

CHAPTER I

INTRODUCTION AND RESEARCH METHODOLOGY

1.1 Introduction

Agro industries are those units which add value to agriculture products/residues, both food and non-food, by,

1. Processing into products which are marketable or usable or edible.
2. Improving storability.
3. Providing the link from farm to the market or part thereof.

Agro industry also includes Hi-Tech and Bio-technology based agriculture. “Agricultural Product” means produce of agriculture, horticulture, sericulture, floriculture, fisheries and includes minor forest produce and live stock based products. Agro-industry processes, outcomes of plant or animal origin by transformation and preservation through changing physical and chemical characteristics and packaging. It has tremendous contribution to economic development.

1. It transforms raw material into finished products for consumption.
2. It constitutes a significant proportion of the developing countries’ production and exports.
3. It develops food system that provides the nutrients which are critical for well-being of the expanding population.

There is rising demand and necessity of agro-processing activity as agricultural production rises. Conversely, new processing activities can open up new opportunities to farmers, and thus, create additional revenues for them. Income of small and subsistent farmers can be increased by creating new market for farm products. In the context of regional development, it provides economic justification to build rural infrastructure. Agro-industry plays a pivotal role in rural industrialisation. It provides significant and long-term development stimulus to rural population. Farm employment usually increases when agro-industry creates backward demand. This is indeed an important outcome, since agriculture is the primary source of employment in the developing countries. Further, it creates jobs in sectors like transportation, distribution and retail trade as well.

The agriculture and industry are related to each other. Increased farm productivity promotes industrialisation. There is slow development of agro industries in underdeveloped countries due to lack of purchasing power in the hands of the people. There is also lack of modernization in the farm sector. Industries and agriculture remains competitive in short run but in the long run they turn out to be complementary.

The highly industrialized countries have strong base of agriculture. Agriculture helps industry by various ways. It supplies raw material to industries. It provides food to people engaged in the industries, increase purchasing power of the community, which helps to purchase industrial goods. Savings by agriculture helps industries for capital formation.

1.1.1 Classification of Industries

Broadly the industries can be divided into four groups as shown in the following figure,

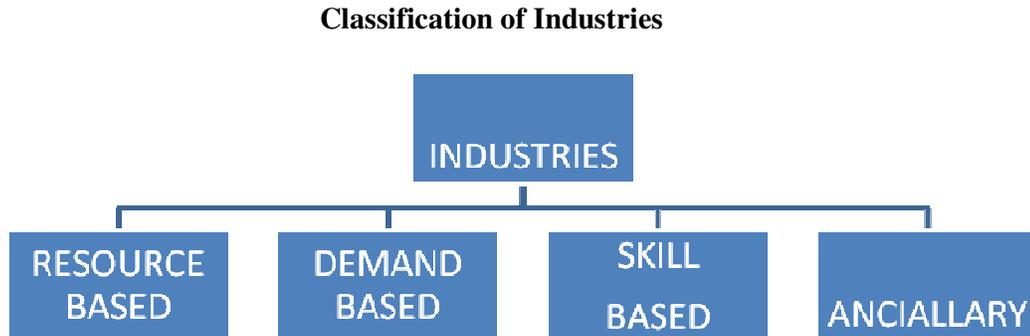


Figure 1.1

The resource based industries includes the following types of the industries, out of which the agro based industries is the major one.

Resource Based Industries

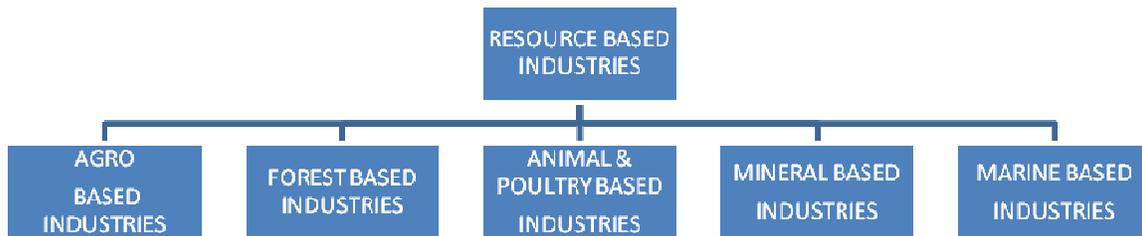


Figure 1.2

Agro-industry also plays a crucial role in the industrialisation process of the developing countries. Although its importance reduces as industrialisation advances, yet with rise in income and with increased urbanisation, the demand for more complex and diverse types of processed food increases. The value of trade in processed foods exceeds than that of basic agricultural commodities by several magnitudes (Handerson et al., 1998). Although majority of this trade takes place in the developed countries and is dominated by a few multinational companies, still there is considerable scope in terms of subcontracting to these firms. Another important contribution of agro-industry in manufacturing is its capacity to generate employment. It is generally found to be more labour intensive and less capital using

and has low import content than the industry average in the developing nations. In this context, its significance in small-scale industry is particularly remarkable.

1.2 Definition of Agro Process Industry

According to general definition, an agro-processing industry provides facilities to process materials of agricultural origin. Materials of agriculture origin include materials of plant origin as well as materials of animal origin. Similarly, processing may refer to primary processing only or it may include secondary processing (further processing of products of primary agro-processing industries) and tertiary processing (processing of by products of agricultural materials) as well. Therefore, from its narrowest to its broadest definition, the coverage of 'agro-processing industries' ranges from primary processing of materials of plant origin to all kinds of processing of materials of plant and animal origin.

The term agro process industry evoked a lot of confusion. The definition given by the Planning Commission had the widest coverage. The Planning Commission, with a view to develop Agro-Industrial Corporation defined agro-industry in certain manner. Its main thrust was to increase agricultural productivity and criteria to characterize agro-industry were as follows. Agro industry,

- a) Encourages greater input into agriculture.
- b) Leads to better processing and conversion of agricultural commodities.
- c) Ensures high return on processing of goods.
- d) Increases overall agricultural production.

Agro-industry is classified into agro-processing, agro-produce manufacturing, agro input manufacturing and agro service centre on the basis of these four criteria.

