. More than 60% of its total input comes from agriculture sector. Therefore, in order to arrest the fall in agriculture sector, acceleration of food processing industry is very useful.

4:13 INPUTS REQUIREMENTS

The table A: 4.1 in Appendix shows the technical coefficient value of input coefficient. They indicate which intermediate supplies from sectors *i* as necessary to produce one unit of output in sector *j*. The technical coefficients $a_{ij} = \dfrac{x_{ij}}{x_j} \leq a_{ij} < 1$ also known as structural coefficients. After calculating these coefficients we are in a position to write the inter sectoral input output transaction of food processing industry in the form of equation as follows:

Input coefficients they indicate which intermediate supplies from sectors *i* as necessary to produce one unit of output in sector *j*. Such as

$.028804x_1 + .054092\ x_2 + .000867x_3 + .0000304x_4 + .008115x_5 + .000746x_6 + .018785x_7 + .002298x_8 + .000969x_9 + .000117x_{10} + .009948x_{11} + .000064x_{12} + .000010x_{13} + .135911x_{14} + .004397x_{15} + .010400x_{16} + .095393\ x_{17} + .002032\ x_{17} + .014698\ x_{18} + .000280\ x_{19} + .032138\ x_{20} + .000688\ x_{21} + .000002\ x_{22} + .000005\ x_{23} + .000005\ x_{24} + .000150\ x_{25} + .019467\ x_{26} + .0144631\ x_{27} + .003821\ x_{28} + .019676\ x_{29} + .000969\ x_{30} + .066432\ x_{31} + .000161\ x_{32} + .000001\ x_{33} + .000002\ x_{34} + .000811\ x_{35} + .000198\ x_{36} + .001356\ x_{37} + .000007\ x_{38} + .006594\ x_{39} + .017346\ x_{40} + .009112\ x_{41} + .011829\ x_{42} + .003590\ x_{43} + .001279\ x_{44} + .000045\ x_{45} + .001334\ x_{46} + .000053\ x_{47} + .006047\ x_{48} + .002880\ x_{49} + .000007\ x_{50} + .000914\ x_{51} + .000001\ x_{52} + .005452\ x_{53} + .000005\ x_{54} + .000019\ x_{55} + .000092\ x_{56} + .000001\ x_{57} + .000315\ x_{58} + .012566\ x_{59} + .017441\ x_{60} + .000096\ x_{61} + .004781\ x_{62} + .040641\ x_{63} + .002879\ x_{65} + .000927\ x_{66} + .003432\ x_{67} + .003477\ x_{68} + .135712\ x_{69} + .022613\ x_{70} + .008663\ x_{71} + .008442\ x_{72} + .000540\ x_{73} + .000085\ x_{74} + .000009\ x_{75} + .000924\ x_{76} + .000221\ x_{77}$

From the above equation we can say that to produce one unit of food processing industry product we require different units of inputs from 77 industries.

The coefficients of the above equation imply that to produce one unit of product in food processing industry we require, .028804 units of paddy, .054092 units of wheat, .000867 units of jowar, .00304 units of bajra, .008115 units of maize, .000746 units of gram, .0018785 units of pulses, .002298 units of sugarcane, .000969 units of groundnut, .0000117 units of coconut, .009948 units of other oil seeds, .000064 units of cotton, .000010 units of tobacco, .135911 units of fruits, .004397 units of vegetables, .000010400 units of other crops, .095393 units of milk and milk products, .002032 units of paultry and eggs, .01444444698units of other live stock products, .000282 units of forestry and logging, .032138 units of fishing, .000688 units of coal and lignite, .000002 units of natural gas, .000001 units of lime stone, .000150 units of other nonmetallic minerals, .01119467 units of sugar, .014631 units of khansari boora, .003821 units of hydrogenated oil, .00000019676 units of edible oil, .000969 units of tea coffee, .066432 units of miscellaneous food products, .000161 units of beverages, .000005 units of khadi cotton textiles, .000001 unitsof cotton textiles, .000811 units of jute hemp mesta textiles, .000198 units of readymade garments, .001356 units of miscellaneous textile products, .000007 units of furniture and fixtures wooden, .006494 units of wood and wood products, .017346 units of paper and paper products, .009112 units of plastic products, .011829 units of petroleum products, .003590 units of inorganic heavy chemicals, .001279 units of organic heavy chemicals, .000045 units of paints varnishes and lacquers, .001334 units of drugs and medicines, .000053 units of soaps cosmetic and glycerin, .006047 units of other chemicals, .002880 units of other nonmetallic mineral products, .000007 units of nonferrous basic metals, .000914 units of miscellaneous metal products, .000002 units of tractors and agriculture implements, .005452 units of industrial machinery, .000005 units of other industrial machinery, .000019 units of machine tools, .00092 units of other non electrical machinery, .000001units of other electrical machinery, .000315 units of miscellaneous manufacture, .012566 units of construction, .017441 units of electricity, .000096 units of water supply, .004781 units of railway transport service, .040641 units of land tpt including pipe line services, .002879 units of water transport, .000927 units of air transport, .003432 units of supporting activity, .003477 units of communication, .135712 units of trade, .022613 units of banking, .008663 units of insurance, .008442 units of business services, .000540 units of computer, .000085 units of legal services, .000009 units of rending, .000924 units of social services and .000221 units of other services.

The input requirement also shows that .421213 of primary inputs are consumed in the production of one unit of processed miscellaneous food product. As well as .194444 units of industrial products and .263449 units of service are required to produce one unit of miscellaneous food products.

If this computed requirement of inputs does not exceed their available supply in the economy, all is well ie the targets set for the production of x_1 x_2 and x_3 are feasible. Otherwise modest targets must be substituted. This, in fact, is the core of the theory of input – output analysis.

The Input Requirement written above clearly shows the sectoral interdependence in the economy. Suppose the production of processed food sector is to go up by Rs 1000 then they said equation tells us that for the output of processed food industry to increase by Rs 1000 the transfer from agriculture sector to processed food industry must increase by Rs. 1000 $\times$ (0.421) = 421. Similarly the input from industrial sector to processed food product must increase by Rs. 1000 $\times$ (0.194) = 194 and from service to processed miscellaneous food products industry, it must increase by Rs. 1000 $\times$ (0.263) = 263. Thus we can use this input requirement equations in order to calculate the effect of each sector for a change in processed food product industry contribution.

4:14 INTRA DEPENDENCE OF FPI

Inter dependence of an industry may due to inter sect oral as well as intra sectoral. The increased output of food processing industry will further increase the required input from food processing industry itself. In the case of food processing industry intra dependence is strong itself.

"Intra Industry Trade refers to the exchange of similar products belonging the same industry". We can define intra industry trade as "The trade within industries rather than between industries – Such trade is more beneficial than inter industry trade because it stimulates innovation and exploits economics of sale. Intra industry trade occurs when a country exports and imports in the same industry". That means trade based on differentiated products is known as intra trade.

Out of 130 industries, eight industries are belong to food processing industry. Suppose the Rs. 1000 increase in output in food processing industry required certain amount of output of this industry itself. Thus in order to increase total output of Rs. 1000 in FPI

$.019x_1 + .015x_2 + .038x_3 + .021x_4 + .001x_5 + .067x_6 + .001x_7 + .018x_8$ are required from this industry itself. Thus total output of Rs. 1000 + .019 (1000) + .015(1000) + .038(1000)+ .021(1000)+ .001(1000) + .067(1000) + .001(1000) + .018(1000) are required from food processing industry itself.

So total output of Rs. 1000 + 19 +15 + 38+ 21+67 + 1 + 11 = Rs. 1173 are required. In order to increase the total output of Rs. 1000, Rs. 173 transaction are required from this food processing industry itself. Therefore we can say that 17% of intra trade transaction are took place in the case of food processing industry.

4.15 FORWARD AND BACKWARD LINKAGES OF FOOD PROCESSING INDUSTRY: SECTOR WISE

Here we can see that the sector wise classification of backward and forward linkages of food processing industry.

IOTT 2003-04:

The highest backward linkage is from secondary sector with 2539870 lakh rupees then primary sector contributed and from service sector, it is nearly 5501988 lakh rupees and 3440884 lakh rupees respectively. Out of the 77 backward linkage industries, 26 industries from primary sector, 33 industries from secondary sector and 18 industries from service sector.

Then we can analyse the sector wise contribution of food processing industry to different sectors. As per the analysis, the forward linkage of food processing industry mainly goes to secondary sector, then primary sector and service sector. Out of the 65 forward linkage industries, 3 industries from primary sector, 51 industries from secondary sector and 6 industries from service sector.

From these, we can understand that secondary sector has a highest backward as well as forward linkage with secondary sector. Even though food processing industries are highly linked with secondary sector it given a strong and steady linkage with this sector

IOTT 2013-14: The highest backward linkage is from agriculture sector with 5943 billion rupees. Then secondary sector contributed and from service sector, it is nearly 1169 lakh rupees and 1677 lakhs rupees respectively. Out of the 21 backward linkages industries 5

industries from primary sector, 10 industries from secondary sector and 6 industries from service sector.

Then we can analyse the sector wise contribution of food processing industry to different sectors. As per the analysis, the forward linkage of food processing industry mainly goes to secondary sector, then primary sector and service sector. Out of the 10 forward linkages industries 2industries from primary sector, 4 industries from secondary sector and 6 industries from service sector. Food processing industry are highly linked with primary sector, it gives a strong and steady linkage with this sector with primary sector also.

If food processing industry flourished, it will give a positive boost to agricultural sector in the economy. Therefore, the development of food processing industry has great role for the strengthening of rural development.

Rural development is the process of improving the quality of life and economic well being of people living in rural areas often relatively isolated and sparsely populated areas. Rural development implies both the economic betterment of people as well as greater social transformation.

4.16 AGRICULTURAL INPUTS USED BY FOOD PROCESSING INDUSTRY

Table 4.4 Agriculture Inputs used by FPI

	Items	Value of items used in FIP	Total value of used items	% value of used item to its total value
1	Paddy	376244	11667368	3.22%
2	Wheat	706564	6957469	10.16%
3	Jowar	11325	399294	2.84%
4	Bajra	3967	572531	0.69%
5	Maize	105995	844923	12.54%
6	Gram	9739	871566	1.12%
7	Pulses	245372	2705625	9.07%
8	Sugar cane	30014	2296155	1.31%
9	Ground nut	12661	1306954	0.97%
10	Coconut	1526	621935	0.25%
11	Other oilseeds	129938	2833403	4.595
12	Fruits	1775303	4794690	37.03%

13	Vegetables	57439	5895476	0.97%
14	Other crops	135853	8821708	1.54%
15	Milk and milk products	1246053	11044005	11.28%
16	Egg poultry	26547	1519633	1.75%
17	Fishing	419791	3171642	13.24%

Source : Calculated by the Scholar

4.17 TOP SECTORS WITH HIGH FORWARD LINKAGE

The following table shows the various sections in IOTT which have the highest total forward linkage. The following conclusion can be drawn from the data in the above table.

Table 4.5 Top sectors with high forward linkage

Sl. No.	Section No. in IOTT	Name	Total	Ranks
1	1	Paddy	11667368	10th
2	21	Milk and milk products	11044005	11th
3	43	Miscellaneous food products.	13618010	9th
4	63	Petroleum products	17375680	4th
5	106	Construction	44152786	2nd
6	107	Electricity	14790881	7th
7	110	Land tpt. including via pipelines	31833835	3rd
8	116	Trade	45422018	1st
9	118	Banking	16842282	5th
10	120	Ownership of dwelling	13931500	8th
11	121	Education and research	10887331	12th
12	130	Public Administration	15615700	6th

Source : Estimated by the Scholar

The following conclusion can be drawn from the data in the above table. In the total forward linkage, the food processing industry occupies the 9th position in the whole economy. Within these twelve sectors two sectors belong to primary sector, three belongs to secondary sector and rest belongs to tertiary sector. Food processing or food manufacturing industry is the third largest industry in India. This reveals the Indian Food Processing Industry is highly dominant component of the national economy. This sector provides vital linkages and synergies between industry and agriculture and has been identified as a sector having immediate potential for the growth of the economy.

4.18 CONCLUSION

Demand for agriculture products is an important parameter for agriculture development and position, especially in the case of food products. Upscaling of food processing industry has given considerable scope not only to strengthen the synergy between agriculture and food processing but also to arrest the fall in agricultural growth through diversification and commercialization of agriculture and also create new direct and indirect avenues of income and employment for rural people. In order to find out the potentiality of food processing sector to be the driver of economic growth and enhance rural incomes, the study of forward and backward linkage effect of this industry is a best method. The sectoral inter dependence of food processing industry reveals the importance of this industry. The extensive backward linkage effect on agriculture shows role of this industry to speed up economic growth. The calculated value of forward and backward linkage effect lies nearest to one. So, we can say that Food Processing Industry is a strong backward linkage sector or backward oriented sector.

The next attempt of this study is to find out the interdependence of food processing industry in Kerala Economy. There is no authority has published IOTT for Kerala. Therefore, to study the backward and forward linkage of food processing industry with the help of IOTT is not possible. In order to find out the potentiality of food processing industry, this study focuses the value chain analysis. Value chain analysis is a means of segregating various activities of a business and identifies them with respect to their contribution towards value generation by identifying the cost i.e., inputs consumed by that activity and the output generated out of that activity. Value chain analysis plays a key role in understanding the need and scope for systematic value addition capacity of industry. The value chain analysis is also help in understanding the advantages and disadvantages of firms and economy as a whole in specializing the production of a particular product. Value chain analysis is a useful tool for policy framework. The tool value chain analysis is rarely used in studies related with Indian Food Processing industries. Any researches in food processing industry does not deal with value chain analysis in Kerala context. There is growing relevance of value chain analysis concepts and their application in food processing industry for market-led-rural development strategies through its linkage effects. The concepts are applicable across a wide range of products in food processing sector and therefore have great potential to help in developing rural enterprises and the rural economy. Therefore, the entire analysis in the next chapter is

expected to throw light on the feedback effect of agriculture value chain and linkages to the agriculture sector as a whole.

CHAPTER 5
VALUE CHAIN ANALYSIS OF FOOD PROCESSING INDUSTRY

Value Chain of Fruit Processing Industry

Linkages and Interdependence of fruit value chain

Internal Linkages and external Linkages

Backward Linkages and Forward Linkages

Linkages and Leakages

Conclusion

5.1 INTRODUCTION

Value chain analysis for fruit processing is undertaken in this study to assess the processing possibilities of Food Processing Industry. Value chain analysis is the best method to assess the potentiality of an industry. Value chain analysis is rarely used technique in Food Processing Industry. A value chain is defined as the linked set of value creating activities all the way from basic raw material sources for component suppliers through the ultimate end use product delivered into the final customers hands (Shank 1989).

On the basis of the collective information from review of literature the fruit is selected in the study to identify the potentiality of processing through value chain analysis. It is selected on the basis of variety of fruits grown in the study area. Another base used in viability of fruit for processing and producing high value-added products. Among the different food products units in this study area fruit is more economically viable for processing. Processed products of fruit are high demand in domestic as well as foreign market.

5.2 DESCRIPTION OF SAMPLE UNITS

Food processing Industry includes large number of micro small, medium and large-scale units.

Value addition for many of the micro or small-scale processed food is a impressive. However, the market for these processed foods is limited. Further as these processed foods are appreciated & demanded by specific location or season. Thus, micro and small-scale processed foods are not emerging into scale economics with high value addition.

In medium and large-scale fruit processing units the commercial value of the fruit is enhanced to its maximum level. The data obtained from the fruit processing sample units reveal that the large and medium scale fruit processing units enhance the fruit value several fold higher than small scale processing. Fruit procured from the farmers at a reasonable price and will become several fold values added products through different stages of processing.

Food processing activities are spread over the all districts in Kerala. This study covered four districts namely Thrissur, Ernakulum, Kozhikode and Thiruvanthapuram. These districts were selected for the study based on the concentration of fruit and other food products industry. Thiruvanthapuram is the capital and lies in the southern part of Kerala.

Ernakulum and Thrissur lie in the middle part of Kerala. Kozhikode located in the northeast part of the state.

In Kerala 879 food processing units are there. Out of these 879 units, 2.9% of the total, that is, 26 units are selected for the primary survey of this study.In National level, out of the total number of fruit processing units,2.9% belongs to fruit and vegetable description [NIC:1030]

Among the 26 sample units fruit processing firms were further stratified into medium and large scale. Out of these 26 units, nine units are large scale unit and 18 units are medium scale.

5.3 DEFINITION OF LARGE, MEDIUM SMALL-SCALE INDUSTRIES

Medium and large-scale industries are selected on the basis of following definition.

Table: 5.1 Investment Ceiling for Plant Machinery or Equipment

Classification	Manufacturing enterprises
Micro	Up to Rs. 25 lakh
Small	Above Rs. 25lakh & Up to Rs 5 crore
Medium	Above Rs.5 crore and up to Rs.10 crore
Large	Above Rs.10 crore

Source: The Gazette of India, 16th June 2016

The data obtained from existing fruit processing units reveals that, the mainly processed fruits are mango, grapes, pineapple & papaya. Banana and Jackfruit are rarely processed combinedly with other fruits. Sabarjilli, Lime & Guava are also processed at a small margin. The units which process jack fruit or banana focuses only the processing of these fruits. They have a little interest in process of other fruits. The data obtained from the primary survey units reveals that the common end products of fruit processing industry are juice, pulps, jams, pickles, syrups, squashes & beverages. Chips and dehydrated fruits are also processed in these units. As the numbers of differentiated products are increases the market value of fruits also enhanced. Every units are interested and concentrate on the introduction of new variety products.

5.4 VALUE CHAIN OF FRUIT PROCESSING INDUSTRY

The value chain of fruit processing industry is developed and various players in the chain are located based on the primary survey conducted for the present study.

Chart 5.1 Value Chain Frame Work/ Map

```
                    ┌──────────────┐    ┌──────────────┐    ┌──────────┐    ┌──────────┐
                    │ Local market │──► │Local Processing│──►│  Local   │──►│  Local   │
                    │              │    │  unorganized  │    │ markets  │    │consumers │
                    └──────────────┘    └──────────────┘    └──────────┘    └──────────┘

┌────────┐          ┌──────────────┐    ┌──────────────┐    ┌──────────┐    ┌──────────┐
│ FRUIT  │────────► │   Trade      │    │ Processing   │──► │ Retailers│──► │ Domestic │
│  s     │          │(Wholesalers) │    │  organized   │    │          │    │Consumers │
└────────┘          └──────────────┘    └──────────────┘    └──────────┘    └──────────┘
                    ┌──────────────┐    ┌──────────────┐                    ┌──────────┐
                    │ Government.  │    │   To big     │                    │  Value   │
                    │ Procurement  │    │  processing  │───────────────────►│ Addition │
                    └──────────────┘    │    units     │                    └──────────┘
                                        └──────────────┘

        ┌──────────────┐    ┌──────────┐
        │ Wholesalers  │◄── │  Export  │◄────────────────────────
        │   Abroad     │    └──────────┘
        └──────────────┘
        ┌──────────────┐                                    ┌──────────────┐
        │International  │                                    │Institutional │
        │   Market     │                                    │  Consumers   │
        └──────────────┘                                    └──────────────┘
```
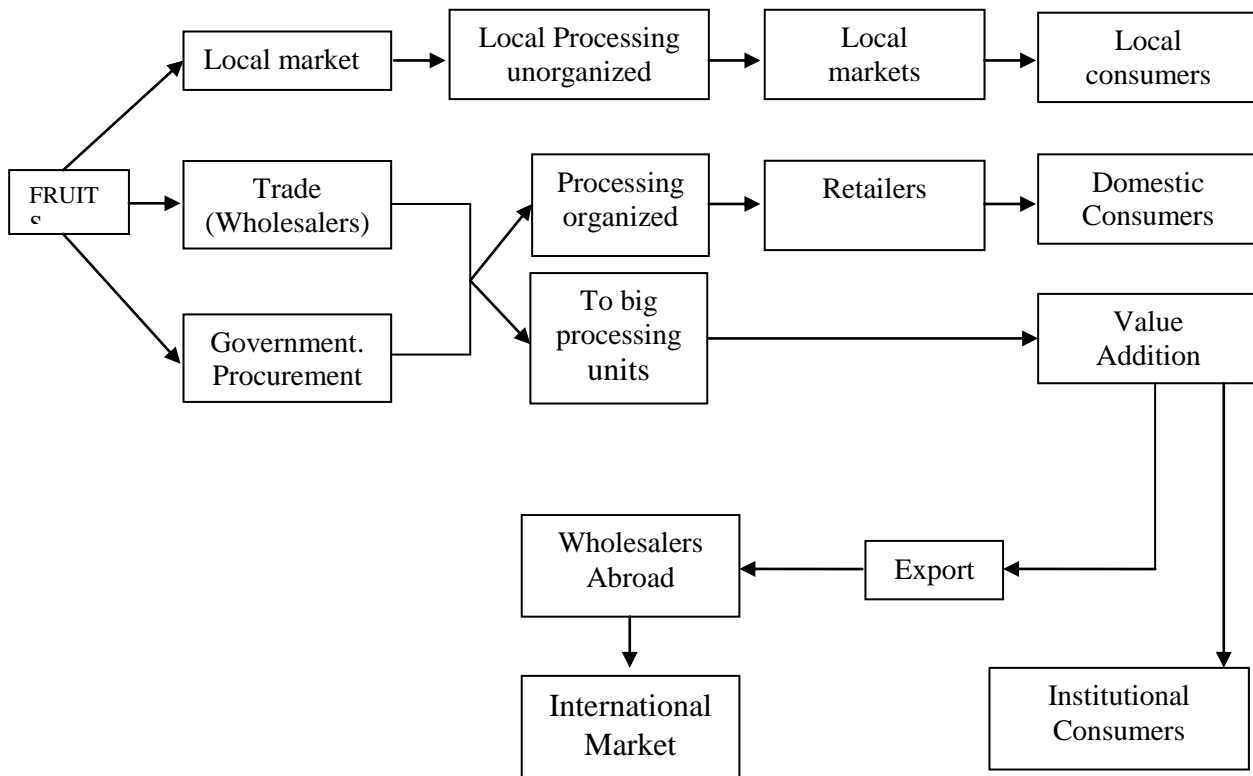
Source : Constructed by the Scholar

The value chain is more complex in reality as it comprises more than one raw material suppliers and more than one fine market. The study aims to capture the entire value chain which is complex. As the product moves through various actors, it gains value. In the above frame work, we have attempted to explain the different segments in value chain.

Post-harvest operations start with the sale of the produce. Some of the produce is sold in the local market or purchased by the traders from the farm gate. Government. also undertakes procurement to maintain the seasonal surplus. The transportation is required for the sale of the farm produce and plays an important role in fetching better prices to the farmers. In Indian context the primary production happens to be a key actor in the value chain, the farmers are the players in first segment of value chain and making available the raw material for the food processing industry.

Then the fruit enter into the hands of II segment players in the value chain activities and they are also very active. Fruits sold in the local market are either consumed for local supply or to the retailers, involved in the sale of raw materials to the processing units. Local market also feeds the traders with the supply of fresh fruits once the fruit are produced, they take the route to local market for local processing or enter the organized sector for large scale

82

processing. The local processors cater to the local consumers at district or maximum state level. The organized sector consists big processing units and create enhanced value addition.

While the processed fruit enter into trade, the III segment of value chain starts. In this segment processed fruits are supplied to exporters while importers also enter the domestic market. This segment also considers the feedback from the consumers and it helps the processors to bring further Improvement in the quality of production.

5.5 STAGES IN FRUIT VALUE CHAIN ANALYSIS

The value chain model shows the particular configuration of activities that are needed to create value in a product or service.

Sullivar O et.al [1998] describe this chain of activities as the natural value chain. It includes what the has to accomplish with its input resources to achieve its final output product. These activities whatever the firm has to accomplish are described as the value chain stages.

Stages involved in processing fruit

Stage 1:	Cleaning of fruit
Stage 2:	Soaking of fruit
Stage 3:	Fruit juice or pulps
Stage 4:	Dehydration
Stage 5:	Grinding of fruits
Stage 6:	Adding procure fruits processed food input
Stage 7:	Creating variety tastes by adding different agricultural inputs.
Stage 8:	Make delicious with livestock product mix
Stage 9:	Preserving with chemicals or preservatives
Stage 10:	Packing & Branting

Fruit value chain consists of a large number of activities namely, purchasing of fruits, processing and marketing of processed products at different markets. Each of these activities or stages has both backward and forward linkages. Incomes to the farmers are the important backward linkages. Post harvest management, grading and sorting and marketing of raw fruits are the forward linkages. Value addition on fruit processing depends on input cost, output value, technological up gradation as well as scale of processing. Large scale processing results in a greater number of differentiated value-added products value addition at household or small-scale processing are not at maximum. Therefore, income and employment generated by processing depends on the scales of operation or the nature of processing units.

5.6 VALUE LINKS/ IN THE FRUIT PROCESSING INDUSTRY VALUE CHAIN

Chart 5:2   Value Links/ in the Fruit Processing Industry Value Chain

```
                    ┌─────────────────────────────────┐
                    │  Cultivation & Farm Management  │
                    └─────────────────────────────────┘
                                   │
                                   ▼
                    ┌─────────────────────────────────┐
                    │ Post Harvest Management (Separation, │
                    │     Grading, Packaging)         │
                    └─────────────────────────────────┘
                                   │
                                   ▼
                    ┌─────────────────────────────────┐
                    │         Transportation          │
                    └─────────────────────────────────┘
                                   │
                                   ▼
                    ┌─────────────────────────────────┐
                    │ Fruit Market (Dealers, Agents and │
                    │  Government. (Procurement)      │
                    └─────────────────────────────────┘
                                   │
                ┌──────────────────┴──────────────────┐
                ▼                                      ▼
      ┌──────────────────┐              ┌──────────────────────┐
      │ Primary Processing│              │ Secondary Processing │
      └──────────────────┘              └──────────────────────┘
```

Chips	Dehydrated Products	Procuring

Add spices; Oil tamarind Mustard etc	Add grains coconut pulse, crops, meet etc.	Add livestock products ghee, egg, milk, honey etc

Variety Products Pickle Sauces	Delicious Products Fruit Bars Juice Jellies	Differentiated Products Jams Squashes Beverages

Preserving

Sodium Chloride	Food Colours	Potassium Metasulphate	Citrix Acid	Sodium Benzoate

Packing and Branding

Consumer Market	International Market

Source : Constructed by the Scholar

The flow chart (chart 5:2) describes the value chain links in fruit processing. It includes inbound logistics, processing & outbound logistics. The inbound logistics depends on quality and availability of improved varieties of fruits. The most important stage in the fruit value chain is processing. In this stage raw fruit is processed in to different fruit derived products. Fruit processing consists of primary, secondary and tertiary processing.

In the creation of value at fruit value chain depends on all upstream and downstream activities. Upstream activities consist of supply side of the chain and downstream activities are marketing and distribution activities of the chain. The efficiency and effectiveness of each links in the chain will have direct impact on both upstream & downstream activities.

As primary processing, fruit is sorted and graded. Packing on the basis of quality and variety, also happens at there. Market value of raw fruit at this stage is determined on the basis of primary processing. Therefore, fruit processing largely depends on the quality and availability of fruits. Both growers and traders undertake the primary processing.

In the secondary processing raw fruit is converted to different products and by products, these products are either used for the further processing or for direct consumption. The secondary process happens at micro or small-scale units. Fruit products obtained in the secondary processing are sold in different markets. A secondary processing it is an intermediary level in the fruit commodity chain. Fruit products obtain from the secondary processing is used to manufacture variety and delicious food products.

In the fruit value chain, more physical and market value is added at the tertiary processing. Value addition at this stage is an importance activity. At the tertiary processing level, more agricultural products live stock products as well as primary processed food products are used by the manufacturers. Therefore, the backward linkage effect is more and more at these tertiary processing levels. Therefore, in the tertiary processing end use products like jams, jellies, fruit bars, ice creams, squashes, sauce, pickles are produced. More variety of value-added commercial products are produced

The importance linkages in the flow of fruit are growers, traders, processing units, marketing and final customers. Thus, fruit value chain consists of strategic components and activities involved in the movement of raw fruit from growers through the processors to the final customers. At each stage of the chain value is added. Processing and marketing of processed products add highest value to the raw fruit.

5.7 VARIOUS ACTORS IN THE FRUIT VALUE CHAIN

The following are the chain actors in the fruit value chain

- Growers
- Traders
- Transporters
- Local processors
- Agents or Middlemen
- Large scale processing units
- Retailers
- Marketers
- Final consumers

As the product moves along various chain actors it gains value. Many actors may participate in economic transactions only and may not be adding any value, for eg, transporters. Growers and traders belong to primary sector in the economy processors, large scale processing units and marketers belong to secondary sector in the economy. Therefore, fruit processing value chain spreads into primary and secondary sectors of the economy.

5:8 ROLE OF VARIOUS ACTORS

The role of various actors in the value chain of fruit processing industry is given below.

Farmers: The term farmer in the study refers to the cultivators of fruits either for commercial purpose or at their household land. From the case studies conducted at farmers, we can recognize that majority of fruit growers fall in the medium and small categories. Generally fruits are grown in the marginal lands in Kerala. Susceptibility to insects is a major risk in fruit cultivation. Unpredictable weather are also major risk as in the case of all agricultural production. Climatic changes bring changes in the taste and colour in the fruits. Farmers generally grows pineapple and banana in a commercial purpose. Since jackfruit and mango grows in a commercial purpose it is only 1/3 of the total production. The majority fruit that are grows in a commercial purpose is collected and its supply chain are smooth. But the fruit grows in a household land, its supply chain of large portion of fruits are blocked.

The usual practices of these farmers are they sell their tree as a whole instead of fruits. In the case study found that 90% of the farmers sold the trees before the harvest season and only 10% sold fruit on the basis of its weight.

The survey data shows that the price received by the farmer for their fruits are different. Apart from the nature of fruits, there are various other factors that influence the price given of the farmers. They are the size of the trees, variety of fruits, location of the area, season, climate etc.

Table 5.2 Average Price of fruit Received by farmers [per kg]

No	Fruit [major fruits from Kerala]	Average Price
1	Jackfruit	18
2	Mango	60
3	Banana	30
4	Pineapple	18

Source: Estimated by the Scholar

During the harvest season fruit plucking becomes difficult and farmers tend to sell the trees despite the higher expenses for plucking. High perishability of fruits, compel the farmers to sell the trees at the seasons. It is seen that 93% of the farmers sold the fruits to the broker or to the agents of traders. The remaining 7% percent sold directly to the customers.

One of the dominant questions that is raised in connection with fruit price is whether the famers are trapped or they get the right price for their product. In this context an analyze about the role of each actors in the price determination process is importance. In this study such analysis can conduct only on the basis of the opinions of farmers who are surveyed in case study. Farmers have the opinion that price is determined through mutual bargaining. Farmers are likely to get better price if they manage to sell the fruits to customers or traders directly. The farmer – the former actor of fruit value chain has not dominated in the process of price determination. The agent or dealer offers a price at 20% of the actual rate even though most of the formers feel that they do not get the right price, they are compelled to accept the offer from the agent or dealer.

Dealers or Agents: The role of a dealer or an agent is very important in the supply chain of fruits. The dealer stands as middleman or an intermediate in between farmers and fruit processors. The majority of the sample units collects the fruits from the dealers and a few processing units are collects from farmers directly. The dealer collects the fruits at the farm gate from famers directly. Some parts of the collected fruits are consumed as a fresh

fruit and some part has make available at processing units. Farmer can sell seasonal surplus to this dealers but less satisfactory rate. The bargaining power of a farmer is limited since fruit are a perishable commodity. Labour cost and transportation cost, cost for plucking, loading and unloading are the full responsibility of these dealers. Avoid to become damaged and keep the fruits as fresh are the main risks of these dealers. According to the opinion of farmers, these agents or dealers may get a higher share as they go in search of the farmers and their bargaining strength. At the same time according to the opinion of processors, these agents or dealers may get a share less than two or three percent. They get fruits at a cheap rate as the farmers are given. This opinion disproves the general argument that a major portion of the price of agricultural products is pocketed by agents or dealers. It is observed that neither the farmer nor the agent in dominant in the process of price determination in fruit value chain.

At the same time the existence of dealers or agents is a clear indication of poor supply chain of fruit procurement. It also indicates the inefficient infrastructure in the local market.

Processing Units : Processing units are those who buy fruits and create value added products. Processing units are of various capacities depending upon their investment in processing units. Their investment varies and based on their investment we classify these units as micro small, medium and large. We selected only medium and large scale units.

5.9 PROCUREMENT OF FRUITS IN SAMPLE UNIT

Table 5.3 Procurement of Fruits in Sample Unit

Sl. No	Fruit Procurement	No. of unit	Percentage
1	Directly from farmers	4	15.38%
2	Purchasing from dealers	17	65.38%
3	From government. ware house	1	3.85%
4	Open market	4	15.38%

Source: Calculated by the scholar

The table 5:3 shows that, fruit processing units procure raw materials mainly from two channels namely, procuring directly from the farmers and purchasing from dealers. Dealers are the major source of supply of fruits. 65.38% of sample food processing units depend on dealers. Only one sample units procure fruits directly from government. warehouse. 15.38% of processing unit collect from farmers, and other 15.38% of fruit from

open market. Since fruits are a seasonal produce of a particular region, processing units procure fruits from different places at different time. From the procurement practices, we can say that fruit procurement of the processing units corresponding to their plant capacity. Large scale unit purchase more than from one channel whereas, the other units largely purchase from a single source.

5.10 RELATIVE SHARE OF VARIOUS ACTORS

As already mentioned the price of processed food is determined by a number of actors. The relative share of various actors in the chain of processed food can be worked out on the basis of primary survey data and case study information.

Table 5.4 Share of various actors in processed food

Actors	Share%
Farmer	15%
Dealer	30%
Food processing unit	65%
Customer	100

Sorce :Calculated by the Scholar

From the table 5:4, it is inferred that the value addition by the trader is greater than the value added by the farmer. The value addition by processing unit over the value of raw materials is 65%. In the case of processing unit, his entire share in processed food is not his profit. He incurs certain cost such as cost of intermediate good and cost of operational services.

5:11 FRUIT CONSUMPTION AND ITS AVERAGE VALUE

Another important point at in primary survey indicates that to overcome the seasonal availability of raw materials these firms procure fruits from different states. These processing units normally purchase fruits from Kerala itself during the harvest season only. During off season in Kerala these processing units are interested to collects fruits from other states where they have harvest season. Ninety five percent of primary surveyed units prefer to purchase from other states instead of purchasing from government ware house. Karnataka, Tamil Nadu, Maharashtra and North India are the other fruit purchasing states.