1.2.1 Categories of Agro Based Industries

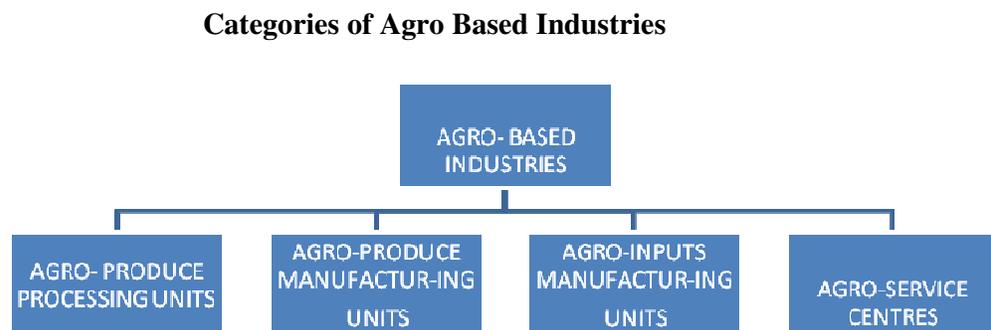


Figure 1.3

NCAER (1965) looked at agro-industry as more of an organic link between agriculture and industry. It defined, “Agro-based Industries are those which use agricultural raw materials or manufacture products that farmers need for agricultural production”.¹ In present days’ writings, it is the agro-processing which is largely considered as agro-industry.

Austin (1981) defined, “Agro-industry as an enterprise that processes agricultural raw materials including ground and tree crops as well as livestock”.² The

degree of processing varies from the cleaning and grading of apples to the milling of rice, to the cooking, mixing and chemical alteration that create a textured vegetable food. According to him, agro-industry can roughly be categorised as per the degree of raw material transformed.

Srivastava (1989) considered, “Agro-industry as an enterprise that processes bio-mass i.e. agricultural raw materials, which include ground and tree crops as well as livestock and fisheries, to create edible or usable forms, improve storage and shelf life, create easily transportable forms, enhance nutrition value and extract chemicals for others”.³ It is divided into two categories: (a) agro-food industry, and (b) agro-nonfood industry. Processing includes processing of main products, processing of by products and extraction of chemical as well.

Desai et al. (1991) divided, “Agro-industry into food-processing and agro-related industry. They had a wider coverage of agro-industry in agro-related industry category”.⁴

UNIDO (United Nations Industrial Development Organisation) defined, “Agro-industry as those industries which use raw materials from agriculture as main material from which manufactured goods are produced on a commercial scale. The term agriculture also includes fisheries and forestry. Agro-based industries are synonymous to agro-industries. It further defined agro-related industries/agro-allied industries as those which produce inputs to agriculture or even material used for protection of agricultural products”.⁵

Recent research work by Chadha and Sahu (2003) also used same concepts. They defined, “Agro-industry as subset of manufacturing that processes raw materials obtained from agriculture and its associated sectors such as animal husbandry, forestry and logging and intermediate products derived such as raw hides and skins for manufacture of leather and leather products”.⁶

The Agro industries process raw materials which are subject to seasonality, perishability and variability. There are also cyclic variations in their availability. These unique features of Agro industries’ necessitate the industries’ integration with the farmers to source raw material supply. In addition to this, the decision of selecting an agricultural product depends upon the demand-supply position, procurement of proper machinery, appropriate technology, scale of operations and the profit margin. In case of Agro Industry, product selection also depends on the degree of processing involved. Agro Industry can be from simple handing and preservation of fresh fruits and vegetable to highly complex products like ready to eat foods.

1.2.2 Agro Based Non Food Processing Industry

The agro based non food processing sector can be sub divided into heterogeneous segments like textile, wood, paper and leather based products. With increasing urbanisation, increasing incomes and spread of education, the demand for these products has been increasing. As compared to the pre-reform period, the export of processed products from these segments especially textile and leather have been increasing in the post reform period.

1.3 Agro Process Industries in India

The Agro Processing Industry is an important sector of the Indian economy. The agro processing industry sector, which has experienced acceleration during the period 1990-95 has slowed its pace in the past half decade as, the manufacturers have realized that the consumer is yet to familiarize himself with the products available in the market.

The agro industry contributes about 18% of India's manufacturing output and around 5% of total industrial investment. The estimated turnover of this highly heterogeneous industry exceeds Rs. 570 billion. Niche segments comprising packaged and branded agro products have recently witnessed rapid growth accompanied by intense competition. Nearly 52% of the Indian household budget is spent on food items and the share of processed food entering the market is expected to rise rapidly.

Both in terms of foreign investment and number of joint ventures / foreign collaborations, the consumer food segment has top priority. By last year, foreign investment of Rs. 20,870 Million had been proposed. Deep sea fishing and aquaculture, milk and milk products, meat and poultry segments attracted attention of foreign investors, interest is also growing in fruit and vegetables and grain / cereal based products.⁷

Maharashtra and Gujarat will continue to dominate this industry with more than half the nation's output and value addition. The Maharashtra Government has taken the right steps by introducing stringent pollution control laws.

1.3.1 Composition of Agro-processing Sector

The composition and size distribution of the agro-processing sector is analyzed in terms of the National Sample Survey' 56th round conducted in the year 2000-01. Agro processing industries are analyzed in terms of the three size groups as defined below in Table 1.1.

Table 1.1
Size Composition of Rural Agro Processing Industries

Sr. No.	Code	Description	Definition
1	OAME	Own Account Manufacturing Enterprises	An enterprise, which is run without any hired worker employed on a fairly regular basis.
2	NOME	Non-Directory Manufacturing Establishments	An establishment employing less than six workers (household and hired workers together).
3	DME	Directory Manufacturing Establishment	An establishment employing six or more workers (household and hired workers together).

Following table no. 1.2 shows the structure of manufacturing enterprises in rural sector on the basis of their size composition in India.

Table no.1.2
Enterprises' Structure in Indian Rural Sector (Size Composition Basis)

Sr. No.	Industry	OAME		NDME		DME		Total	
		No.	%	No.	%	No.	%	No.	%
I	Agro Industries								
01	Cotton, Ginning etc.	1804	00.02	222	00.05	66	00.05	2092	00.02
02	Food Products	2104292	22.54	190597	40.07	65804	45.30	2360693	23.71
03	Tobacco Products	1615877	17.31	12699	02.67	19593	13.49	1648169	16.55
04	Textile Products	1552011	16.63	92178	19.38	45255	31.15	1689444	16.97
05	Wearing Apparel	1545661	16.56	120099	25.25	5458	03.76	1671218	16.79
06	Leather Products	87631	00.94	3172	00.67	681	00.47	91484	00.92
07	Wood Products	2402384	25.74	56227	11.82	7819	05.38	2466430	24.77
08	Paper Products	25243	00.27	408	00.09	599	00.41	26250	00.27
	Total	9334903	84.41	475603	75.55	145275	58.85	9955781	83.42
II	Non Agro	1723345	15.59	153880	24.45	101579	41.15	1978804	16.58
	Grand total	11055248	100.00	629481	100.00	246854	100.00	11934583	100.00

Source: NABARD Report (2005).