The weather condition also influences the quality of fruit. The fruit may at its best quality on the proper harvest time period. The quality of end products may vary with the colour and taste of the fruits. This also a main reason for depending other states for procuring fruits on off season in Kerala.

Table 5.5 Opinion of respondents on the availability of fruits

Sl. No.	Available as per requirement	No. of units	Percentage
1	Yes	26	100%
2	No	0	-

Source: Estimated by the Scholar

According to the table 5:5 hundred percentage of the respondents are in the opinion that the fruit is available as per their requirement. All the units mentioned that they never face any supply shortage of raw material as per their requirement. That is because majority of the processing units located in Kerala procuring fruits from other states.

Table 5.6 Name of common processing fruits and its available places

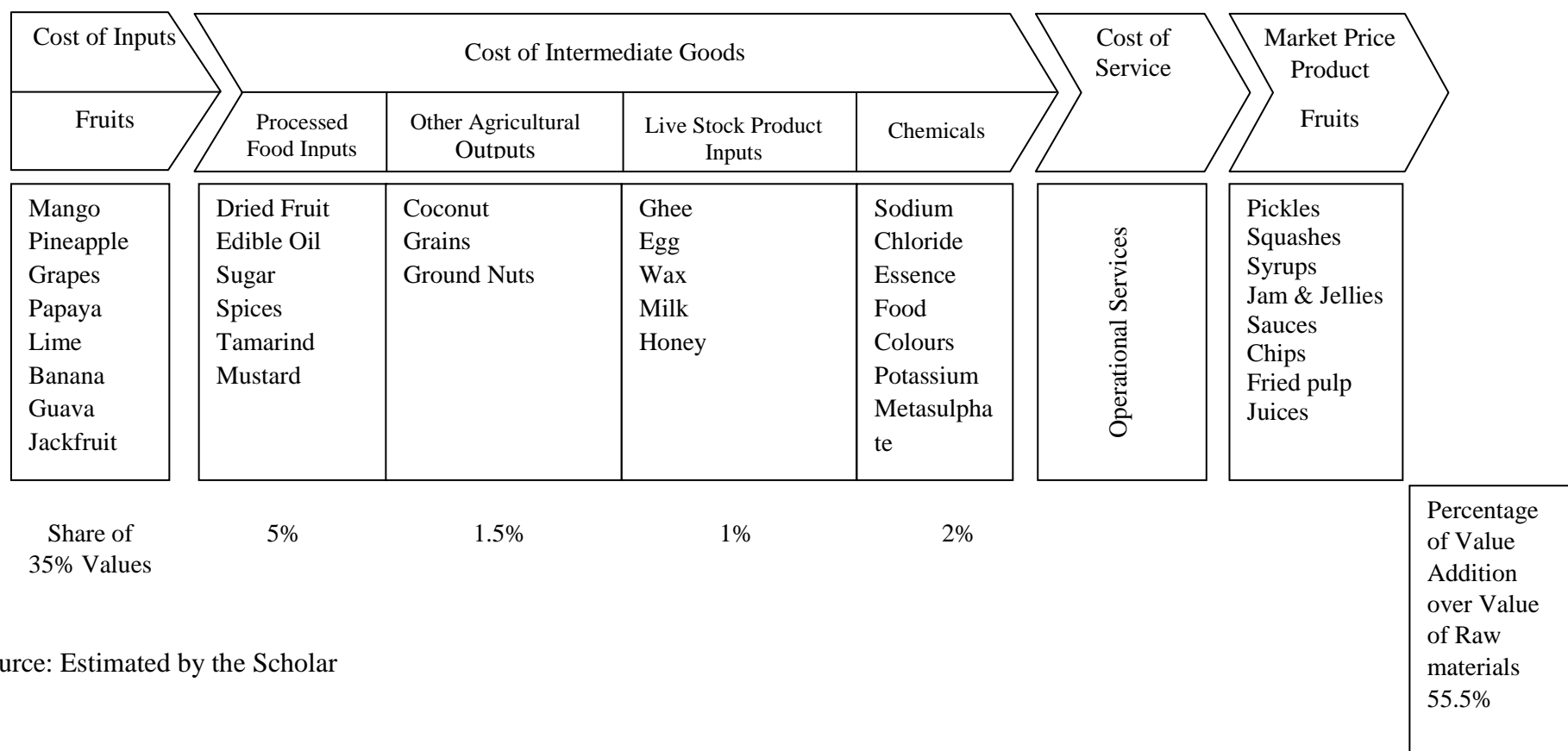| Sl. No.	Name of fruits	Available places
1	Jackfruit	Kerala, Tamil Nadu
2	Mango	Kerala, Karnataka
3	Banana	Kerala, Tamil Nadu
4	Pineapple	Kerala
5	Orange	Maharashtra, Nagpur
6	Grapes	Bangalore
7	Others (papaya, sabarjilli, guava, passion fruit, sapota)	Tamil Nadu

Source: Estimated by the Scholar

Muthalamada for mango, Wayanad for jackfruit, Thrissur for banana Vazhakulam for pineapple are the major places in Kerala.

5.12 VALUE ADDITION AT DIFFERENT STAGES OF CHAIN

Economic information is very helpful in monitoring of the value chain. Economic analysis includes assessment of value addition that is generated at the different stages of chain. It helps in creating awareness among firm operators regarding potential for value addition.

Value added is a measure for the wealth created in the economy. Growth of total value is a macroeconomic estimate contributing directly to the GDP of the economy. The development of food processing industry is given top priority because it embodies huge potential for value addition, that implying a large income generation. To calculate value added by a value chain, cost of all materials used and services hired are deducted from the value of sales. Revenue generated by the value chain is divided between the values added created by the operators and the intermediate goods and operational services by players who are not included in the main stream of the value chain.

Chart 5.3 Values addition at different stages of Value Chain

Cost of Inputs	Cost of Intermediate Goods				Cost of Service	Market Price Product
Fruits	Processed Food Inputs	Other Agricultural Outputs	Live Stock Product Inputs	Chemicals		Fruits
Mango Pineapple Grapes Papaya Lime Banana Guava Jackfruit	Dried Fruit Edible Oil Sugar Spices Tamarind Mustard	Coconut Grains Ground Nuts	Ghee Egg Wax Milk Honey	Sodium Chloride Essence Food Colours Potassium Metasulphate	Operational Services	Pickles Squashes Syrups Jam & Jellies Sauces Chips Fried pulp Juices
Share of 35% Values	5%	1.5%	1%	2%		Percentage of Value Addition over Value of Raw materials 55.5%

Source: Estimated by the Scholar

The above figure shows the calculation of value added at different stages of fruit value chain. The value added by the value chain is calculated from average cost. The evaluation of fruit processing industry reveals that there is in many products an economic activity with high value addition. As against other industries, fruit processing industry involves a number of activities and a large variety of final products.

5.13 ACCESS OF FINAL MARKET FOR PRODUCT

From the perspective of value chain analysis, one of the key issues is how producers access final market? The first step is the identification of the key buyers in a particular chain. In value chain of fruit these buyers are at or close to final markets, which Geneffic characterizes as "buyer – driven sectors".

There are different types of key buying institutions in fruits value chain, they are:

- Retailers buying in large volumes
- Whole sale firms (category agents) buying in large volume
- Direct customers
- Independent buyers generally small firms
- Distributers: key links of the chain which buy in large volumes

Table 5.7 Nature of sale of fruit processed food products

SI No.	Nature	No. of firms	Percentage of firms
1	Direct to customers	3	11.1
2	Distributers	12	44.4
3	Retailers	4	16.6
4	Wholesalers	9	33.3
5	Agents	9	33.3
6	Exporters	2	22.2

Source :Estimated by the Scholar

The table 5:7 gives their share in the marketing of fruit processed products. The wholesalers and distributers play a vital role in the fruit value chain. From the table it is inferred that all the units make use of multiple ways for the sale of the product. 44% of the food processing units sell their product through distributers.

The dynamics of buying function: In fruit chains the buying function is becoming increasingly concentrated. That have been dominated by wholesalers and distributors,

concentration levels are increasing rapidly. Therefore, the power and role of these buyers in the value chains in which they operate are also increasing rapidly.

Supply chain management techniques have helped to upgrade systematic competitiveness in value chain. They are often linked to the relationship between buyers and suppliers. The development of long term and high trust relationships generally require a smaller number of suppliers. Some firms in the field survey completely depend a single channel for accessing the market.

Table 5.8 Marketing of Fruit Processed Products

Nature	Number of firms	Percentage of firms
Inside Kerala only	5	22.2%
Inside Kerala and outside Kerala	9	33.3%
Inside Kerala and export	3	11.11%
Inside Kerala, Outside Kerala and Export	9	33.3%
TOTAL	26	100

Source : Estimated by the Scholar

Some unit has its own marketing network to abroad. Few units' marketing network is limited within two or three districts, 22.2 percent of industries marketing network is extended to all over Kerala. 33.3% units marketing network is flourished to other states. The main destinations of this type of sale are our neighbouring states Tamil Nadu and Karnataka, Lakshadweep and North Indian states have also a link with Kerala fruit processing industry. It is clear from diagram that on an average 25% output is sold within the state, 43 percent outside the state and 32 percent is exported. Percentage of fruit processing unit has it is own marketing network in and outside India.

Figour 5.1 Marketing of fruit processed products
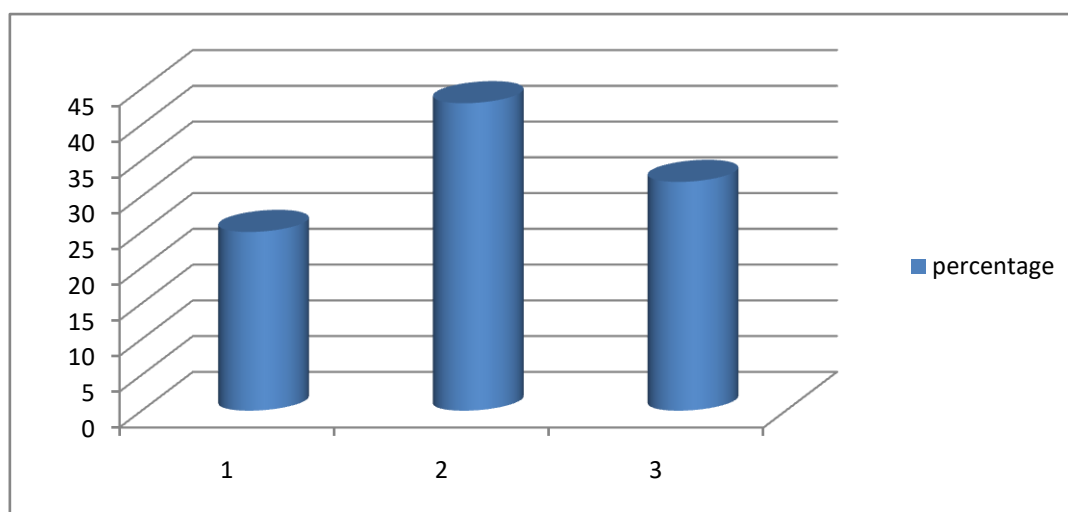
Source: Calculated by the Scholar

The main marketing destinations of fruit processing unit in outside India are Bahrain Qatar, few European countries UAE Oman and GCC countries. One unit has its own marketing network in Ghana. The export and import agents act as the link between domestic market and overseas markets. The processing units in field survey have export license sell directly to import agents of that country, supermarket or other industries in foreign market by adding 25 to 30 percent value to the product to meet the freight and other expenses of packing and forwarding. The import agent or supermarket or foreign retailers adds value to the products by assembling, branding and marketing. Competition from the domestic producers as well as the foreign producers is a threat.

5. 14 Competitive pressures in the fruit value chain

Start-up favourable**:** Government policy makes it easier for the opening of new firms in the fruit processing industries. Skilled human capital better infrastructure and more efficient financial intermediation in Kerala is also favourable for the beginning of new fruit processing industry. Considered in this way, the most important problem faced by the existing firms is competitive pressures. From the experience shared by the sample unit, we can recognize that the fruit processing firms faces strong competitive pressures at the local market as well as the export market**.** As more and more countries have developed their capabilities in industrial activities so barriers to entry in production have fallen and competitive pressures have heightened. The value chain is an important tool for understanding the distribution of returns arising from the final form of the product. Since competition is there, essentially the primary returns accrue to those fruit processing units who are able to protect themselves from competition. The search for new combinations allows the entrepreneurs to escape from the process of competition.
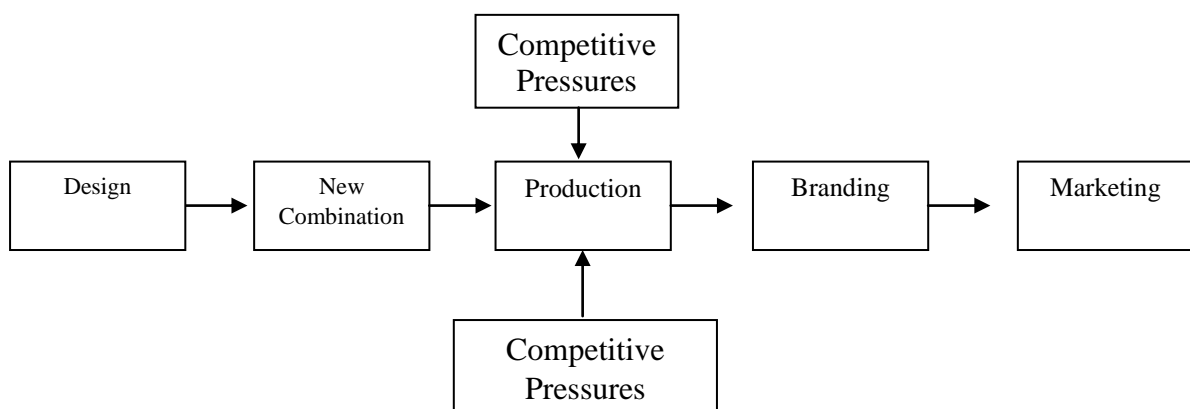
Source: Constructed by Scholar

The techniques followed by the fruit process on from the competition pressure are design, branding and marketing, the areas outside of production. In the case of 'new combination', firms expect research and development and efficient government. support. "Government may also protect producers from competition not just through firm specific policies such as import controls, but also through factor specific policies such as controls on immigration"

5:15 INPUT COST OF PROCESSING UNITS

Table 5.9 Input Cost of Processing Units

Item	Percentage
Cost of fruits	35%
Cost of Intermediate gods/ Processing components	9.5%
Processed food Items	5%
Other Agricultural Output	1.5%
Live stock Pdt I/P	1%
Chemicals	2%
Cost of operational services	55.5%
Fuel minerals	3.02%
Wood paper products	4.5%
Rubber Plastic & Petroleum Pdts	3.15%
Electricity electrical & Non electrical	13.19%
Real estate dwelling & other services	2.1%
Transport	.97%
Construction	2.57%
Water	2.6%
Communication	.95%
Trade Hotel Restaurant	3.11%
Banking & Insurance	1.52%
Tax & other expenses	2.1%
Advertisement cost	1.54%
Labour cost	5.42%
Total	100

Source: Estimated by the Scholar

It is clear from the table 5:9 that cost of inputs is 35%, cost of intermediate goods is 9.5% and cost of operational services are 55.5%. The food processing units made 65% of value addition by adding 9.5% of processing components and 55.5% of operational services. The cost of intermediate goods includes cost of processed food items, other agricultural output live stock products and chemicals that are used in during the different stages of processing.

Processed food item includes sugar vanaspati other oil, tea, coffee, miscellaneous food products and beverages that are used in processed food. Other agricultural product means the pulses and cereals that are used for differentiated products.

Live stock products such as egg, ghee, honey, milk are used for making delicious products. Chemicals such as Sodium Chloride, food colours, Potassium Metasulphate Citric Acid, Sodium Benzoate etc are used for the preservation purposes.

Costs of operational services are classified on the section in input output transaction table.

Tax expenses, advertisement cost & labour cost are also added for the complete picture of operational service cost. The cost of natural gas and crude petroleum products are included in fuel minerals and it incurred 3.02% of total cost. Cost of packing materials such as bottle, jars, wood boxes, paper boxes, plastic bottles covers & tins are included in the next two categories and it is worth 4.5% and 3.15%. Electrical and non electrical includes hand tools, spare parts of industrial machinery machine tool, wires cables, battery electronic equipment and electricity charges and it incurred 13.19% of total cost. We can see that it is the highest cost in operational services. Business services, computer and related activities legal services, real estate activities and social services include 2.1% of its cost. The second highest cost incurred for transportation purposes that are 9.73% water and communication costs are 2.6% and .95% respectively. Trade and Hotels and restaurants incurred 3.11% of total cost. The next categories of operational cost are banking and insurance expenses and it is worth 1.50%. Firm spends 1.54% of its total cost for their advertisement purpose. Labour costs of food processing industries are approximately 5.42% of its total cost. From the primary survey we can observe that tax expenditure incurred for food processing industries are 2.1%. It is clear from the above discussion that though the share of processing unit in processed food products are 65%, it incurred several cost such as intermediate goods and operational services. It can therefore be conclude that though the addition made by food processing unit is greater than that of the farmer, their cost share also high compared to the farmer.

5.16 LINKAGES AND INTER-DEPENDENCE OF FRUIT VALUE CHAIN

Value chain is not a collection of independent activities. There exist linkages and interrelationships among activities in the value chain. Porter defines "Linkages are relationship between the way one value activity is performed and the cost or performance of

another". It is important that all activities are not value creators. Some existing activities may be destroying values or draining capital. If so, such activities need to be rearranged or outsource. Integration of activities is needed to manage interdependencies or to co-ordinate these linkages. Such type of ability on the part of management often reduces cost. These linkages and inter relationships among the value chain are the opportunities that can be developed to achieve synergy and competitive advantage.

This section is an attempt to recognize the linkages and interrelationships among activities in the fruit value chain as well as among the sectors in the economy. There are several ways to classify interrelationship such as by participants in linkage, by purpose of linkage etc. The two methods which are used to illustrate those interrelationships in this study are linkage with participants (internal or external) and linkages with direction (forward or backward).

5.17 INTERNAL LINKAGES AND EXTERNAL LINKAGES

Based on the participants in the linkage, interrelationships can result from internal linkages or external linkages. This type of linkages and interrelationships among the value chain has significant role to achieve competitive advantage since each and every food processing industry involved in the processing of differentiated products as well as different products.

Table 5.10 Internal Linkages And External Linkages

Internal Linkages	External Linkage
• Intra unit interrelationship • Intra firm interrelationship • Inter unit interrelationship	• Inter firm interrelationship • Network interrelationship

Source: Constructed by the Scholar

5.17.1 Internal Linkages:

"An internal linkage is one that describes a relationship that can occur when value activities are performed within one unit or between two units in the same firm. "Internal Linkages result in three different kinds of interrelationships intra unit interrelationships intra firm interrelationships and inter unit interrelationships.

An intra unit interrelationship can occur when the activities in value chain of differentiated products of a firm in question are performed by that one unit itself. In the case of fruit value chain intra unit interrelationship is strong. The surveyed processing units are

97

involved in the production of several differentiated products. The activities of the value chain of each differentiated product are not independent. The value chain activities of a product in a unit are depending on the value chain activities of another product in that unit. This interrelationship results from linkages within one value chain. Intra unit interrelationship: For example, the activities and services involved in the processing of Pineapple jam and Grape jam are interrelated. The value chain of apple jam in a unit and value chain of grapes jam in that unit are interdependent. And these interrelationship results from one value chain.

An intra firm interrelationship can occur when the activity in question in one unit value chain is provided by another unit in the same firm. These interrelationships result from an internal linkage between two units (two value chains) of the same firm in the production of differentiated products. These types of interrelationships are rarely seen in the fruit processing industry at primary survey. In the linkage of value chain of 26 sample units there is no flow of materials or services between the firms. Intra firm interrelationships: The activities and services involved in the processing of jam with any fruit in a particular unit and the activities and services involved in the processing of jam with any fruit in another unit are independent. Thus are no such interrelationships or interdependence between two units of the same firm.

An inter unit interrelationship can occur when sharing takes place between two difference products in a unit. That means internal resource sharing. Sharing of activities or skills takes place between the two value chains. Since there internal linkages are generally between different products we can describe it as business unit interrelationships. Inter unit interrelationships are very strong in the case of fruit processing industry. The sample unit, medium scale as well as large scale industries, produces more than four to eight different products. The value chain activities of each difference product are interrelated. The activities such as purchasing processing, distribution sales etc. of different products in a unit are interdependent. They act as same for the whole different products in a single unit. Inter unit interrelationship: from the field survey we can observe that sharing of activities and services take place between different in a unit. Internal linkages take place between the value chain of squashes and the value chain of jellies or the value chain of jams and the value chain of sauces

5.17.2 External Linkages

An external linkage is one that describes an interrelationship between one unit and an outside external firm. External linkages result in two kinds of interrelationships inter firm interrelationship and network interrelationships.

An inter firm interrelationship can occur when an activity needed in one unit's value chain is provided by an outside source. It is an external outsourcing or external linkage between one unit's value chain and the value chain of another firm. The food processing industry is experiencing growth in outsourcing partners. Outsourcing for such firms includes some activities such as product development warehousing, cold storage, customer analysis and research. Medium scale firms are increasingly avoiding cold storage & ware house facilities because it needs of increasing cost and most modern technologies.

A network interrelationship can result from the linkage between a unit/ firm and one or more outside firm. That is external resource sharing with more than one external firms. These interrelationships are designed to create a new value chain that is shared by all partners.

5.18 BACKWARD LINKAGE & FORWARD LINKAGE

In order to study the backward linkage and forward linkages of fruit processing industry in Kerala we attempted to produce an input output table on the basis of primary survey. The resulting table has been prepared for 25 sectors. It is an aggregation of 130×130 structure of IOTT prepared by National Account statistics. 130×130 matrix in the IOTT has been collapsed to a 25×25 matrix and they prepared a IOTT as in the case of 2013 – 14 IOTT. Therefore, the officially published IOTT and the prepared IOTT in this study contain the same 130 sectors and subsectors. Therefore, the comparisons between the tables become possible. In terms of IOT the horizontal values represent forward linkage of a particular commodity while the vertical values represent backward linkages.

Table 5: 11 Backward Linked Sectors of [Fruit Processing Industry] sample units

No	Different Section	Linked with	
		Yes	No
1	Agriculture	✓	
2	Animal husbandry	✓	
3	Forestry		—
4	Fishery		—
5	Fuel minerals	✓	
6	Non fuel minerals	✓	
7	Manufacturing food and bev. & tobacco	✓	
8	Textiles and leather		—
9	Wood and paper products	✓	
10	Rubber, plastic, coke and petroleum products	✓	
11	Chemical and chemical products	✓	
12	Non metallic minerals products		—
13	Metal and metal products		—
14	MFG electrical and non electrical	✓	
15	Transport equipment	✓	
16	Miscellaneous products		—
17	Construction	✓	
18	Electricity and water	✓	
19	Transport storage & communication	✓	
20	Trade hotel and restaurant	✓	
21	Banking and insurance	✓	
22	Real estate dwelling & other services	✓	
23	Education		—
24	Health		—
25	Public administration		—

Source: Estimated by the Scholar

5.18.1 Backward Linkages

Fruit processing industry demanded various industries output as input for the production of its output. That means some industry's forward linkage became the backward linkages of another industry. Here we analyse the backward linkage of fruit process industry in Kerala.

In the case of IOTT 2003 – 2004, the food processing industry has backward linkages from 77 industries. This means 77 industries output is used its input for the production of processed food. In the case of 2013-14 IOTT the food processing industry has backward linkages from 21 industries. The whole economic activity is classified into 25 sectors out of these 25 sectors, 21 industries have a interdependence with food processing industry.

From the IOTT that prepared with the information collected from the field survey, in this study we can observe that the fruit processing industry in Kerala has the direct backward production linkage with 15 industries. This means 15 industries output is used as its input for the production of fruit processed food items. Out of the merged 25 sectors of the whole economic activities, 15 industries have an interdependence with food processing industry. 15 industries include 60% of the total economic activities. As the linkage effect increases the growth of those industries also increases.

The sector wise classification of backward linkage effect of fruit processing industry is significant. Out of the 15 backward linkage industries, 3 industries from primary sector, 6 industries from secondary sector and 6 industries from tertiary sector. As per the primary data analysis the backward linkage of fruit processing industry in the case of number of industry priority mainly goes to secondary as well as tertiary sector, and least to primary sector. Agriculture, Animal husbandry and fuel minerals are the three industries in the primary sector which has the backward linkage of fruit processing industry. Fruit processing industry has backward linkage with manufacturing food and beverages, wood and paper products, Rubber plastic coke and Petroleum products chemical and chemical products, electrical and Non electrical products and transport equipment in the secondary sector. The other an industry with which has backward linkage by fruit processing industry is Construction, Electricity and water, Transport, storage and Communication, Trade Hotel and Restaurant, Banking and Insurance and Real estate Dwelling and other services industries are belongs to Tertiary sector.

Another important aspect is that more than half of all fruit processing industries in value terms organists from agriculture sector itself. That means fruit processing industry has highest backward linkage with agriculture in value terms.

Out of the total inputs 55% comes from fruits, 10% comes from processed food 2 % comes from live stock product and 1.5% comes from other agriculture input such as grain, pulses, coconut, groundnut etc. That is 68.5% of its total input comes from agriculture sector. Agriculture sector become the most important key sector of food processing industry. It also emphasis the importance of agriculture products as its value addition process.

5.19 LEAKAGES IN LINKAGES

The important observation of this study is the linkages as well as leakages in our economy. To overcome the seasonality of raw materials these firms procure fruits from

different states. These processing units normally purchase fruits from Kerala itself during the harvest season only. During off season in Kerala these processing units are interested to collects fruits from other states where they have harvest season. Ninety five percent of primary surveyed units prefer to purchase from states instead of purchasing from government ware house. Karnataka, Tamil Nadu, Maharashtra and North India are the other fruit purchasing states. The weather condition also influences the quality of fruit. The fruit may got at its best quality on the proper harvest time period. The quality of end products may vary with the colour and taste of the fruits. This also a main reason depending other states for procuring fruits on off season in Kerala.

Really it is a leakage to our economy. Procurement is very expensive. It is only affordable to large scale firms. So, only such units are willing to procure fruits in harvest season in bulk quantity. In their opinion the transportation cost from other states is less than the procurement expenditure. The consumption of these fruits from other states leads to the leakage to our economy.

Procurement for a long time period needs modern machine and advanced technology. It needs high rate of capital. Therefore, procurement of fruits in harvest season become limited. Since the fruit processing industry flourished, the wastage of agriculture products is not banned. The seasonal overproduction is always at there. So, in order to boost agriculture as well as to arrest the wastage of agriculture products, procurement facilities have to be developed. Our state should have enough capacity to procure fruits and other agriculture products in bulk. This will also help the farmers in the harvest season to get normal price for their products. Otherwise, they are compelled to sell their product at a very pathetic rate, since their products are perishable.

5.20 CONCLUSION

Fruit processing industry are highly linked with primary sector. There has a strong and steady linkage between fruit processing industry and agriculture sector. Though fruit processing industry is a sunrise industry in the industrial context its performance is a great relief in the midst of the poor agricultural development of the state. The potential growth of the fruit processing industry however is not explored properly. The extent to which its potential growth can be explored in the background of actual dynamism of the various actors is a crucial question to be addressed. With value chain framework, this study made an attempt towards this. Value chain describes the full range of activities which are required to bring a

product or service from conception through different phases of production, delivery to final consumers. The value chain analysis would enable the adoption of adequate measures for realizing the full potential of the fruit processing industry. The institutional policies and strategies of actors may affect the distribution of income and competitiveness of the actors in the chain.

CHAPTER 6

ROLE OF STATE IN PROMOTING FOOD PROCESSING INDUSTRY

Emergencies

Farmers and agriculture sector

Industry

Opportunities in Food Processing Industry

Suggestions

Conclusion

6.1 INTRODUCTION

Food processing Industry is the subject of concurrent list so both of the central and the state govt. can make rules, regulations and policies for its devt. The govt. has therefore been focusing on commercialization and value addition to agricultural products, minimizing post harvest wastage, generating employment and promoting exports. The govt. has formulated and implementing several schemes to achieve all these goals and enhance food processing sector.

For this purpose Govt. set up a separate ministry (Ministry of food processing Industries) in July 1988 to give on impetus development of food processing sector in the country. The ministry of food processing, Industry has been therefore focusing on better utilization and value addition of agricultural products, minimizing post harvest wastage, induction of modern technology in to the FPI and encouraging research and development in food processing industry. The ministry act as a catalyst for bringing in greater investment into this sector. The ministry is providing policy support and facilities to promote value added exports. Foreign direct investment is permissible for all the processed good products up to 100% an automatic route except for the items reserved for micro and small enterprises (MSEs). FDI is permissible under automatic route up to 24%. However in case of export oriented units of FDI is permitted even case of items reserved for small scale sector. In addition the export oriented units are given a number of incentives and concession under the export import policy. Such as duty free import of capital goods raw materials and intermediates export income being exempt from corporate tax. Secondly the Indian Govt. has abolished licensing for almost all FPI except for some items like been potable alcohol and wine, cane sugar etc. It also creates the critical infrastructure to fill the gaps in the supply chain from farm to consumers.

The main objectives of this chapter have been the following:

First, it has tried to make an assessment of the economic losses & important hurdles faced by fruit cultivators and enterprises in food processing industry in Kerala. Which are likely to become major challenges for farmers and enterprises in getting back on their feet in the coming weeks and months

Second it has made a review of the important policy incentives that have been taken by the state in time to time to promote the growth of the food processing sector in the country, which are likely to become critical challenges in these emergency days.

Third the study has tried to understand the expectations of enterprises in Kerala with respect to the policy initiatives from the state and Central Governments to tackle the crisis in the economy.

6.2 DATA SOURCES   This chapter is based on an extensive analysis of the primary survey. We have prepared a well structured questionnaire with most relevant question related with this pandemic condition and sought written responses on it from 26 sample food processing units. It is also based on discussions with a selected number of farmers and dealers who are involved with fruit cultivation during the time of case study. This study is also used the relevant informations from publically available sources such as Department of industrial policy and promotion, Reports of Govt. of India planning Commission and MOFPI reports.

6.3 EMERGENCIES

FLOOD This study is conducted during several emergencies. The first one is the severe floods of 16th August 2018.These floods have completely changed Kerala. In 2019, there were floods in some parts of Kerala again and it went through many natural calamities like hurricane. The floods of 2018 shocked the people of Kerala as a whole and were completely unfamiliar to the people of Kerala. Unexpected heavy rains presented extraordinary views to Kerala. The people of Kerala have gone through some off the worst days of the century. According to the calculations of Kerala government, the people of Kerala were affected by the flood at the rate of one in six.

COVID The next is the outbreak of Covid epidemic.Covid shook agriculture and industry as we stepped to the path of survival from such a major natural disaster. At the survey time world is facing threat of Corona Virus Disease known as Covid 19. The first case of the corona virus was reported in the end of 2019 in the Wuhan city of China. Then it spread to all over the world. The spread of corona virus compelled social distancing which led to the shutdown of institutions, business, offices, markets, events, seaport, airport etc. The countries are compelled to ban export and import also. The spread of corona virus shifted the global economy as a whole. Thus health crisis translate to an economic crisis. Due to the Covid 19 India govt. has lockdown the country for 41 days. The complete lockdown in India has affected agricultural sector, industrial sector and service sector in all states of the nation.

The economic crisis associated with Covid 19 Pandemic unprecedented. Previous disasters were mainly natural disasters such as flood, when the economy suffered damage to its productive capacity over a specific time, with measurable consequences in the short and

medium term. The production of goods and services during the Covid 19 Pandemic came to an abrupt and almost total halt. Further the halt to production during the Covid 19 Pandemic is not locality or scale specific. Its effects are from top to bottom and across all locations. There is uncertainty about the period that will take to résumé production after the crisis is over. There is also uncertainty about how long it will take to resume production after the crisis is over. There is also uncertainty about how long it will take to achieve previous levels of production. This is because the resumption of production involves national and international supply and distribution chains. It is essential to assess the state of agriculture and industry in this period and the interventions on the part of the government in it.

LOCKDOWN   Union govt. as well as state govt. declared Lockdown due to wide spread of corona virus. Complete transportation and each and every sector in the economy have closed arbitrarily in order to keep social distancing. The corona virus out break and spill over to the every aspect of the Indian economy and it also spread an uncertainty about the future situation. For India the trade impact is estimated to be the most for the chemical sector. It also affected the pharmaceutical supply chain. The corona virus disrupted the higher education industry. The most visible outcome of the Covid 19 crisis was on financial markets as the effect in the global stock market. The severity was felt in various sectors of the economy with travel bans affecting the aviation industry, sporting event cancellations affecting the sports industry, the prohibition of mass gathering affecting the events and entertainment industries. During the pandemic there was a general decline in value of bank transactions a decline in card payments and a fall in the use of ATM cash machines. This led to fewer fees collected by banks which negatively affected banks profit.

Printers that manufacture packaging are shut vehicles of suppliers of packaging materials are getting detained and the flight shout down has led to goods being stuck in different parts of the country that need to be airlifted. The problem is not just the movement of final product but even the ancillary goods which are materials intended for making finished product.

The problem of availability of essential goods across offline and online channels is getting worse. Online food delivery starts ups Swiggy and Zomato are operating with very few restaurants available on their platforms. As head of the lockdown announcements by many states, ecommerce raw sharp spike in orders but started facing logistical difficulties in meeting the sudden surge in demand. Such platforms witnessed

massive increase in absenteeism among the on ground staff as high as 75 – 80% for some large retailers. Staffers were unable to come to work due to transport problem and blockades at state borders led to new supplies being cut off and huge delays in deliveries to customers.

It is very difficult for staff to come to the store. They have been harassed and beaten up by police in various states. Several incidents of police crackdown on retail employees and closure of warehouse were also reported. They have been closed due to police action.

Retailers said supplies of various essential products have come to a stand still as many states like Karnataka, Tamilnadu, UT of Delhi among others have sealed their borders and are hampering movement of trucks. Fish and meat processes have already been hit. Thousands of small and medium units dealing in flour, rice, dal, oils and sugar have also closed due to the high handedness of the local authorities they said.