1.4 Status of Agro-based Industries in the State of Maharashtra

Maharashtra has been one of the major producers of fruits and vegetables, milk and meat products. Maharashtra has 10 to 15% production share of agro produce related to processed industry. Major units in Maharashtra are in

- a. Fruit and Vegetables
- b. Bakery Products
- c. Dairy Products
- d. Cereals
- e. Meat Products
- f. Fish Products

1.4.1 Overview of State of Maharashtra

Maharashtra occupies the western and central part of the country and has a long coast line stretching nearly 720 kilometers along the Arabian Sea. The Sahyadri mountain range provides a physical backbone to the State on the west, while the

Satpuda hills along the north and Bhamragad -Chiroli-Gaikhuri ranges on the east serve as its natural borders.

Maharashtra is the second largest State in India both in terms of population and geographical area spread over 3.08 lakh sq. km. The State has a population of around 10 Crore (2001 Census) which is 9.4 per cent of the total population of India. The State is highly urbanized with 42 per cent people residing in urban areas whereas at national level it was around 28 per cent. The sex ratio of the State is 922 as against 933 for India. The State has 35 districts which are divided into six revenue division's viz. Konkan, Pune, Nashik, Aurangabad, Amravati and Nagpur, for administrative purposes. Maharashtra has a long tradition of having very powerful bodies for planning at the district / local level. For local self governance in rural areas, there are 33 Zilla Parishads, 351 Panchayat Samitis and 27,920 Gram Panchayats. The urban areas are governed through 22 Municipal Corporations, 222 Municipal Councils, 3 Nagar Panchayats and 7 Cantonment Boards. The Gross State Domestic Product (GSDP) at current prices for 2007-08 is estimated at Rs. 5, 90,995 Crore and contributes about 13 per cent of the National Income. The GSDP has been growing at a rapid pace over the last few years. The State boasts of a very vibrant industrial sector and a rapidly growing services sector. Both these sectors presently contribute about 86 per cent of the state's domestic product. The agriculture & allied activities sector contributes just 14 per cent of the state's income though about 55 per cent of the population is dependent on income from this sector. Mumbai, the capital of Maharashtra and the financial capital of India houses the headquarters of almost all major financial institutions, insurance companies and mutual funds. India's premier stock exchanges i.e. the Bombay Stock Exchange as well as the National Stock Exchange and the Commodity Exchanges are located in Mumbai.

The State has 225.6 lakh hectares of land under cultivation where cereals, pulses and other major food grains are grown. Forests cover another 52.1 lakh hectares. The extreme weather conditions, coupled with low quality soils and rain fed cropping results in lower agriculture productivity. Number of irrigation projects is being implemented to improve irrigation. A watershed mission has been launched to ensure that soil and water conservation measures are implemented speedily in the non- irrigated area.

The State has made rapid strides in the production of commercial crops like sugarcane, soyabean, cotton, oilseeds and onions. The last few years have seen a healthy shift towards horticulture crops. The State is well known for its Alphonso mangoes, grapes, bananas, pomegranates and oranges.

Animal husbandry is one of the important allied activities and has 24 per cent share in agriculture sector. The State's share of milk, livestock and poultry population in India is 7.7, 7.6 and 7.0 per cent respectively. The long costal line is a boon to the State's economy. The State contributes to 25 per cent in India's total export of fish. The State has been recognised as the country's industrial powerhouse and maintains the position of being the most industrialized state. The State is pioneer in SSI. The State continues to attract industrial investment from both, domestic as well as foreign institutions. It has become a leading automobile production hub and a major IT growth centre. It has proud of having the largest number of special export promotion zones being set up in the country. During the year 2007-08, about 27 percent of the exports from the country are from the State.

The State is becoming one of the leading wine producing areas in the country. At present, 35 wineries are functioning with an investment of Rs. 109 Crore and export of 22.49 lakh liters of wine. The State has given importance to primary education, which has resulted in consistent improvement in literacy rate. The literacy rate of the State is 77.6 per cent as against 65 per cent at national level during 2001, which increased to 79 per cent during 2007-08. Maharashtra is a pioneering state for female education in the country and during the same period the female literacy rate increased from 67 per cent to 71 per cent. The State has excellent higher educational institutions in the fields of engineering, medical and management. The State has well spread all weather road networks of 2, 35,595 km length. ⁸

1.4.2 The Nature and Composition of Agro Industries in Maharashtra

With the geographical area and population of the state around 9 percent of the total area and population, Maharashtra boasts of being a better developed state of the country. The decadal population growth in the state from 1991 to 2001 has been 22.73 percent as against 21.54 percent in the country. Urbanization in the state is also increasing. 42.43 percent of the state population in 2001 was in urban areas, as against 38.69 percent in 1991. The state economy is rowing at about 6 to 7 percent p.a. In 2004-05, the state contributed around 13 percent to the gross domestic product (GDP). The per capita income (net national product (NNP) at 1993-94 prices) in the state, in 2003-04 was Rs.16479 and is higher than that of the country i.e. Rs.11799. The secondary sector contributes almost 28 percent to the state domestic product (SDP) whereas the tertiary sector contributes 58 percent to the SDP. These sectors are growing at the rate of around 8 percent per annum. Almost 14 percent of the working factories in India are located in the state. The per capita value added in industries i.e. Rs 5003, is above all India average of Rs. 2383. Similarly, the per capita gross output in industries is also higher than the all India average. (Economic Survey of Maharashtra, various years).⁹

The ASI results of 2004-05 relating to the organized industrial sector have revealed that the state contributed almost 21.5 percent and 19.7 percent to the gross value of output (GVO) and net value of output (NVO) respectively to the GVO and NVO at India level. The state leads as far as the values of total input per worker, total output per worker and annual wages per worker are concerned (Economic Survey, 2007-08).