The agriculture sector, much more dependent on natural factors has faced many challenges in the course of its journey. The most recent threat in Covid 19 and it is impacting agricultural sector not only in Kerala but all over the country. As a result the entire activity of agriculture sector, harvesting, and processing form gate sale are likely to be disrupted. The Covid 19 crises resulted in limited public transport system absence of business activity, low container traffic, slow down port operation and banned exports.

6.4 FARMERS AND AGRICULTURAL SECTORS

The situation of fruit growers in Kerala became pathetic by Covid 19 and with the subsequent lockdown. Banana and Pine apple growers were most affected; Wayanad is the largest banana growing district in the state. The average harvest in the district from June to August is over one lakh tones. At least 1.25 crore bananas are grown on 5000 to 6000 hectares of land during the season. Thriruvananthapuram is one of the important markets for bananas exported from Wayanad. Bananas from Wayanad reach Kayamkulam, Pathanamthitta, Kollam and to Mumbai. The department of Agriculture and Horticrop estimates that over 60,000 tonnes of bananas were planted in Wayanad.

In the previous years, it was up to Rs 40 per kg and during the lockdown period it was Rs. 15 – 16. The truth is that even if it is sold for Rs. 16, the farmer will not have any surplus. If the farmer sells at Rs. 16 at the market price, the average income per bunch is 136 Rs. When that happens, the farmer losses Rs. 44 on a bunch. The situation is similar banana

cultivators in Thrissur and Palakkad. At this time the farmers had no choice, but to watch the bunches perish.

During the lockdown period losses were reduced substantially because of the timely intervention of the department, VFPCK and Horticorp. The Farmers Retail Outlets (FRO) set up locally (one each in every Panchayat, two each in Municipalities and five each in corporations enabled farmers to sell their products locally to consumers. The online marketing strategy adopted by the govt. agencies helped in the direct sale of products like mango pineapple banana, papaya and vegetables to the city dwellers. Moreover inter District movement of surplus produce was also organized.

From March 23, 2020 till April 13, 2020 Horticorp produced 1200 MT of fruits and vegetables from farmers and outside the state. Online marketing of fruits and vegetables to the consumers was arranged through private online food delivery portals in Thiruvanthapuram, Kottayam, Ernakulam, Thrissur and Kannur districts. Supply of fruits and vegetables was also arranged to difference community Kitchens residents' associations' guest worker camps and other agencies throughout the state. Marketing of fruits and vegetables to the consumers also took place through the 100 own stalls and around 200 franchise outlets of Horticrop.

In banana and plantains the most important problem was a sharp fall in prices. The prices of banana fell from Rs 40-45 per kg to Rs 15-16 per kg during the lockdown. A similar lo is expected in the plantain sector also.

In Kerala, the annual production of banana and plantations together is about 8.1 lakh MT. We estimate that the production of banana and plantations in March and April 2020 would be about 1.3 lakh MT. Assuming a Rs 20 per kg loss of price for the farmers the total loss is estimated at about Rs 269 crore for banana and the plantains for the two month period.

In pineapple a major crop in central Kerala the price fell from Rs 20-25 per kg. to Rs. 10-15 per kg during the lockdown. Horticrop and VFPCK made efforts to procure pineapple from the production sites and sell it online. Still for the 50000 MT harvest of pineapple in the state, the losses are estimated at about Rs 50 crore.

Infrastructure facilities

During emergencies such as Covid 19 Pandemic, it is very essential to evaluate the already existed infrastructure facilities. Ministry of Food Processing Industry has implemented several schemes for the development of food processing industry. The scheme for infrastructure development has three components of cold chain and setting up/modernization of abattoirs.

The fact is that none of these schemes, implemented by the government through MOFPI from time to time were insufficient to face emergencies the like Covid 19. Marketing value added products is the only way to protect the farmers when production is high. These infrastructure facilities can accommodate only 10% of the total production in Kerala. Therefore the farmers of Kerala and agriculture are not safe.

6.5 INDUSTRY

According to UN report the impact of Corona virus epidemic for India is estimated to be about 348 million dollars and the country figures among the top 15 economics. The corona virus out break and spill over to the every aspect of the Indian economy and it also spread on uncertainty about the future situation.

All firms were closed during the lockdown period. Many entrepreneurs were not able to open their firms immediately even after lock down.

The firms in the sample unit are kept closed for at least 2 – 3 months. Many firms were unable to keep their company open for ten months. Two months later, opened institutions could not function in the same way as in the past. The working hours of open firms were regulated on the basis of working hours and days. The firm could not work continuously every day the week. The government had also fixed the working hours of each day.

During the month of March 2020, most manufacturing enterprises in the state lost around 10 days of production. However, manufacture of refined petroleum products, which account for 20 percent of the total value added by the states manufacturing sector continued to operate. Processing of food and beverages which account for 14 percent of the total value added by the state's manufacturing sector has been operating at around 50 percent of its capacity despite the lockdown. Most of the other manufacturing units have been closed due to the lockdown and the subsequent disruptions. It can be assumed that 70 percent of the

manufacturing production in the state was being lost due to the lockdown and the disruptions which started from the third week of March 2020? Some of the major factories in the state producing chemicals have started operations from the middle of April. The lockdown has gradually begun to be lifted in parts of the state from April 20, 2020 onwards. At the same time, many segments of the food industry in Kerala, (as elsewhere in the country) (such as the production of bread, rice products, milk products and so on) have continued to operate despite the lockdown (because of the exception given to these, industries from the lockdown)

As part of the complete closure of Covid 19, many firms have moved on to the concept of differentiated products. Many companies are starting to try new products that are different from the ones they had before. The packing style and the decision to restructure were also noted. Large quantity packers or bottles shifted to small quantity packages in order to approach direct customers.

An important concern expressed by Kerala Vyapari Vyavasayi Ekopana Samithi, an association of traders and manufactures in Kerala was about the possible deterioration to stocks held by enterprises during the lockdown period. Damages to stocks are likely to be high for certain products mainly food products along with cement and clothing.

NUMBER OF WORKERS An important item of expenditure for enterprises during the current lockdown is the money they need for the payment of wages and / or other relief to their employees. This is a particularly heavy burden for labour intensive industries such as footwear or plywood manufacturing or food processing industry. These are also industries which rely heavily on guest (migrant) workers from other Indian states. The requirement for large amounts of working capital creates difficulties for enterprises during a period in which they receive little incomes.

As part of the relief package announced by the Central govt. in March 2020, the govt. will pay both employee's and employer's contributions to the provident fund for three months for certain types of establishments. These are establishments which employ less than 100 workers and in which 90percent of the staff earn Rs 15000 or less (monthly). However, many firms in Kerala point out that they will not be able to avail of this benefit because of the above referred conditions (especially the salary limit of Rs 15000). They appeal that the relief may be made available to all firms.

The food processing industries were no different. Firm were greatly affected by the unavailability of manpower and the inability to operate with the entire work force. Workers

had to be transported safely to the industry, incurring additional financial costs, as well as the extra cost of organizing raw materials and raw materials and supplying products to different locations in times of poor transportation. There are also companies that have been paying wages to workers during the days of the strike. This causes financial loss.

INCOME LOSS Notwithstanding the loss of incomes during the lockdown period firms will have to incur expenditures in a number of items including loan repayments, GST payments, and rent and electricity charges. The payments of wages or other relief to their employees during the lockdown is a heavy burden, particularly for labour intensive industries such as food wear, plywood manufacturing food processing industries etc

All the sample unit firm interviewed in this study said that the present turnover is much lower than in the past.50% to 70% shared that they experienced less turnover. Lack of credit is another difficultly faced by all these firms. That, too – did not affect their business in the slightest. All the industries decided to cut short their investment plan in the context of Covid. But the decision to cut investment by 40% to 70% is worrying.

SUPPLY CHAIN ISSUES AND SHORTAGE OF RAW MATERIALS

Supply shocks are always due to some barriers. Since Agricultural products are perishable commodities Covid 19 disrupted the supply chain of agricultural sector. Lack of labour shortage, bottle neck in the farm gate, sale, lack of transportation and especially lack of availability in local transport led to the slow movement of agricultural goods into market. This has created shortage of perishables. Banned export and import by many countries also affected the supply chain of agricultural products across the world. There has been increase in the costs of products due to increase in the shipping charges of products. Farmers are at risk to lose the market value of their products. E pass issue is another barrier which affected the smooth functioning of supply chain. Lack of credit flow from banking and non banking financial companies also discourages the farmers from the natural agricultural activities. With above discussed barriers the overall supply of agricultural products declined during lockdown period.

If this were the case in the agricultural sector as a whole, the experience of the sample units would have been different. 78% of the sample units also said that they did not face shortage of raw materials. Firms that experienced low availability of raw materials reported a reduction of only 25% to 30%.

LACK OF DEMAND

Manufacturing and trading enterprises in Kerala worry about the possibility of a stagnation of demand in both the domestic and export markets. In fact they say that the demand conditions in the country have already been week for most of 2019 even before the outbreak of the corona virus disease.

The outbreak of the corona virus disease across the world and the lockdown imposed in India to fight the pandemic have substantially weakened export and domestic demand. Many persons associated with industry and trade in Kerala fear that it may take several months for the demand to pick up, even after the crisis is over. Many traders and entrepreneurs say that the months from March to June are typically a period of high consumer demand in Kerala. This is because of festivals occurring during this period and higher demand trading and manufacturing enterprises fear that they may lose out completely on this demand because of the lockdown and the subsequent disruptions.

Fall in market disturb the entire chain of production and demand cycle in food processing sector. Tourism hospitality and aviation are the major sectors that are facing maximum loss in the present crisis. Closed tourism sector cancelled conference, workshops seminar and other events affected the hotel services at huge level There was directly or indirectly was a drop in the demand for processed food products as marriage hotels restaurants, religion ceremonies and other events were closed down or cancelled. Closed air port and sea port, limited transportation facilities and stopped export and trade also affected the export demand of processed food products continuous close down of all sectors and a drop in the demand for ready to eat foods also created a demand shock up. Minimized consuming nature of people during lockdown has become a reason for a fell the demand for processed food products. Thus the overall demand for processed food products remained depressed during lockdown.

Among the sample unit 78% of units recorded a lack of demand for their products. According to them, demand has fallen by 20% to 60%. 22% of sample firm commented that their products had the same demand as before and did not feel the lack of demand.

6.6 OPPORTUNITIES IN FOOD PROCESSING INDUSTRY

The ongoing crisis has highlighted the critical need for and opportunities in Kerala in the area of food and agro processing. As the approach paper to the Thirteenth 5 year plan

noted the growth of agro based industries in Kerala will provide a boost to the production of a rich variety of agricultural products in the state, including rice, coconut, rubber, pepper cardamom banana and pineapple. At the same time, these industries will cater to the large market for food and agro based products within the state and outside. With the disruptions to transport and supply chain networks caused by the corona virus disease, there is now greater appreciation of the importance of self – reliance in the food production and processing even at the regional level. At the same time, Kerala's capabilities in food and agro processing are far from adequate. For instance in recent days, the absence of processing facilities has created serious difficulties and losses for producers of milk and pineapple within the state. Farmers insist that the building of facilities for even primary processing of fruits and vegetables will go a long way towards improving their incomes. Pineapple farmers say that there is an urgent need to create processing facilities within the state to make pineapple pulp (from pineapple fruit)

The state govt. may launch a campaign to accelerate the building of storage and processing capabilities for Kerala's agricultural products, including jackfruit, pineapple, nutmeg and banana. The govt. may encourage young and professionally qualified entrepreneurs in to this field, facilitating innovative ideas in production and marketing of food products.

Here it is essential to discuss the incentives that have been taken by the govt. time to time to promote the growth of the food processing sector in the country. These are as follows:

Policy Incentive

Several policy incentives such as De licensing foreign direct investment and Taxation Policy/ Fiscal Incentives have been taken for the promotion of food processing industry.

1. Most of the processed food items have been exempted from the purview of licensing under the industries (Development and Regulation) act 1951 except items reserved for small scale sector and alcoholic beverage.

2. Foreign Direct Investment is permissible in food processing sector up to100 percent on automatic route except for items reserved for micro and small enterprises subject to applicable laws/ regulations. Securities and other condition cities. Food processing Industry is permissible under automatic route up to 24 percent of the capital if foreign investment is more than 24% Industrial License under Industries (Devt. Of Regulation) Act 1951 is required.

3. Taxation policy/ Fiscal Incentives. To make processed food affordable MOFPI providing tax rebate to the FPI these are as follows.

   a) Income Tax: MOFPI provides Income Tax rebate of 100% on profit for 5 years industries in fruit and vegetables. The income tax exemption has also been provided for the specified thrust area industry including certain FPI set up in the north east including Sikkim, Ultrakhand and Himachal Pradesh.

   b) Service Tax: These are some activities exempted from service tax.

      i. Construction: Commissioning or installation of original works pertaining to post harvest storage infrastructures for agricultural produce including cold storage for such purchases.

      ii. Mechanized food Grain Handling Systems.

      iii. Service provided by a goods transport agency by way of transportation fruit and vegetables milk, food grains or pulses in a good carriage.

      iv. Services of loading, unloading, packing storage or warehousing of agricultural produce are not liable to service tax.

   c) Customs Duty Import of food processing machinery allowed freely. Customs duty rates have been substantially reduced on plant and equipment as well as on raw material and intermediates especially for export products. Most of cost chain equipment like refers vans exempted from customs duty. All imported goods related to food processing would be entitled to at concessional basic uniform assessment at concessional basic customs duty of 5%.

   d) Excise Duty: Excise duty brought down to zero on processed food based on fruit and vegetable, dairy, meat, fish, poultry food ingredients ready to eat foods packaged and limits of excise duty for small scale industries rose from 1 crore to 1-5 crore.

Goods and Service Tax

1st July 2017 onwards GST launched into operation in India. GST subsumes erstwhile state taxes like VAT, octroi. Luxury tax and purchase tax, as well as central taxes like customs duty; central excise duty and service tax

At present, The Trade Promotion Council of India (TPC) urged the govt. for a flat 5 percent Goods and service Taxes on all food processed items to spur the growth of the sector.

Developmental Incentives

MOFPI providing developmental incentives to food processing industries by the different schemes, assistant organizations

1. Human Resource Development (HRD) The ministry has been implementing the scheme for Human Resources Development since 9th plan and onward to augment the supply of trained manpower/ personnel at all levels namely entrepreneurs' mangers, sales persons, floor workers etc for food processing sector.

2. Implementation of HACCP/ ISO 22000, ISO 14000/ GHP/G
The ministry has taken initiatives to increase awareness about food safety and quality issues amongst industry and other stakeholders.

MOFPI also provides financial assistance for implementation of HACCP/ ISO 22000, ISO 14000/ GHP/GMP and other quality/ safety management system. The objectives of this scheme are to motivate the FPI for adoption of food safety and quality assurance mechanisms such as ISO 14000/ ISO 22000 HACCP, GMP, GHP

3. Setting up/ up gradation of quality central/ food testing laboratory.

MOFPI is operating a plan scheme for setting up/ up gradation of quality standard of processed products and to match the international standard "CODEX" set up by food and agricultural organization and WHO. This scheme benefits all stakeholders including domestic industry exporters, entrepreneurs' small and medium enterprises academic and research institution etc.

4. Strengthening of Institutions

This scheme focuses on putting in place new and strengthening of existing institutional mechanisms for human resource development in the food processing sector as well as towards undertaking development activities in areas such as grapes meat and poultry processing etc.

PROMOTIONAL ACTIVITIES

In order to create awareness about the potential and prospect of FPI in the country MOFPI provides financial assistance for organizing workshop seminars, exhibitions and fairs.

Ministry also participate in National/ International exhibitions/ fairs to disseminate information regarding the untapped potential of food processing sector in the country and to

familiarize the entrepreneurs with modern techniques of production and packaging development of market investments into the sector.

6.7 SUGGESTIONS

The sample units have several suggestions also

CONCESSION OF TAX: Introduction of Goods & services tax (GST) in 2017 have aggravated the problems faced by tiny and small manufacturing firms in India. They have now received bank accounts and have to pay GST, but they still find it tough to access working capital loans. At the same time GST payments have now become a new source of worry for the entrepreneurs. Enterprises in Kerala have demanded significant support for them from the GST system. To begin with they expect to see a much speedier process in the repayment of GST dues for them from the govt. Speedier GST repayments will provide substantial relief for these firms in respect of their working capital position.

Sample units expect to receive some concessions too from the GST system. An association of traders has appealed that the govt. may repay GST levied current stock, which got damaged during the lockdown period. Some manufacturers have suggested that they may be allowed to reschedule their GST payments, which are due during the period of crisis, to a later date. At the same time, there should not be any interest charges for rescheduling the payments.

MORATORIUM OF DEBT : Given the nationwide lockdown, the Reserve Bank of India has allowed banks and other financial institutions to provide a moratorium of three months on the payment of equated monthly installments (EMIs) to all borrowers of term loans. The moratorium does not imply any waiver on the repayment of the principal amount or interest charges. It only means that the payments of EMIs can be rescheduled to a later5 date. At the same time however borrowers will have to pay simple interest on each of the monthly installments (EMIs) for the period for which they defer the payments. This amounts to an increase in their overall interest burden. Representatives of small enterprises fell that relief measures for them should include not just a moratorium on EMI payments but also some reduction in interest rates. Entrepreneurs in Kerala expect to receive arrears in payment and restructuring of debt.

ASSISTANCE FROM THE BANKING SYSTEM: Enterprises in Kerala expect to receive high degree of assistance from the banking system and govt. to tide over the current crisis.

Many entrepreneurs demand that there should be substantial or even a complete waiver of interest payments during the moratorium period. At the same time they also demand that the moratorium period should be extended to a year. Entrepreneurs fear that the current proposals by the Reserve Bank of India, which involve only a rescheduling of EMI payments for three months and not any waiver on interest rates, may actually increase their overall financial burden.

Another demand from small enterprises is that the banks should provide them with at least 50 percent higher (than what is normally allotted for them) levels of working capital with no additional collateral. Speedier repayments of GST dues to the enterprises by the govt. will be a great relief to these enterprises. Entrepreneurs have appealed to the state Govt. and the local bodies to give concessions for them on certain payments, including fixed changes imposed by KSEB, during the crisis period (the state govt. has now agreed to waive KSEB's fixed charges.

The norms adopted by banks with respect to categorizing a loan as non performing asset (NPA) have been a major source of anxiety for small enterprises. If a borrower fails to make loan repayments for three consecutive months banks categorized her loan as NPA. Subsequently, banks begin to charge higher (period) interest rate on this loan and even initiate loan recovery measures. Such an approach by banks on loan defaults can turn out to be counterproductive for small firms especially during a period of general economic recession given the current crisis, banks should consider the longstanding demand from small enterprises to adopt a more sympathetic attitude to them with respect to loan defaults.

WORKING CAPITAL SUPPORT : The challenges faced by enterprises with respect to working capital needs are severe now as the ongoing economic crisis is widespread, affecting most industries and most regions of the world. Small firms in Kerala and elsewhere in the country supplying parts or ancillaries to the bigger firms face delays lasting between 43 and 90 days for payments from the latter. In some instances payments may be delayed up to six months. This had been the situation during normal times with the ongoing crisis in the economy; small firms fear that they may have to wait longer than unusual to receive their payments.

The financing of working capital requirements poses a heavy burden for the entrepreneurs of small firms. Typically working capital requirements are bigger during the periods of recession due to the slowdown in orders and worsening in the nonpayment of dues.

On the other hand, banks are particularly reluctant to provide loans to firms during periods of recession (because of fears of loan defaults). As a result entrepreneurs have to take loans at high interest rates to maintain their operations.

RELIEF FROM PAYMENT: Enterprises have appealed to the state Govt. and the local bodies to give concessions or relief on certain payments. These include payment for the renewal of a number of licenses (some of which are issued by the local bodies). An important demand from many enterprises has been that they should be exempted from the payment of fixed charges due to Kerala State Electricity Board until the end of the crisis Govt. of Kerala has now announced that the payment of fixed charges on electricity may be deferred by six months.

Both manufacturing and trading enterprise appeal that there should be some waiver in the monthly rents they have to pay during the period of the crisis. Trading establishments in particular point out that rental expenses are quite high in Kerala (relative to the rest of India). While governmental institutions (such as KSDC and KINFRA) have been working out details on giving rental concessions (on industrial spaces rented out by them) private owners of commercial buildings may also be encouraged to provide some concessions on rent. Another demand from the pair of entrepreneurs was water charge subsidy.

OTHER ISSUES AND SUGGESTIONS: Many firms have been thinking about issues that may arise in the immediate post lockdown phase. One of their main concerns relate to maintaining social distance at the work place and arranging transport facilities for workers who used to commute daily for work.

Some manufacturing firms have been considering options to maintain social distance at the factory when the factories reopen after the lockdown. Installing plastic curtains between workstations is a possibility. However there are worries that this may reduce machine speed and involve additional expenses.

Some of the enterprises point out that they will be able to operate only with a critical number of workers on the shop floor. Also their operations will have to be carried out more or less on a continuous basis. In other words, during the post lockdown phase, if the regulations were to permit their operations only on a few days of the week with a very limited workforce, they will face serious challenges.

It is often remarked that moments of crises sometimes open up new and exciting possibilities too. Some entrepreneurs we talked too appeared to share such a sentiment. They emphasized the need to rethink their businesses, upgrade technologies, enhance value addition and embrace innovative practices.

For instance some of the units suggest that they may be supported with funds for technological upgrading through the government's cluster development programmes.

6.8 CONCLUSION

The economic crisis associated with the Covid 19 Pandemic is unprecedented. Previous disasters were mainly natural disasters, when the economy suffered damage to its productive capacity over a specific time, with measurable consequences in the short and medium term. The production of goods and services during the Covid 19 pandemic came to an abrupt and almost total halt. Further the halt to production during the Covid 19 Pandemic is not locality specific or scale specific. Its effects are from top to bottom and across all locations. There is uncertainty about the period that it will take to resume production after the crisis is over. There is also uncertainty about how long it will take to achieve previous levels of production. This is because the resumption of production involves national and international supply and distribution chains.

Kerala had received praise from different parts of the world for its successful management of the crisis so far, for its strong social institutions and efficient governance mechanisms. This is indeed an opportune moment achieve a revival of agricultural and industrial production and of entrepreneurial spirit in the state The goodwill that Kerala has earned for its achievements in the health and social sectors should form the spring board for the states' successful entry into a range of innovative industries including foods processing, biotechnology, Pharmaceutical research and medical equipment manufacturing.

The state govt. may launch a campaign to accelerate the building of storage and processing capabilities for Kerala's agricultural products including jack fruit, pineapple nutmeg and banana. The govt. may encourage young and professionally qualified entrepreneurs into new opportunities in food and agro processing facilitating innovative ideas in production and marketing.

Chapter 7

Summary and Conclusion

Summary

Findings

Policy Implications

Conclusion

7.1 INTRODUCTION

Food processing industry is considered as a sunrise industry in the industrial context of Kerala. Its best performance will be a great relief in the midst of poor industrial development as well as the poor agricultural development. However, the potential growth of food processing industry is not explored properly even now. The extent to which its potential growth can be explored is a crucial question in the economy to day. This study is an attempt towards this question through the background of linkage effect analysis and value chain frame work. These two methods would enable the adoption of adequate measures for realizing the full potential of the food processing industry.

7.2 SUMMARY

The main objectives of this study are to identify the extent of linkage effect through backward and forward linkage calculation and to identify the whole activities in value chain of food processing industry by understanding various actors in the chain, their relative contribution performance of processing units etc. This study has been carried out by two different angles ie. Leontief linkage coefficient with the help of IOTT (2003-04 and 2013-14) and other value chain analysis through primary survey of food processing units. This study is arranged in seven chapters. This section sums up the whole study briefly.

The first chapter reviewed the all relevant research works related to this study. An attempt has been done in order to understand the various concepts, research methodologies, analytical tools and findings of past studies and set the objectives accordingly, such as, to understand the structure and characteristics of food processing industry to examine the backward and forward linkage of food processing industry, to analyze the value chain of fruit processing industry in Kerala and to assess covid impact on food processing industry. The chapters have been set on the basis of the objectives.

The second chapter discussed about the related theories in this study Wassily Wassilievich Leontief's Input Output method, Albert Otto Hirschman's Linkage effect and Micheal Eugene Porter's value chain analysis are the macro economic theories that are used in this study. Build upon a research on the basis of theory gives a strong persistence for that research. This chapter deals with the complete and comprehensive description of all these theories. The second chapter proceeds with the various concepts and definitions related with this study.

The third chapter focuses on the present status and characteristics of food processing in all India level as well as in Kerala level. The secondary data provided enough proof to display that Indian food processing industry is undergoing rapid transformation. The secondary data related with number of factories employment gross value added, invested capital input, output export import and contribution to gross domestic product are discussed separately. The secondary data is again indicates the fact that food processing industry is important to the nation as well as the uplifting of agriculture.

The fourth chapter examined the second objective such as to examine the backward and forward linkage of food processing industry. Statistical calculation of linkage coefficient strengthen the nature and intensity of backward and forward linkage effect of food processing industry Leontief input output system has used for the measurement of linkages. Comprehensive studies of Indian Input Output Transaction Table of 2003-04 and 2013-14 have done. The calculated values of forward linkage coefficient and backward linkage coefficient shows that food processing industry is a strong backward linkage sector or backward oriented sectors or section depend on their industry supply.

The attempt in the next chapter is to find out the potentiality of fruit processing industry in Kerala economy. There is no authority has published IOTT for Kerala. Therefore to find out the potentiality of fruit processing, study uses Value Chain Analysis Primary data has collected from 26 fruit processing units. From the data obtained from the primary survey, we can identify the fruit value chain actors such as growers, traders, transporters, local processors, agents or middleman, large scale processing units, retailers, marketers & final consumers.

In the case of fruit processing, percentage of value addition over the value of raw materials are 33 percentages. From the primary survey we can observe that intra unit & inter unit inter relationships are strong in the case of fruit processing industry, at the same time intra firm inter relationship are very rare.

This study is going on the time of emergencies such as Kerala flood, corona etc. As a perishable input fruit processors has to suffer much more compared to other industries. These kinds of volunerability of fruit processing industry are discussed in the sixth chapter.

Thus the entire analysis is expected to throw light on the feedback effect of agricultural value chain and linkages to the agriculture sectors as a whole and the kind of role played by the state in the process of value chain and its feedback effect.

7.3 FINDINGS

The major findings of the study are summarized as follows:

- The study identified that fruit processing sector plays a significant role in Kerala economy in terms of income employment and export earnings.

- There is a noticeable growth in the number of food processing industry.

- Food processing industry stimulates induixve and sustainable economic development through various types of forward backward linkages.

- Food processing industrial linkages enhance primary and secondary employment opportunities.

- It strengthens the bargaining ability of farmers for a better price for their raw products.

- Food processing industry has strong backward linkage with agriculture sector and strong forward linkage with secondary sector.

- From the calculation of Leontief Technical Coefficient we can say that the food processing industry is a strong backward linkage sector or backward oriented sector.

- Backward production linkage of food processing industry is much stronger than its forward production linkage.

- The analysis of survey results reveals that an increase in the dependency of Kerala for fruits on other states which retard the sustainable devt of the fruit cultivators.

- In order to reduce the dependency on other states for fruits food processing industries and cold storage units are to be promoted.

- The role of each actor in the value chain is analyzed in terms of their relative contribution in order to estimate the efficiency of the chain. The various actors identified in FPI industry are farmers traders agents or middleman transporters, Local processors, wholesaler large scale processing units retailers marketers & final consumers.

- The share of farmers is low and it means that farmers contribution comes down as it moves from low value added products to high value added products.

- In the case of fruits, the role of the processors are high as they are able to increase the value addition through processing of fruits

- The field survey findings shows that the role of agents or middlemen are low.

- Compared to the other actors the share of manufacturers is the highest in the value chain of food processing industry. Moreover their share goes up as a product is processed further from low value added products to high value added products.

- In Kerala ownership of large scale units as majority are limited companies. As against this, majority of the medium scale processing units are either proprietary or partnership firms.

- The cost of procurement of fruits in very higher. Therefore the fixed capital to be employed in food processing industry is a huge amount.

- It is inferred that the net value addition in fruit processing sector in higher. The average net values added by fruit processing units are 33%.

- Instability in price, insufficient infrastructure inadequate processing leads to wastage and underutilization of for seasonal fruits. Most of forts are needed to solve this problem through its backward & forward linkages.

- The discussion with the farmers reveals that there exist unutilized fruits in each seasonal and there is further scope for expansion.

- The study identified that food processing of industry Kerala faces many challenges in the form of lack of capital, high cost of production. Competition from large and established branded firms.

- Insufficient infrastructure for production distribution and marketing also causes a ban in the full fledged growth of food processing industry.

- Shortage of cold storages and other facilities to the procurement of fruits are the main challenges faced by the processing units.

- High cost and unavailability of modern processing technology, lack of trained and skilled workers also become the reason for the slow growth of food processing industry.

- The fruit cultivators as well as fruit processors need a strong bondage from the part of govt. through integrated and useful policies.

The food processing sector is one of the sectors attracting a considerable share in Foreign Direct Investment. The Foreign Direct Investment is an important source of fund technology, and management which would bring in efficiency in the FP sector analysis shows a fluctuating trend in GVA by FPI, however the contribution of FPI in agriculture, increased. The calculated value of

forward linkage coefficient and backward linkage coefficient shows that FPI is a strong backward linkage sector and backward oriented sector.

In the case of fruit processing percentage value of value addition over the value of raw materials are 33 percentages. From the primary survey we can observe that intra unit or inter unit interrelationships are strong in the case of fruit processing industry at the same time intra firm 'interrelationship are very rare.

7.4 POLICY IMPLICATIONS

The strong linkage found in food processing industry invites the need to encourage its development. Majority of industries have a positive outlook about the future sales and profit. Therefore support at various levels in required for promoting the industry. Long term planning and diversification schemes are required for the procurement of fruits. The major policy implications for the development of FPI in Kerala are presented below.

Research and Technology Development efforts must focus on the procurement of fruits in order to reduce the large investment Capital.

The govt. through its policy measures may subsidise and incentivizes some development efforts such as cold storage.

Research and Development activities for the preservation of fruits must be promoted and popularized among the farmers for effective use of value added products.

Assurance of quality standards and measures will pave for further value creation in terms of branding quality certification which would ultimately result in better export competitiveness.

Processing facilities for higher value added products must be promoted in small and medium scale industries.

The govt. may extend financial facilities to the existing firms instead of starts ups only.

The access to credit particularly from the organized financial institutions has constrained FPI to invest in fixed capital and new technologies and thus expand viably. This should be broken by large scale infusion of credit from the formal sector.

FPI comes under the purview of multiple registration authorities. May be because of this problem, the no. of unorganized FPI is highest. To avoid this it is required to bring them under single registration authority.

Govt. can attract more and more processing units by giving more incentives like interest subsidies, renewal of existing loans and tax exemptions.

7.5 SCOPE FOR FURTHER RESEARCH

Even though food processing industry is highly prioritised subject in the global level, there is only a very few studies have been conducted so far in this area with a specific contribution to the development of food processing industries. The present study used Input Output Transaction Table 2004-14.Therefore the scope of the study limited to the year 2014 which is the last publication in the study period. So there is a scope to future research based on the newly published Input Output Transaction Table which should give more updated information. The study is limited to fruit processing industries as there are 13 subsectors under the classification of food processing industry. There is also a scope to study the performance of other subsectors. The sampling is done only in the large and medium scale industries in Kerala as the majority number of food processing belongs to micro and small industrial group. Performance of micro and small industries has wide scope for the further research. Proper studies from different angles on food processing industries are required highly priority in Kerala Economy.

7.6 CONCLUSION

Indian Food Processing Industry is undergoing rapid transformation. On the supply side vast arable land and diversified agro climatic conditions, India has potential to be a food basket of the world. Processing would take care of seasonal supply and fluctuating demand of agriculture produce. It also stressed on the fact that the progress of the industry towards value addition can reduce post harvest wastage in agriculture sector and use of the seasonal surplus in a productive way. As the number of food processing industry increases it has the ability to impact a large number of people by providing employment opportunities and increasing their income. There is a high potential demand in the export market.. The study stressed on the fact that food processing industry is important to the nation as well as the uplifting of agriculture.

With this detailed study, we can say that food processing sector has the potential to be the driver of economic growth and enhance rural incomes. It shows the need to study the

extensive forward linkage effect of this industry in our economy. This study focuses on the importance of food processing industry from the angle of inter industry linkage perspectives. The sectoral inter dependence of food processing industry reveals the importance of this industry. The structural interdependence between various sectors has provided an analytical case to the understanding of the backward and forward linkage of the industry and it is the first step to identify the key sectors and its linkages. The underlying logic is that food processing sector with powerful linkages with other sector stimulate growth of other sectors. The remarkable character of food processing industry is that its dependence on other sectors for their inputs. This creates leakages in linkages which enables interstate economic activities.

Demand for agriculture products is an important parameter for agriculture development and position, especially in the case of food products. Upscaling of food processing industry has given considerable scope not only to strengthen the synergy between agriculture and food processing but also to arrest the fall in agricultural growth through diversification and commercialization of agriculture and also create new direct and indirect avenues of income and employment for rural people. In order to find out the potentiality of food processing sector to be the driver of economic growth and enhance rural incomes, the study of forward and backward linkage effect of this industry is a best method. The sectoral inter dependence of food processing industry reveals the importance of this industry. The extensive backward linkage effect on agriculture shows role of this industry to speed up economic growth. The calculated value of forward and backward linkage effect lies nearest to one. So, we can say that Food Processing Industry is a strong backward linkage sector or backward oriented sector.

Fruit processing industry are highly linked with primary sector. There has a strong and steady linkage between fruit processing industry and agriculture sector. Though fruit processing industry is a sunrise industry in the industrial context its performance is a great relief in the midst of the poor agricultural development of the state. The potential growth of the fruit processing industry however is not explored properly. The extent to which its potential growth can be explored in the background of actual dynamism of the various actors is a crucial question to be addressed. With value chain framework, this study made an attempt towards this. Value chain describes the full range of activities which are required to bring a product or service from conception through different phases of production, delivery to final consumers. The value chain analysis would enable the adoption of adequate measures for

realizing the full potential of the fruit processing industry. The institutional policies and strategies of actors may affect the distribution of income and competitiveness of the actors in the chain. Emergencies such as Covid 19 pandemic, flood etc.are an opportune moment to achieve a revival of agriculture and industrial production and of entrepreneurial spirit in the state.