In spite of its progress in the industrial sector, the state still can be called as an agrarian state as almost 57 percent of the state population is still dependent on this sector for its livelihood. This sector however contributes only 13 percent to the GSDP' The major constraining factor for this sector is the scanty rainfall in several parts of the state and the extent of irrigation which covers only 16 percent of the land under cultivation as against 42 percent at all India level. Per hectare yield of food grains in the state is 924 kg which is far below the average of 1716 kg per hectare at all India level. This explains the lower productivity of several crops grown in the state. Almost sixty percent area under cultivation is occupied by food grains as of now and gradually the cropping pattern is shifting towards commercial crops. Apart from the traditional commercial crops like sugarcane and cotton, the area under horticultural crops and oilseed crops is increasing. Due to the stagnation of the nature constrained

agricultural sector, horticultural development and the related processing activities have become one of the thrust areas in the state.¹⁰

Table 1.3 shows the number of units in the organized and the unorganized sector and their sub sectors. It is observed from the table that the unorganized sector clearly dominates the organized sector as far as the number of the units is concerned. It can be seen that in the organized sector, non agro-based industries are dominating with their share being around 70 percent. Further, in the organized sector, within the agro- based industries, the share of food processing industries is observed to be around 30 percent in 1994-95 and has increased to 74 percent in 2000-01. In the unorganized sector, the share of food processing industries which was around 54 percent in 1994-95 has declined to 35 percent in 2004-05 as the number of non food agro-based industries has increased by a larger extent.

Table 1.3
Structure of Agro-based Industries in Maharashtra

Sr. No.	Industry	Number of Working Units					
		Organized Sector			Unorganized Sector		
		1994-95	2000-01	% Change	1994-95	2000-01	% Change
01	Manufacture of food products	979	2146	119.20	168179	232674	38.35
02	Manufacture of Beverages, Tobacco Products	765	89	-88.37	2566	8913	247.37
03	Food Processing Industries (1+2)	1744	2235	30.84	170745	241587	285.72
04	Manufacture of Cotton	1598	1415	-11.45	30513	96647	216.74
05	Textiles, Wool, Silk, and						
06	Synthetic Fiber Textiles, Jute, Hemp and Mesta Textiles.						
07	Manufacture of Textile Products (including wearing Apparel other than foot ware)	925	650	-29.73	50076	376393	651.64
08	Manufacture of Wood and Wood Products	252	177	-29.76	192460	180570	-6.18
09	Manufacture of Paper and Paper Product, printing, and allied industries	1217	652	-46.43	18835	5604	-70.25
10	Manufacture of Leather and Leather Products and Fur Products (Except repair)	75	119	58.67	22045	34012	54.29
11	Non Food Processing Industries (4 to 10)	4067	3013	-58.70	313930	693227	846.24
12	Total Agro Based Industries (3 + 11)	5811	5248	-27.87	484675	934814	1131.96
13	Total Non Agro Based Industries	12847	13278	27.16	380005	304068	1088.69
14	All Industries (12 + 13)	18658	18526	-0.71	864680	1238882	43.28

Source: 1. Annual Survey of Industries (ASI), Data 1994-95 and 2000-01

2. National Sample Survey (NSS), Data 1994-95 and 2000-01

Thus, the broad features of the industrial sector of the state are that the food processing industries are growing at a faster pace considering both the sectors.

Among non food industries, wood and paper units are seen to have adversely affected in terms of numbers in both the sectors.

The structure of industries in unorganized sector in Maharashtra state is shown in table 1.4. This table focuses on the structure in terms of various types of units like OAMEs, NDMEs and DMEs as mentioned in table 1.1 above.

Table 1.4
Percentage Share of Unorganized Manufacturing Enterprises in Maharashtra

Sr. No.	Description	Total OAME	Total NDME	Total DME	Total Units
1994-95					
1	Food Products	78.68	16.99	4.33	100
2	Beverages etc	85.47	1.23	13.30	100
	Food Processing	78.92	16.42	4.66	100
3	Cotton-wool-jute textile	46.31	27.58	26.11	100
4	Textile Products	84.89	11.48	3.63	100
5	Wood & its products	87.56	8.71	3.73	100
6	Paper and its products	29.25	35.69	35.06	100
7	Leather & its products	79.51	14.22	6.26	100
	Non food processing	78.20	13.94	7.86	100
	Total Agro Based	78.39	14.6	7.01	100
	Total Non-agro Based	53.45	25.81	20.74	100
	All industries	71.12	17.87	11.01	100
2000-01					
1	Food Products	84.35	12.70	2.95	100
2	Beverages etc	90.19	0.90	8.91	100
	Food Processing	84.56	12.27	3.70	100
3	Cotton-wool-jute	56.40	23.43	20.18	100
4	Textile Products	89.17	8.41	2.42	100
5	Wood & its products	91.20	6.33	2.47	100
6	Paper and its products	38.28	32.61	29.11	100
7	Leather & its products	85.12	10.62	4.26	100
	Non food processing	84.16	10.47	5.37	100
	Total Agro Based	84.27	10.95	4.78	100
	Total Non-agro Based	63.17	21.28	15.56	100
	All industries	78.53	13.73	7.71	100

Source: National Sample Survey (NSS) data for unrecognized manufacturing.

1.4.3 Overview of Sangli District

The history of Sangli District is related with Maratha Dynasty. The Mugal's, Aadilshaha and Marathas struggled for providing supreme rule on this reason. Shrimant Aappasaheb Patwardhan, the Leader of Maratha Dynasty made Sangli, the Capital of "Sangii Sansthan." In post independence era, in 1947, the District "South Satara" was formed by adding some part the Satara District and the independent erstwhile states viz. Aundh, Jath, Sangli, Miraj, Kurundwad etc. In 1960, the name of "South Satara" was changed as "Sangli District". The Sangli district is bounded by

Vijapur district of Karnataka State in the East, the part of Kolhapur district in the South, the part of Ratnagiri in the West and Satara district in the North. The district is located between 16.46 to 17.10 North Latitude and 73.42 to 75.40 East Longitude. Total geographical area of the district is 8601.50 sq.km. Average rainfall is about 850 mm per year. Agriculture is the main occupation in the district. Almost 77% people in this district are engaged in agriculture. The major crops are Jawar, Barja, Wheat, Sugarcane, Cotton, Tobacco, and Groundnut. The gross cultivable land is 8.66 lac hectares and net cultivated land is 5.69 lac hectares. The gross land brought under irrigation comes to be 119 thousand hectares and the net land is 97 thousand hectares. The main river of Sangli district is Krishna and its tributaries are Varana and Yerala. The work of lift irrigation project is in progress at Takari near Sagarshwar and Mhaisal irrigation project is under construction near Miraj.

The total population of Sangli district is 25.82 lacs. Male and female population is 11.28 and 10.81 lacs respectively. The rural Population is 77 percent while, literate population is 62.61%. The total number of villages is 727 of which 723 are inhabited and 4 are deserted. Electrification of the entire district is completed.

There are 21 banks in the district with 416 branches. The registered factories in operation are 2514. Total units of Large & Medium Scale industries are 56. Units registered under small scale industries category are 6046, with investment of Rs.18743 lacs and production capacity worth Rs.22187 lacs. They provide employment to 31397 persons.

Industrial estates are developed by M.I.D.C. at five places. In addition, five Co-operative Industrial estates are in Operation. The number of sugar factories and spinning mills are 17 and 13 respectively. Sugar production is 5.22 lac tons. Total length of railway track and road is 174 kms and 9703 kms' respectively. Agricultural production is marketed through 5 main markets, 6 sub markets, 13 marketing societies and 21 fruit and vegetable markets. There is ample scope for dairy, poultry, fisheries and horticulture activities in the district as they have adequate facilities.

There are attractive numbers of technical and professional education facilities in the district. Sangli district is well known for cultural and political awareness. Numbers of agro processing units are working in co-operative as well as private sectors. They carry out processing on agro produces like turmeric, milk, grapes, sugarcane, and cotton etc.¹¹

1.5 Indian Agro Processing Sector – Opportunities & Challenges

The agro process industries have to face many challenges. The liberalization of Indian economy and world trade, as well as rising consumer prosperity has drawn up new opportunities for food processing sector. Indian food processing industry has become an attractive destination for investors all over the world. In this context, some of the major opportunities and challenges are as described below.

1.5.1 Opportunities

India's huge market size demands for food, with growing incomes and changing life styles create incredible market opportunities for food producers, machinery makers, and food technology and service providers.

- The Indian food sector estimated to be worth over \$200 billion, expected to grow to \$310 billion by 2015. It also contributes to a major part of the retail basket. The \$6.1- billion Indian food retail chain is also growing a 9% and has invited FDI to the tune of over \$3 billion. India is emerging as major player in global food trade.
- Size of the semi-processed and ready to eat packaged food industry is over Rs. 4,000 Crore (US\$1 billion), growing at over 20%.¹²
- Increased urbanization, improved standards of living and the convenience needs of dual income families point to major market potential in the food processing and marketing sectors. This is also evident from the presence of several global foods giants and leading Indian MNCs in the country's food processing sector (e.g.,) Nestle India Ltd, Cadbury's India, Kellogg's India, Hindustan Lever Ltd, ITC-Agro, Godrej Foods and Reliance Foods etc.,
- The segments with the largest growth potential have been identified as dairy, wheat, fruits and vegetables, and poultry.
- Technological and human resources related to food industry are available a plenty in the country. Recent initiatives taken to give a special focus to this industry in a bid to provide logistics management and technology for increasing exports of fruits, vegetables and processed foods as the next areas of growth for exports. The proposed food parks would be equipped with facilities to sort and grade agriculture produce for export.
- The surplus food production, as well as the increasing preference for Indian foods in several regions of the world can be leveraged through exports.
- Post liberalization, (1991) the government has taken various steps to encourage the sectoral growth like removal of price controls, de-reservation from small scale and reduction in import controls. The Government is also providing a fillip to logistics and food retail, customs duty on refrigerated motor vehicles has been reduced from 10% to zero and the excise duty/countervailing duty from 16% to 8%.¹³

1.5.2 Challenges

The accomplishments of the green and white revolutions have, however, not been matched by concurrent developments in supply chain management, and in new technologies for better processing, preservation, and storage of food. Pockets of shortages and near starvation, substantial wastages due to spoilage, quality deficiencies, and inadequate returns to the farmer are still very much in evidence.

The challenges for the food preservation, distribution and processing sectors are diverse and demanding, and need to be addressed on several fronts to derive maximum market benefits. Presently, the organizations addressing the educational and R & D requirements are too few, and there is a pressing need for supplementing their efforts.

Some of the major challenges are:

- Disintegrated value chain.
- Inequitable price to farmers.

- Lack of sufficient warehousing and cold chain facilities.
- Inadequate dissemination of benefits of modern technology.
- Low price-elasticity for processed food products.
- Poor distribution network.
- Weak backward-forward integration from farm to consumers.
- Development of sustainable and viable marketing channels.
- Development of linkages between industry, government and institutions.

1.6 Review of Literature

Staley and Morse (1965), in their pioneering study, have explained several underlying patterns of advantages to small-scale industries. These patterns embody the interacting effects of production costs, scale economies, market characteristics and locational factors. They placed them in three distinct categories: (i) locational advantages for enterprises processing dispersed raw materials, having limited local market and with relatively high transport costs; (ii) process advantages where manufacturing operations can be separated, handicrafts and operations requiring simple assembly, mixing or finishing operations and (iii) market advantage factors for enterprises with differentiated product having low scale economies and selling in small total market.

Ho (1980) tried to classify Korean and Taiwanese industries under these three categories of advantages and found that locational and process advantages are most important for prevalence of small-scale industries. A further study of Korean economy over the years by him revealed that in course of development, the comparative advantages of small industries in locational factors (mainly transport cost) was giving way to process factor advantages. In case of both Korea and Taiwan he did not find the market advantage factor to be important.

Sundaram and Tendulkar (1988) discovered high differential of value added per worker not only between the rural households and the census sector but also between the rural and urban segments of the household industry at identical two digit level in 12 out of 14 meaningful comparative cases for the year 1974-75. They gave several possible reasons (not empirically shown) for the coexistence of different segments with sizeable shares in the same two digits code. First, different segments specialise in different product lines which does not get revealed in aggregated two digit code. Secondly, there could be product differentiation across different segments. However, this market advantage factor was not observed even in case Taiwan and Korea. Third, there is geographical segregation of product market and large transport cost which can be termed as locational advantages to small-scale sector. Fourthly, government policy favours small-scale sector by controlling raw material supply, imposing differential excise duties, providing scarce domestic/ imported input at exclusive prices, etc.

However, Little, Mazumdar and Page (1987) presented a different view. They found considerable differences in the employment size structure of six Indian states (namely Bihar, Haryana, Madhya Pradesh, Punjab, Uttar Pradesh and West Bengal) even though they are subject to the same macro-economic and industrial policies.

Dhar and Lydau (1961), had found considerable dearth of medium sized establishments (50-499 workers) in India as compared to Korea, Taiwan and the United States.