The state govt. may launch a campaign to accelerate the building of storage and processing capabilities for Kerala's agricultural products including jack fruit, pineapple nutmeg and banana. The govt. may encourage young and professionally qualified entrepreneurs into new opportunities in food and agro processing facilitating innovative ideas in production and marketing. The entire analysis is expected to throw light on the feed back effect of food processing value chain and linkages to the agriculture sector as a whole,and the kind of role played by the state in the process of value chain and its feed back effect.

Annexure

ANNEXURE
A.3.1.AREA, PRODUCTION AND PRODUCTIVITY OF TOTAL FRUITS IN INDIA

YEAR	AREA (In "000MT)	PRODUCTION (In "000MT)	PRODUCTIVITY (In MT/Hectare)
1991-92	2874	28632	10.0
1992-93	3206	32955	10.3
1993-94	3184	37255	11.7
1994-95	4310	38603	9.0
1995-96	3357	41507	12.4
1996-97	3580	40458	11.3
1997-98	3702	43263	11.7
1998-99	3727	44042	11.8
1999-00	3797	45495	12.0
2000-01	3869	43138	11.1
2001-02	4010	43001	10.7
2002-03	3788	45203	11.9
2003-04	4675	45645	9.8
2004-05	4964	49295	9.9
2005-06	5510	58740	10.7
2006-07	5554	59563	10.7
2007-08	5776	63503	11.0
2008-09	6101	68465	11.2
2009-10	6329	71515	11.3
2010-11	6383	74878	11.7
2011-12	6705	76424	11.4
2012-13	6982	81285	11.6
2013-14	7216	88977	12.3
2014-15	6610	86602	14.4
2015-16	6301	90183	14.3
2016-17	6480	92846	14.3

Source: Ministry of Agriculture and Farmers Welfare Government of India

A 3.2 FDI and GDP

YEAR	FPI as a share of GDP in Agriculture	FPI as a share of GDP in Manufacturing
2004-05	8.8	9.8
2005-06	9.0	9.6
2006-07	9.4	9.1
2007-08	9.7	9.11
2008-09	10.26	9.2
2009-10	9.92	8.04
2010-11	10.43	8.49
2011-12	12.03	9.61
2012-13	12.24	9.78
2013-14	11.0	9.0
2014-15	12.1	9.7

Source: National Account Statistics Reports

A 3.3 EMPLOYMENT

Year	Number of Persons	Annual growth Rate
2004-05	13.43	
2005-06	13.92	3.65%
2006-07	14.76	6.03%
2007-08	15.05	1.96%
2008-09	15.64	3.87%
2009-10	16.06	2.71%
2010-11	16.62	3.46%
2011-12	17.77	6.92%
2012-13	16.89	-4.94%
2013-14	14.68	11.69%
2014-15	17.73	4.73%

Source: Annual Growth Rates calculated using employment data from issues of Annual Surveys of Industries, MOFPI.

A 3.4 (i) Number of Food Processing Industry

Sl.No	NIC 2008	Description	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
1	1010	Meat	77	90	85	115	146	140	148	170	148	181
2	1020	Fish, crustaceans and molluses	340	352	359	436	390	462	466	427	534	535
3	1030	Fruits and vegetables	735	709	832	1052	1078	1110	1101	1133	1192	1254
4	1040	Vegetable and animal oils and fats	2515	2429	2421	3307	3394	3312	3300	3240	3147	3112
5	1050	Dairy products	1096	1100	1112	1493	1653	1695	1753	1783	1943	2039
6	1061	Grain Mill products	12807	13464	13397	17792	18244	18131	18272	18953	19141	18899
7	1062	Starches and starch products	442	589	670	757	766	723	744	699	670	629
8	1071	Bakery products	955	993	1056	1450	1399	1519	1498	1613	1626	1767
9	1072	Sugar	778	733	744	895	906	859	791	763	780	741
10	1073	Cocca, chocolate and sugar confectionery	404	456	466	509	560	539	505	594	564	594
11	1074	Macaroni, Noodles, Couscous and similar farinaceous products	73	61	51	83	75	129	105	91	89	118

12	1075	Prepared meals and dishes		45	139	343	416	352	298	277	364	323
13	1079	Food product N.E.C	4091	4290	4225	5114	5101	5251	5546	5765	5983	6300
14	1080	Prepared animal feeds	555	547	606	677	755	873	820	881	918	976
15	1101	Distilling, rectifying of sprits	280	291	296	325	378	365	369	395	376	414
16	1102	Manufacture of wines	64	79	69	74	77	78	71	74	70	77
17	1103	Manufacture of malt liquors and malt	120	96	117	154	141	154	143	153	150	123
18	1104	Production of mineral water and other bottled waters, soft drinks	887	896	834	1264	1401	1483	1520	1597	1624	1658
		Total	26219	27220	27479	35838	36881	37175	37450	38608	39319	39740

Source: Annual Survey of Industries (ASI), MOSPI

A 3.4 (ii) Number of registered Food Processing units in Kerala

Sl.No.	Year	Number of units
1	2006-07	1171
2	2007-08	854
3	2008-09	709
4	2009-10	879
5	2010-11	1216
6	2011-12	1437
7	2012-13	1501
8	2013-14	1460
9	2014-15	1525
10	2015-16	1579
11	2016-17	1629

Source: Annual reports of ASI, MoFPI

A 3.5(I) Fixed Capital in Registered Food Processing Units (Rs .in Lakh)

Sl.No	Description	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
1	Meat	126344	101975	96342	113506	136187	188491	229815	230624	259009	279358
2	Fish, crustacean and molluses and production thereof	86914	101933	116582	135663	215042	218097	246008	290738	418808	450170
3	Fruits and Vegetables	296661	275858	327598	531916	505999	501574	657128	523811	687093	810808
4	Vegetables and animal oil and fats	712932	845007	1187254	1614818	1840886	1444663	1405609	1618927	1411417	1789008
5	Dairy products	371080	547866	930752	704491	1069540	1061069	1203869	1819010	2235963	2242929
6	Grain Mill products	647718	890289	1050418	1306519	1506971	1945138	1795134	2090286	2153648	2276923
7	Starches and Starch products	90307	103214	173731	192117	248310	337226	364366	388513	586808	509957
8	Bakery products	155073	221147	229552	281791	398068	506883	496347	518810	470860	595473
9	Sugar	2530829	2743964	3133491	3721427	4357493	4390085	4775493	5128426	5975210	6250540
10	Cocoa, chocolate and sugar confectionery	108667	170417	144508	260067	599510	428881	584166	593211	636690	857246
11	Macaroni, Noodles,	19251	33555	53791	40311	69023	158787	149697	163222	137456	222398

	Couscous and similar farinaceous product									
12	Prepared meals and dishes	-	24991	96664	60218	70312	190525	93296	129803	147675	121544
13	Food Products N.E.C	507985	662751	713298	1015961	970364	1739802	1754618	1658405	2088831	2274851
14	Prepared Animal feeds	108090	89425	152347	149963	274149	287359	409278	634472	600017	715021
15	Distilling, rectifying and blending of sprits	311308	433220	502625	631732	895850	755781	1007754	1122130	1016219	1224665
16	Manufacturing of wines	63808	82615	53726	41785	51285	90429	73802	71034	59288	83256
17	Manufacture of malt liquors and malt	264136	266184	362944	419121	495995	654504	570884	748912	637538	614485
18	Production of mineral water and other bottled waters, soft drinks	432383	521230	622623	849105	798841	987191	1022807	1469026	1112213	1285914
	Total	6833486	8115641	9948246	12070511	14503825	15886485	16840071	19199360	20634743	22604546

Source :Annual reports of ASI, MOFPI

A 3.5 (ii) Total Fixed Capital in Registered food processing units and its growth rate

Sl. No.	Year	Total Fixed Capital	Growth Rate
1	2007-08	6833486	18.93
2	2008-09	8115641	18.76
3	2009-10	9948246	22.58
4	2010-11	12070511	21.33
5	2011-12	14503825	20.17
6	2012-13	15886485	9.53
7	2013-14	16840071	6
8	2014-15	19199360	14
9	2015-16	20634743	7.47
10	2016-17	22604546	9.54

Source: Annual survey of ASI, MoFPI

A 3.6 FOREIGN DIRECT INVESTMENT AND FOOD PROCESSING INDUSTIES

Year	FDI in Food Processing Industry (In US$ Million)
2000- 01	45.75
2001-02	219.39
2002-03	36.88
2003-04	109.22
2004-05	43.98
2005-06	41.74
2006-07	102
2007-08	70.17
2008-09	102.71
2009-10	278.89
2010-11	188.67
2011-12	170.21
2012-13	401.46
2013-14	398.28
2014-15	515.86
2015-16	505.88
2016-17	727.22
2017-18	904.9
2018-19	628.24
2019-20(April-June)	329.04
Total	9405.1

Source: RBI Report, MOFPI Report, Department of Industrial Policy and Promotion, Department for Promotion of Industry and International Trade

A 3.7 (i) EXPORT OF FRESH AND PROCESSED FRUITS AND VEGETABLES FROM INDIA

YEAR	Fresh Fruits and Vegetables		Processed Fruits and Vegetables		Total	
	Quantity in tonnes	Value Rs. in lakhs	Quantity in tonnes	Value Rs in lakhs	Quantity in tonnes	Value Rs in lakhs
2006-07	2009291.53	249732.06	849316.06	267907.42	2858607.59	517639.48
2007-08	1726653.18	244777.61	775063.05	245261.71	2501716.23	490039.48
2008-09	2648629.99	367734.74	845174.19	317358.34	3493804.18	685093.08
2009-10	2562171.48	453389.78	809192.33	313607.60	3371363.81	766997.38
2010-11	2099299.95	397185.78	837339.58	357460.89	2936639.53	754646,67
2011-12	2492408.25	483259.95	923328.38	453817.79	3415736.63	937077.74
2012-13	2933094.97	598670.13	926929.45	512116.53	3860024.42	1110786.66
2013-14	2917405.49	876096.53	1082204.49	648384.08	3999609.98	1524480.61
2014-15	2500961.87	747413.66	1006679.44	667035.90	3507641.31	1414449.56
2015-16upto Jan	1770500.63	603912.69	765064.68	566427.99	2535565.31	1170340.68

Source: MoFPI

A 3.7 (ii) EXPORT OF PROCESSED FOOD AND RELATED COMMODITIES

YEAR	EXPORT US$ Million
2018-19	35302.46
2017-18	35467.91
2016-17	30871.47
2015-16	38052.08
2014-15	36171.96
2013-14	37798.88
2012-13	36212.47
2011-12	31762.38
2010-11	20427.6
2009-10	14787.2
2008-09	16312
2007-08	15686.72
2006-07	108832.34

Source: DGCI&S, Kolkata

A 3.8 India's Import of Food Products [Value in US$ Million]

Sl No	Year	Amount
1	2012-13	18780.98
2	2013-14	16464.47
3	2014-15	19690.73
4	2015-16	21399.54
5	2016-17	23924.36
6	2017-18	23096.61
7	2018-19	19323.03
8	2019-20(April-August)	8154.68

Source: Department of Commerce

**A 3.9 Gross Value Added (GVA)By Food Processing Industries (FPI)
At constant 2011-12 prices**

(Rs. in Lakh Crore)

Sl. No	Economic Activity	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
1	GVA All India	81.07	85.46	90.64	97.12	104.92	113.19	121.04
2	GVA Manufacturing	14.10	14.87	15.61	16.84	19.04	20.55	21.77
3	GVA Agriculture, Forestry and Fishing	15.02	15.24	16.09	16.06	16.16	17.17	18.03
4	GVA FPI	1.47	1.30	1.30	1.34	1.61	1.78	1.92

Percentage Growth

Sl.No	Economic Activity	AAGR	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
1	GVA All India	6.91	5.42	6.05	7.15	8.03	7.88	6.94
2	GVA Manufacturing	7.54	5.45	4.97	7.90	13.06	7.94	5.93
3	GVA Agriculture, Forestry and Fishing	3.12	1.49	5.57	-0.22	0.65	6.27	4.98
4	GVA FPI	5.06	-11.72	0.39	2.66	20.55	10.76	7.68

Percentage share in Total GVA

Sl.No	Economic Activity	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
1	GVA- FPI	1.81	1.52	1.44	1.38	1.54	1.58	1.59
2	GVA -Manufacturing	17.39	17.40	17.22	17.34	18.15	18.16	17.98
3	GVA Agriculture, Forestry and Fishing	18.53	17.84	17.75	16.53	15.40	15.17	14.90

Percentage share in Total GVA

Sl.no	Economic Activity	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
1	GVA Manufacturing	10.42	8.72	8.34	7.94	8.46	8.68	8.83
2	GVA Agriculture, Forestry and Fishing	9.78	8.51	8.09	8.32	9.97	10.39	10.66

Source: National Accounts Division, Central Statistics Office

A 4.1 The backward linkage of food processing industry in factor cost IOTT 2003-2004

SI. NO	Section No. in IOTT	Name of the commodity	Share to FPI (Lakh in FC
1	1	Paddy 0.0327%	376244
2	2	Wheat 0.0615%	706564
3	3	Jowar	11325
4	4	Bajra	3967
5	5	Maize .0092%	105995
6	6	Gram	9739
7	7	Pulses 0.02136%	245372
8	8	Sugar cane	30014
9	9	Ground nut	12661
10	10	Coconut	1526
11	11	Other oil seeds 0.01131%	129938
12	13	Cotton	838
13	17	Tobacco	131
14	18	Fruits .1546%	1775303
15	19	Vegetables	57439
16	20	Other crops 0.0118%	135853
17	21	Milk & milk products 0.1085%	1246053
18	23	Poultry and eggs	26547
19	24	Other live- stock products 0.0167%	191989

20	25	Forestry & Logging	3663
21	26	Fishing 0.0365%	419791
22	27	Coal and lignite	8991
23	28	Natural gas	28
24	30	Iron ore	1
25	35	Lime stone	61
26	37	Other nonmetallic minerals	1955
27	38	Sugar 0.0221%	254281
28	39	Khadsari boora 0.0166%	191116
29	40	Hydrogenated oil	49910
30	41	Edible oil 0.0223%	257011
31	42	Tea coffee processing	12658
32	43	Miscellaneous food product 0.07556%	867750
33	44	Beverages	2098
34	46	Khadi Cotton textiles	2
35	47	Cotton textiles	9
36	51	Jute hemp mesta textiles	10596
37	53	Readymade garments	2580
38	54	Miscellaneous textile product	17710
39	55	Furniture and fixtures wooden	90
40	56	Wood and wood products	86138
41	57	Paper, paper products and newsprint	226581
42	62	Plastic products	119025
43	63	Petroleum products	154514
44	65	Inorganic heavy chemicals	46891
45	66	Organic heavy chemicals	16705
46	69	Paints, varnishes	582
47	70	Drugs & medicines	17428
48	71	Soaps cosmetic & glycerin	687
49	73	Other chemicals	78988
50	76	Other non metallic mineral products	37622
51	80	Nonferrous basic metals	97

52	82	Miscellaneous metal products	11943
53	83	Tractors and agri-implements	4
54	84	Industrial machinery	71222
55	85	Industrial machinery others	61
56	86	Machine tools	242
57	87	Other non electrical machinery	1206
58	93	Other electrical machinery	8
59	105	Miscellaneous manufactured	4115
60	106	Construction 1.43%	164147
61	107	Electricity 1.98%	227814
62	108	Water supply	1256
63	109	Railway transport service	62451
64	110	Land tpt including pipeline 4.62%	530860
65	111	Water transport	37611
66	112	Air transport	12114
67	113	Supporting activity	44833
68	115	Communication	45421
69	116	Trade 15.44%	1772709
70	118	Banking 2.57%	295379
71	119	Insurance 0.99%	113162
72	123	Business services 0.96%	109886
73	124	Computer	7048
74	125	Legal services	1117
75	127	Rending of machinery	121
76	128	Social services	12071
77	129	Other services	2884
		TOTAL INPUT	11482747
		NIT	264612
		TOTAL INPUT + NIT	11747359
		GVA	1314912
		Total Output	13062271

Source: Estimated by the scholar

A 4.2 Forward Linkage of Food Processing Industry in FC

IOTT 2003-2004

SI. NO	Section No. in IOTT	Name of the commodity	Share to FPI (Lakh in FC
1	1	Paddy 21.48%	29250
2	2	Wheat	98
3	7	Pulses	1123
4	21	Milk and milk products .09%	12237
5	22	Animal Services	4530
6	23	Poultry & eggs 0.18%	24101
7	24	Other like stock 0.08%	11355
8	26	Fishing 0.11%	14365
9	38	Sugar	250
10	39	Khadsari boora	65
11	40	Hydrogenated oil	3770
12	41	Edible oil	9546
13	42	Tea and coffee 0.17%	22598
14	43	Miscellaneous food products 6.37%	867750
15	44	Beverages 2.08%	283151
16	45	Tobacco products 0.13%	17893
17	46	Khadi and cotton	578
18	47	Cotton	5509
19	48	Woolen	68
20	49	Silk	11
21	20	Art silk	678
22	51	Jute	51
23	53	Ready made	370
24	54	Miscellaneous	69
25	55	Furniture	4
26	56	Wood and wood products	247
27	57	Paper and …..	8220
28	58	Printing …….	515