In contrast, Papola (1987) did not observe any relation between agricultural growth and level and growth of rural industries' output and value added. He observed that in the faster growing areas, the households engaged in rural industries even on traditional varieties carried on their activities as sole occupation and they even used hired labour to a higher extent. This signifies gradual transformation of the informal sector into the formal sector. The major limitation of the above mentioned studies on India is that none of them, unlike Ho, has empirically examined the nature and significance of various factors in favouring /disfavouring small scale enterprises.

The study by Sarkar (1995) indicated that the Own Account Enterprises (OAE) the smallest size group in the unorganised sector is disadvantageously positioned in terms of backward linkage, raw material concentration index and size of market factors. Their; ever diminishing advantages lie in dispersed raw material availability and sectors where processes are difficult to standardise (i.e., wood products and furniture). Further, raw material concentration index and direct backward linkage are positively and significantly correlated. It signifies that agro-industries using larger proportion of material inputs also have added advantage in geographically concentrated availability of raw materials used in production. Whereas the advantages of factory sector lie in terms of larger market, higher linkages and concentrated availability in raw material. Specialisation of agricultural production in different regions, higher income level by expanding size of market and better transportation facilities are likely to eat into the locational advantages that the OAE still possess.

Singh and Vyasulu (1990) observed that in the census sector (more than 49 workers in the factory sector) primary processing still dominates.

Srivastava (1989) observed movements of agro-industries from mechanical based to chemical based processing but still mechanical-based processing dominates. So, on the whole, let alone rural village agro-processing, the whole of India's agro-industry is characterised by low value added. Apart from this, raw materials are usually the major cost component in agro-industries which are characterised by seasonality, perishability and variability (Austin, 1981). In such circumstances, concentrated availability of raw materials has distinct scale advantages to larger size group of industries in terms of prices, transportation and storage. Conversely, dispersed availability of raw materials may entail greater cost in terms of procurement and transportation for larger size groups as they require procurement of higher volume of raw materials. Size of market, another locational factor, is also important. Small sized market dispersed over a wide region is likely to be difficult for larger firms to serve on account of high transport and marketing costs. In the post-liberalisation period, many micro-level studies have been done to examine the relative advantages of the small agro-processing units' vis-à-vis the larger ones and comparative advantages and performances by them.

Pal and Meena (2003), in a study of randomly selected 12 Chili processing units in Jodhpur district of Rajasthan after equally choosing from 3 size groups—small units (capacity upto 5 quintals), medium units (5-10 quintals per day) and large units (above 10 quintals per day) found that in the year 2000-01, maximum utilisation was in medium units (59 per cent), followed by large units (53 per cent) and small

units (41 per cent). However, recovery rate of chili powder was uniform in all size categories and all units were operating above breakeven capacity and earning profit. But the situation becomes quite different when there is shortage of raw materials.

In a study of 30 mustard processing units, 10 from each size group of small, medium and large units on the basis of chamber size of processing units in Bhand district of Madhya Pradesh, Bakshi et al. (2003) observed that capacity of plant and total operating days of the plant are inversely related to each other revealing that the large sized processing plants operate for less number of days as compared to the small sized processing plants due to shortage of raw materials (mustard).

Pawar et al. (2003), in contrast reported economies of scale in rice processing. Although the cost per quintal of paddy processed is higher with the large units but because of their recovery is higher by about 8 per cent, the net returns are much higher in case of the large units. The cost per quintal of paddy processed worked out to be Rs. 22, Rs. 23 and Rs. 27 for the small, medium and large processing units respectively, but the net returns per quintal of paddy processed worked out to be Rs. 8, Rs. 9 and Rs. 24 respectively. But it is not clear whether the recovery percentages with the small and medium units are due entirely to scale diseconomies or to obsolete technology or some other constraints. This needs further research.

Malliswari (1996) examined cost of four processing units of different sizes which produce mango pulp for independent marketing. It was found that except for raw material, all the other costs are higher per unit in other concerns in relation to the smallest scale of production, thereby indicating that there is a substantial element of fixed expenditure under each head and economies of scale are not reaped at this level. On the other extreme, the large scale concern which had highly sophisticated machinery and organisation, had incurred more expenses on depreciation and administrative overheads. Consequently, their processing costs were much higher.

Staley and Morse (1965) found substantial cost advantages in pulp processing activities at the place of production of raw material, as locational advantages of processing dispersed raw materials at source.

1.7 Need of the study

The traditional literature views that there is development of economy in two sectors. This development of a two sector economy is a result of process of transformation leading to expansion in the size of the modern industrial sector and advancement of the traditional agricultural sector. The process of development transfers agricultural labour to the industrial sector. This has led to decrease in the productivity of the agricultural sector and only increase in the demand for the industrial goods. But this process also releases financial resources for further development of the industrial sector.

The growth of each sector helps the other sector to survive and grow. With increasing incomes and changing pattern of demand, a sub sector within the manufacturing sector viz. the agro-processing sector has emerged and has provided a strong link between the two traditional sectors for exchange of goods, raw material and labour. Modernization of agriculture in 1960s and 70s and the consequent rise in

production made our country self sufficient as far as food grains are concerned. Food grains production increased to 217.28 million tones in 2006-07 from 82.02 million tones in 1960-61. The growth rate of agricultural production however has been fluctuating around only 2.32 percent during 1994-95 to 2007-08. Similarly, in the 1990s agricultural sector, the largest employment providing sector exhibited a declining capacity of employment generation. It was found that the employment elasticity of agriculture which was 0.70 during 1983 and 1993-94, declined to 0.01 during 1993-94 and 1999-00. (Economic Survey of India, 2002-03). Rising costs and falling profits in the agricultural sector have forced the farmers and policy makers to think of avenues of earning income other than traditional crop production.

On this background, the importance of diversification of rural economy and important role played by the agricultural and the allied sector in this case is highly recognised. Agro-based activity i.e. the agro-processing sector therefore has come to occupy an important position as the activities involved are being looked at as growth engines generating income and employment for the agricultural sector. On the other hand, with ever growing population of the country and the increasing incomes, the demand for agro based food as well as non food product is expected to increase rapidly. At all India level, the share of agro-based industry in terms of number of units, employment and output in the manufacturing sector is 65 percent, 63 percent and 35 percent respectively.¹⁴

Agricultural products like crops, grains, cotton, wood and the livestock products can be consumed only after processing. Agro processing could be defined as the set of techno economic activities carried out for conservation and handling of agricultural produce and for making it usable as food, feed, fibre, fuel or industrial raw material.⁸ Agro-processing transforms materials of plant or animal origin through altering physical and chemical characteristics and packaging. A particular produce like grain or fish can be used, as food, feed, fiber, fuel or industrial raw material after processing. Processing increases the durability and shelf life of the raw material. Processing of the primary produce thus adds value to it before it reaches its destination. One particular produce therefore can give rise to several linkage effects. The agro processing sector is a range of activities heterogeneous in nature.

The food grains production in India has been increasing gradually and has reached a level of 217 million tones. The index numbers of production and yield of all commodities were 165.7 and 144.3 respectively in 2000-2001 and rose up to 197.1 in 183.3 respectively in 2006-07 (Economic Survey of India, 2007-08). Apart from the increase in food grains production, there has been an increase in the area under and production of commercial crops like oilseeds and the horticultural crops. India is the largest producer of tea and milk and second largest producer of rice, wheat, vegetables, sugarcane, and tobacco. India has the largest livestock population and the production of meat, poultry and fishery based products is also increasing. With changing consumption pattern and food habits, processed food segment has also started growing rapidly. Recognizing the importance of the food processing for the country as a whole, the government set up the Ministry of Food Processing Industries, in 1988. It is the main central agency of the Government responsible for developing a strong and vibrant food processing sector; with a view to create increased job opportunities in rural areas, enable the farmers to reap benefit from modern technology, create surplus for exports stimulating demand for processed food.

Similarly, it acts as a catalyst and facilitator for attracting domestic and foreign investments towards developing large integrated processing capacities; providing technical guidance and advice to the industry; as well as creating conducive environment for its growth. The food processing industry has been identified as a thrust area for development. This industry is included in the priority lending sector. Most of the food processing industries have been exempted from the provisions of industrial licensing under Industries Development and Regulation Act, 1951. As far as foreign investment is concerned automatic approval for even 100 percent equity is available for majority of the processed food items.

During the last five years, there was an inflow of 24 billion rupees of foreign direct investment (FDI) in the country (D & B Information Services India Private limited, 2007). It needs to be noted however that the food processing sector of India, currently, is still in the nascent stage. Processing of the agricultural commodities constitutes a small proportion of the raw material available. In 2004-05, food processing sector contributed about 14 percent of manufacturing GDP. Of this, the unorganized sector accounted for more than 70 percent of production in terms of volume and 50 percent in terms of value. On the export front, India contributes 1.5 percent (2003-04) to the global agricultural exports despite its leadership in agricultural production A and B information services, 2007). The share of this sector in GDP has almost remained same for the last ten years.¹⁵

Processing of fruits and vegetables is around 2 percent, around 35 percent in milk, 21 percent in meat and 6 percent in poultry products. By international comparison, these levels are significantly low. Processing of agriculture produce is around 40 percent in China, 30 percent in Thailand, 10 percent in Brazil, 78 percent in the Philippines and 80 percent in Malaysia. However, value addition to agriculture produce in India is just 20 percent, wastage is estimated to be valued at around US\$ 13 bn (Rs 580 bn) (D and B information services, 2007).

According to one estimate, due to inadequate processing facilities, fruits and vegetables worth Rs.40000 Crore were being wasted annually. Thus, food processing is also necessary for reducing the wastages which normally take place in the post-harvest period or during the period of a bumper crop. In view of the current status and prospects of the agro processing sector, it is essential to understand the nature of growth of constraints faced by the agro-processing sector.¹⁶

At the disaggregated level, states have exhibited varying performance as far as the group of the agro processing sector is concerned. Maharashtra is one of the states with high potential for the growth of food as well as non food processing sector. It is a leadings rate as far as its industrial development is concerned. It is also known for the advantage it has as far as the horticultural crops are concerned As a result, it is one of the important states as far as the development of agro-based industries is concerned. In this report therefore, we discuss the growth of the agro-processing sector of this state and the problems and challenges before the sector in the state. The data shows that Maharashtra has highest number (856 or 19 percent of the total in India) of units manufacturing fruit and vegetable products with 10 percent of the total installed capacity in 2007.¹⁷ It was also the state with highest value of gross output generated by the registered Small Scale Industries (SSI). Maharashtra was among the front-runners to receive the highest share of FDI in food processing during the last five

years. The dairy and consumer industries received FDI worth Rs 2.7 bn each as foreign investment.

Within the non food industries, Maharashtra is one of the important states as far as textile and textile based products and the leather based products are concerned these products have high export potential also. As the data for Maharashtra shows, these sectors have recorded growth in recent years.

1.8 Statement of the Problem

In this research study, we want to focus on agro process industries (API), which can be restructured with the help of BPR, so that they can be more competent to face the new challenges in the era of cut throat competition. The present study is related with some selected agro process industries located in Sangli district and use of BPR for them. This study is an attempt to develop a model for API using BPR. Some ultramodern techniques like MRP-II, ERP, Six Sigma, TQM, SCM etc. are used in the design of this model.

Agro process industries provide employment opportunities, value addition and financial contribution in national economy. Such industries are the real backbone of rural development. In India, 70 % of population stays in rural area; who have agriculture as their main occupation. Agro processing industries play vital role in the development of rural sector. Hence, the concentration on the development of these industries is essential from economic and social point of view. The challenges before these industries can be faced by application of tool like Business Process Reengineering (BPR). BPR focuses on improvement of infrastructure, quality of products and value addition etc.

Need for the Present Study It is widely recognized that due to the diverse agro-climatic conditions, Indian soil can grow a wide variety of crops. Similarly a wide range of allied activities can also be pursued. This indicates a huge resource base and potential for the growth of agro processing sectors. The Indian food processing industry is one of the largest in the world in terms of production, consumption, export and growth prospects. Earlier, however, Processing was mainly under taken for the commodities like sugar tea, coffee, edible oils and spices and the processing activity was largely confined to food preservation(which mainly involved salting, curdling, drying, pickling, etc), packaging and transportation,

However, over the years, with emerging new markets and technologies the sector has widened its scope .It has started producing many new items like ready-to-eat food, beverages processed and frozen fruit and vegetable products, marine and meat products, etc. It also includes establishment of post-harvest infrastructure for processing of various food items like cold storage facilities, food parks, packaging centres, eradication facilities and modernized a better. The liberalisation of the Indian economy and world trade as well as rising consumer prosperity has opened up new opportunities for diversification in the food processing sector and opened up new avenues for growth. Demand for processed and convenience food is increasing constantly because of urbanisation, changing life-style and food habits of the people. Accordingly, the Indian consumers are being offered newer high quality food products made by using the latest state-of-the-art technology. Indian food processing

industry therefore has become an attractive destination for investors all over the world.