29	59	Leather foot wear	227
30	60	Leather & ……	221
31	61	Rubber products	403
32	62	Plastic products	811
33	64	Coal tar products	1
34	65	Inorganic 0.08%	10751
35	66	Organic 0.09%	11876
36	67	Fertilizers	1770
37	68	Pesticides	579
38	69	Paints	3338
39	70	Drugs 0.18%	24288
40	71	Soap cosmetic 0.15%	20361
41	72	Synthetic ……	1617
42	73	Other chemicals 0.29%	39302
43	74	Structural	482
44	75	Cement	32
45	76	Other nonmetallic	325
46	77	Iron steel …….	17
47	78	Iron, steel ……	77
48	80	Non ferrous	1100
49	84	Industrial machinery	4
50	85	Industrial	17
51	87	Other non electrical	37
52	88	Electrical	33
53	90	Batteries	47
54	92	Communication	268
55	94	Electronic	235
56	96	Rail equipment	50
57	97	Motor vehicles	287
58	102	Medical …..	12
59	105	Miscellaneous	56
60	107	Electricity	215
61	110	Land tpt including via pipeline	309

62	111	Water transport	266
63	114	Storage and ware housing	25
64	117	Hotels & Restaurant 4.34%	590768
65	129	Other services	22
		I I U S E	2028590
		P F C E	10306070
		Gross fixed capital formation	270188
		Change in stocks	58737
		Exports	1039350
		Less I M P	84925
		T. F U S E	11589420
		Total	13618010

Source :Estimated by the scholar

A 4.3 The Backward Linkage of Food Processing Industry

IOTT 2013-2014

Sl. NO	Section in IOTT	Name of Commodity	Share to FPI (Billion)
1	1	Agriculture	5359
2	2	Animal Husbandry	352
3	3	Forestry	12
4	4	Fishery	220
5	5	Fuel Minerals	15
6	7	Manufacturing Food & Beverage of Tobacco	677
7	8	Textile and leather	6
8	9	Wood & paper products	15
9	10	Rubber plastic, coke and petroleum products	229
10	11	Chemical and Chemical products	120
11	12	Non Metallic and Mineral products	7
12	13	Metals and metal products	2
13	14	MFG. Electrical and non electrical	48
14	15	Transport equipment	11
15	16	Miscellaneous products	54

16	17	Construction	10
17	18	Electricity and water	122
18	19	Transport, storage and communication	167
19	20	Trade hotel and restaurant	1268
20	21	Banking and insurance	82
21	22	Real estate dwelling and other services	28
		Total Input	8803
		GVA	2590
		Taxes	-498
		Total Product	10896

Source: Estimated by the scholar

A 4.4 The Forward Linkage of Food Processing Industry

IOTT 2013-2014

Sl. NO	Section in IOTT	Name of Commodity	Share to FPI (Billion)
1	2	Animal Husbandry	470
2	4	Fishery	13
3	7	Manufacturing Food & Beverage of Tobacco	677
4	10	Rubber plastic, coke and petroleum products	2
5	11	Chemical and Chemical products	85
6	16	Miscellaneous products	1
7	18	Electricity and water	1
8	20	Trade hotel and restaurant	440
9	22	Real estate dwelling and other services	41
10	25	Public Administration	186

Source: Estimated by the scholar

A 4.5 Sector wise classification of forward Linkages of Food processing

PRIMARY		SECONDARY		TERTIARY	
Paddy	2950	Sugar	250	Electricity	215
Wheat	98	Khadsari boora	65	Land tpt including via pipeline	309
Pulses	1123	Hydrogenated oil	3770	Water transport	266
Milk and milk products	12237	Edible oil	9546	Storage and warehousing	25
Animal services	4530	Tea and coffee	22598	Hotels and restaurant	590768
Poultry & Eggs	24101	Miscellaneous food products	867750	Other services	22
Other live stock	11355	Beverages	283151		
Fishing	14365	Tobacco products	17893		
		Khadi Textiles	578		
		Cotton Textiles	5509		
		Woolen	68		
		Silk	11		
		Art silk	678		
		Jute	70		
		Ready made	370		
		Miscellaneous textile products	69		
		Furniture	4		
		Wood and wooden products	247		
		Paper and	8220		
		Printing	515		
		Leather food wear	227		
		Leather and	221		
		Rubber products	403		
		Plastic products	811		
		Coal tar products	1		
		Inorganic chemicals	10751		

		Organic chemicals	11876		
		Fertilizers	1770		
		Pesticides	579		
		Paints	3338		
		Drugs	24288		
		Soap cosmetic	20361		
		Synthetic	1617		
		Other chemicals	39302		
		Structural	482		
		Cement	32		
		Other nonmetallic	325		
		Iron steel	17		
		Iron and steel	17		
		Non ferrous	1100		
		Industrial machinery	4		
		Industrial	17		
		Other non electrical	37		
		Electrical	33		
		Batteries	47		
		Communication	268		
		Electronic	235		
		Rail equipment	50		
		Motor vehicles	287		
		Medical	12		
		Miscellaneous	56		
TOTAL	97059	TOTAL	1339926	TOTAL	591605

Source Estimated by the scholar

A 4.6 Sector wise classification of backward Linkages of Food processing

PRIMARY		SECONDARY		TERTIARY	
Paddy	376244	Sugar	254281	Construction	164147
Wheat	706564	Khadsari boora	191116	Electricity	227814
Jowar	11325	Hydrogenated oil	49910	Water supply	1256
Bajra	3967	Edible oil	257011	Railway transport service	62451
Maize	105995	Tea coffee processing	12658	Land tpt including pipeline	530860
Gram	9739	Miscellaneous food products	867750	Water transport	37611
Pulses	245372	Beverages	2098	Air transport	1214
Sugar cane	30014	Khadi and cotton textiles	2	Supporting activity	44833
Ground nut	12661	Cotton textiles	9	Communication	45421
Coconut	1526	Jute, mesca textile	10596	Trade	1772709
Other oilseeds	129938	Readymade garment	2580	Banking	295379
Cotton	838	Miscellaneous textile products	17710	Insurance	113162
Tobacco	131	Furniture and fixtures wooden	90	Business services	109886
Fruit	1775303	Wood & wood products	86138	Computer and related activities	7048
Vegetables	57439	Paper, paper products and news print	226581	Legal services	1117
Other crops	135853	Plastic products	119025	Rending of machinery and equipment	121
Milk and milk products	1246053	Petroleum products	154514	Social and personal services	12071

Poultry & Eggs	26547	Inorganic chemicals	46891	Other services	2884	
Other livestock products and gobar gas	191989	Organic heavy chemicals	16705			
Forestry and logging	3663	Paints, varnishes & lacquers	582			
Fishing	419791	Drugs & medicines	17428			
Coal and lignite	8991	Soaps cosmetic & glycerin	687			
Natural gas	28	Other chemicals	78988			
Iron ore	1	Other non-metallic mineral products	37622			
Lime stone	61	Nonferrous basic metals	97			
Other nonmetallic minerals	1955	Miscellaneous metal products	11943			
		Tractors and agri-implements	4			
		Industrial machinery	71222			
		Industrial machinery (others)	61			
		Machine tools	242			
		Other non electrical machinery	1206			
		Other electrical machinery	8			
		Miscellaneous manufactured	4115			
TOTAL	5501988	TOTAL	2539870	TOTAL	3440884	

Source :Estimated by the scholar

Appendix

APPENDIX

INTERVIEW SCHEDULE

CONTACT INFORMATION

1. Name & Contact Number   :

2. Address of the unit   :

3. Year of establishment   :

4. Nature of the unit

   [1.micro, 2.small, 3.medium, 4. large]:

5. Type of ownership [proprietary/partnership/Pvt. Ltd/Public Ltd/Joint Sector/Co-operative]

6. Number of employees   :

7. Total Investment (in rupees)

 Plant   :   Factory/building :   Machinery :

Hand Tools: Machine tools   :   Non

electrical machinery:

Electrical machinery :   Electrical wire and cables: Batteries:

Communication Equipment: Electronic equipment: Others:

TOTAL   :

8. Principal product   :

9. How many days/weeks/months does your plant function a year:

.........................days

.........................weeks

.........................months

Standards and Certifications

10. Do you have any standard certification for your [put tick marks]

(i) Products   (ii) Organisation

1. Agmark   1. ISO9000

2. ISI   2. ISO9001

3. HACCP   3. ISO9002

4. Any other : ....   4. Others : ....

11. a. What standards or certification requirements do your products need to conform to?

b. Do you have any problems in this regard, give some options   :

INBOUND LONGISTICS : Input Supply and cost (For last one year: Before Covid)

12. How do you procure fruit [put tick marks]

    1.   directly purchase from farmers

    2. Purchase from dealers

     3 . purchase from govt. ware house

    4. If any other (specify)

13. Please mention the different varities of fruits corresponding quantities and cost incurred

Name of the fruits	Name of collecting places(state and district)	Quantity(in Kg. or Tonnes)	Cost per unit in Rs.
	Total		

14. Please mention the other procurement cost of all these fruits (for last one year before Covid)

        1. commission for dealer: 2. communication cost   :

        3. transportation cost   :   4. Storage and ware housing

cost:

        5. others   :

        6. Total   :

15. TOTAL (13+14)   :

16. Processed food Input cost (for last one year before Covid)

Items	Quantity	Price	Items	Quantity	Price
1.Dried fruits			5.Fruit juice or pulps		
2.Fresh or dried vegetables			6.Spices/ ghee		

3.Edible oil			7.tamarind		
4.sugar			8.mustard		
Others(specify)			Others(specify)		

Sub Total (16) :

17. Other agricultural input cost (for last one year before Covid)

Items	Quantity	Price	Items	Quantity	Price
grains			pulses		
coconut			groundnuts		
Other crops			Others(specify)		

Sub Total (17):

18. Livestock product input cost(for last one year before Covid)

Items	Quantity	Price	Items	Quantity	Price
ghee			milk		
egg			honey		
wax			Others(specify)		

Sub Total (18):

19. Cost of Chemicals (for last one year before Covid)

Items	Quantity	Price	Items	Quantity	Price
1.Sodium chloride			2.Acetic acid		
3.Food colours			4.Essence		
5.Potassium metasulphate			6.Sodium benzoate		
7.Citric acid			8.others(specify)		

Sub Total (19) :

20.Cost of Packing Materials (for last one year before Covid)

Items	Quantity	Value
1.Bottles and jars		
2.Cartons/wood boxes		
3.paper boxes		
4. plastic bottles, covers, tins		
5.labels		
6.others(specify)		

Sub total (20) :

20. 0ther Inputs Cost (for last one year before Covid)

Items	Price	Time
1.Fire wood		
2.Electricity		
3. Water		
4. Coal		
5. Gas		
6. Others (specify)		

Sub total (20)   :

21. Labour Expenses(monthly expenses)

Name	Number of workers	Wage per worker	Total Wages	name	Number of workers	Wage per worker	Total Wages
1.manager				2.Food technologist			
3.supervisor				4.Skilled workers			
5.Unskilled workers				6.peon			
7.Sales man				8.others(specify)			

Sub Total (22) :

23 . Other Expenses (for last one year before Covid)

No	Items	Price	No	Items	Price
1	Stationary and postage		7	transport	
2	Telephone and postage		8	commission	
3	Textile and leather items		9	depreciation	
4	Interest for banks		10	Rent	
5	Interest for other financial institution		11	Insurance	
6	Hotel and restaurant		12	Others(specify)	

Sub Total (23)   :

24. Other service cost (for last one year :before covid)

Items	Cost (in Rs.)
Computer services	
Business services	
Legal services	
Rending of Machinery	
Others	
Total	

25. GRANT TOTAL (16+17+18+19+20+21+22+23+24) = ...Rs.

26 . Are there problems in obtaining inputs? Explain.

27. Have you ever purchased inputs jointly with other business firms ? Explain.

v

Output Variety

28. Which products* are processed in your plant using fruits? (For last one year before Covid)

[Products *such as beverages, pickles, squashes, syrups,jams and jellies, sauces, chips,canned fruit and juices, other juices, raw dried fruits, fruit pulp etc.]

Sl.No	Products	Fruits(from which these products are produced)		Quantity of product	Sales Value(Net of Tax) of product
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
TOTAL					

OUTBOUNT LOGISTICS:. **Market Access (For last one year before Covid)**

29. What channel do you follow in marketing of your products? What percentage goes to each?

30. What peak and seasons?

1.

Channels	Percentage goes to each	Channels	Percentage goes to each
Direct to customers		Agents	
Retailers		Wholesalers	
Small firms		Large firms	
Exporters		Others(specify)	

are your slack

Peak :

from......................month to....................month

2. Slack : from ....month to ....month

31. Could you realize the targeted sales? (during the year prior to Covid)   1. Yes 2. No.

32. If no, explain whether decline in sales was mainly due to, (put tick marks)

   1. External reasons   2. Internal reasons   3. Both.

33. What are the internal factors responsible for fall in sales? (put tick marks)

   1. Inadequate supply of raw material   2. Improper production.

   3. Increase in cost of production.   4. Irregular supplies.

   5. Poor marketing efforts.   6. Excessive dependence on one or few buyers.

   7. Poor quality of production.   8. Others (specify):

34. What are the external factors responsible for fall in sales? (put tick marks)

   1. Competition.   2. Fall / Decrease in demand.

   3. Entry of new sellers.   4. Availability of new substitution.

   5. Govt policy   6. Marketing Problems

   7. Others (specify) :

35. Do you have your own vehicle for distribution of products? 1. Yes 2. No.

36. Transportation cost for the distribution of final product (for one year before Covid)

Transport Services	Cost
Motor vehicles	
Parcel service Lorry	
Rail	
others	
Total	

37. Do you think that your product needs advertisement and publicity? 1. Yes 2. No.

38. If yes, what media do you use? (put tick marks)

     1. Radio.   2. T. V. / Cable.   3. News paper.   4. Hand bills.

     5. Signboards.   6. Window display.   7. Cine slide.   8. Any other.

39. How much do you spend on advertisement in a year (prior to Covid)? .... Rs.

40. Expenditure on taxes: (For one year before Covid)

     GST: Others: TOTAL:

41. Do you export your product : 1.Yes   2. No

42.If yes

Name of the Product	Fruit (from which these products are produced)	To which country	Quantity	Cost of exporting

43. Do you supply your product to other states : 1. Yes   2.No

44 .If yes

Name of the product	Fruit (from which these products are produced)	To which state	Quantity	Cost of Exporting

45.GRANT TOTAL [33+35+38+41+44] :

46.Do you receive any government support :

REMARK

ADDITIONAL QUESTIONS RELATED WITH THE IMPACT OF COVID-19 PANDEMIC AND LOCKDOWN

1. Is your enterprise currently operational :   1.Yes   2.No

2. If yes, were you closed during lockdown?   1.Yes   2.No

3. If yes (qus.2), how many weeks were you closed down? Number of weeks: ....

4. If yes(qus.1), how many weeks ago did you resume operations? Number of weeks: ....

5. If your enterprise is operational, how many hours in a day are you operating?

   1. Same number of hours as before the lockdown

   2. More number of hours than before the lockdown

   3. Restricted hours.

6. If your enterprise is operational, how many days in a week are you operating?

   1. Same number of days as before the lockdown

   2. Restricted days(specify) :

7. If your enterprise is operational, is the line of activity of your enterprise

   1. Same as before the lockdown

   2. Restricted to fewer items.

   3. Diversified or shifted to other items

8. What is the current number of workers?

   1. Same as before the lockdown

   2. Less than before the lockdown

   3. More than before the lockdown

9. If less workers, then approximately what percentage of workers are you currently operating with?

10. What is your present turnover?

   1. Same as before

   2. Less than before

   3 . More than before

11. If less turnover, then approximately what percentage of the normal turnover?.........

12. In how many months do you think you will be able to achieve the same level of turnover as before lockdown (in months) : ....

13. Do you face lack of credit in these days?   1. Yes   2.No

14. If yes, how much do you lack?   ....

15. Do you face the shortage of raw materials?   1. Yes   2.No

16. If yes

Sl. no	Product	Quantity	Percentage (as combared with before Covid)

17. Did you cut short your investment plan because of Covid?   1. Yes   2. No

18. If yes, then percentage of reduction?   ....

19. Do you face lack of demand for your products?   1. Yes 2.No

20. If yes, approximately what percentage of the normal demand?   ....

21. What are the difficulties that have face during lockdown/still face?   1. Yes   2. No

    1. Financial Issues-Debt /Interest burden

    2. Financial Issues-Payment due from customers

    3. Financial issues-Other fixed liabilities –taxes , tariffs, rentals etc.

    4. Payment of wages to workers during lockdown

    5. Supply chain issues

    6. More government restriction

    7. Availability of labour(including skilled labour)

    8. Others(specify) : ....

22. Among the above discussed difficulties, which one is mostly affected: ....

23. What are the specific measures of central /state/RBI that have helped you (Yes 1, No 2 for all options)

    1. Moratorium of debt

    2. Reduced interest burden

    3. Restructuring of debt

    4. Receiving Arrears in payment

    5. Deferment of tax payments

    6. Reduced waiver of tariffs

Others (specify) : ....

24 . What kind of additional support do you expect from the government for your business?

    1.   ....

    2.   ....

    3.   ....

25. What is your future plan for business in coming one year?

    1. consolidate and expand

    2. would downsize

    3. May close down

    4. Would diversify into another line of business

    5. Other (specify)

26. Have you tried for any government relief / financial assistance to restart your business during this Covid Pandemic? (specify)

27. How concerned are you regarding the impact of the Corona pandemic on the future of your business?

    1. very concerned

    2. concerned

    3. Not so concerned

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