1.9 Objectives of the Study

1. To study existing business practices in the agro process industries in Sangli district.
2. To examine techniques used for improving processes.
3. To identify areas where the scope for betterment exists.
4. To recognize factors and problems which are generating obstacles in business process.
5. To determine weak links in the value chain.
6. To suggest measures for non-value adding activities in the agro process unit.
7. To study different IT based tools to improve performance of agro process industries.
8. To study existing BPR philosophy available for engineering industry and to design suitable model for agro process industry.
9. To suggest some steps for achieving excellence in rural based agro process industries.

1.10 Hypotheses of the Study

1. There is need of new solution to resolve the problems faced by agro processing units. BPR can be a solution in this direction for achieving excellence into the management of agro process industries.
2. Existing solutions are unable to resolve problems in front of agro processing industries
3. Agro processing industries are not prepared to accept new model if it is based on existing solutions. There is requirement of appropriate strategy that can build competent rural based agro processing industry structure which can minimize the cost, accept ground realities and provide benefits to all sections of the society. Existing solutions have limitations to address these problems. The BPR model can be fruitful to achieve these requirements
4. Existing solutions are not effective to solve the problems in front of agro processing industries Available models of BPR which include MRP-II, ERP and SCM are mostly addressed to the needs of corporate sector industries. They can be suitably applied for neglected agro processing sector.

1.11 Limitations of the Study

1. This study is restricted only to agro process industries. Other agro support industries like fishery, poultry, animal husbandry etc. are not included in this study.
2. This study is related with the case study of Sangli district only. This district is comprised of ten talukas.
3. The study is limited to agro process industries located in rural areas and semi-urban industrial zones.

4. The data of some selected agro process industries only is considered for this study.
5. This study is based on limited data of last five years. (2004-2005 to 2008-2009).
6. The study is concerned with application of (BPR) Business Process Reengineering philosophy to eradicate problems in front of agro process industries.
7. Only selected modern techniques like Manufacturing Resource Planning (MRP), Enterprise Resource planning (ERP), Total Quality management (TQM), Six Sigma, Supply Chain Management (SCM) etc. as a part of BPR model are referred with the study of agro process industries.
8. The idle BPR concept for manufacturing sector is considered to design a suitable model for agro processing industries.

1.12 Research Methodology

Research methodology is the framework of the study which includes selection of suitable sample and collection as well as analysis of data base.

1.12.1 Sampling Technique

According to the records there are 467 establishments, registered as the agro processing units in Sangli District, where at least one worker is employed. Out of them 73 units are not in working status. From remaining 394 agro processing units, the 10% i.e. 40 units are selected as sample for this study by using cluster sampling method.

We have categorised agro-processed industries into two groups, one is food-processing industries and another is non-food processing industries. Food processing industries contains mainly six industries. These are,

- | | | | |
|------------------------------------|---------------------------|--|--|
| 1. Grain Processing, | 2. Bakery | | |
| 3. Horticulture (Fruit-processing) | 4. Spices | | |
| 5. Milk-processing | 6. Sugar- Cane Processing | | |
- Industries.

The non-food processing category comprises mainly of.

1. Cotton & Textile Processing
2. Paper and Pulp Processing
3. Wood processing industries.

The selected number of industries in each taluka of Sangli district according to the above classification is as shown in table 1.5.

Table 1.5
Selection of Sample from Sangli District

(Taluka-wise and Category-wise)

Sr. No.	Taluka	Food Processing						Non-Food Processing			Total	
		I	II	III	IV	V	VI	VII	VIII	IX	No	%
01	Miraj	3	1	-	1	2	-	1	1	-	9	22.50
02	Walwa	-	-	1	1	1	-	1	-	-	4	10.00
03	Shirala	2	-	-	1	-	-	-	-	1	4	10.00
04	Tasgoan	-	1	1	-	1	1	-	-	1	5	12.50
05	Palus	-	-	2	-	-	-	-	1	-	3	07.50
06	Kadegoan	-	-	-	-	1	-	1	-	1	3	07.50
07	Khanapur	-	1	-	-	-	1	1	-	-	3	07.50
08	K'Mahakal	-	1	1	-	-	-	-	-	1	3	07.50
09	Jath	-	1	-	-	-	1	-	-	1	3	07.50
10	Atpadi	1	1	-	-	-	-	-	-	1	3	07.50
Total		6	6	5	3	5	3	4	2	6	40	100.00
%		15	15	12.5	07.5	12.5	07.5	10	05	15.		

Source: Field Survey

We have selected 28 industries (i.e. 70% of total sample) from the first category under the four sectors i.e. individual, partnership, co-operative and from the government sector and in case of second category we have selected 12 industries from the this category (i.e. 30% of the total sample) containing all the four sectors as per the first category. These all samples will be representatives of all ten talukas of this district. The following table 1.6 shows the selection of sample by cluster sampling technique for this study.

Table 1.6
Sample Selection (Sector –Wise)

Sr. No.	Sector	Food Processing						Non-Food Processing			Total	
		I	II	III	IV	V	VI	VII	VIII	IX	No.	%
1	Individual	5	5	2	2	2	1	2	-	5	24	60.00
2	Partnership	1	1	2	1	2	-	1	2	1	11	27.50
3	Co-operative	-	-	1	-	-	2	1	-	-	04	10.00
4	Government	-	-	-	-	1	-	-	-	-	01	02.50
Total		6	6	5	3	5	3	4	2	6	40	100.00

Source: Field Survey

Appropriate weightage has been given to the production capacity during selection of sample industries from food processing and non-food processing sectors as shown in table 1.7.

Table .1.7
Sample Selection (Scale –Wise)

Sr. No	Production Scale	Food Processing						Non-Food Processing			Total	
		I	II	III	IV	V	VI	VII	VIII	IX	No.	%
1	Cottage	-	3	2	2	1	-	-	-	1	09	22.50
2	Small	4	3	2	1	2	1	-	1	3	17	42.50
3	Medium	2	-	1	-	1	1	3	1	2	11	27.50
4	Large	-	-	-	--	1	1	1	--	-	03	07.50
Total		6	6	5	3	5	3	4	2	6	40	100.00

Source: Field Survey

Similarly, sample industries were identified with the criteria of their age, on the basis of year of establishment as represented in table 1.8

Table 1.8
Sample Selection (Age wise)

Sr. No	Age (Years)	Food Processing						Non-Food Processing			Total	
		I	II	III	IV	V	VI	VII	VIII	IX	No.	%
1	Less than 06	1	1	1	1	1	1	-	-	1	07	17.50
2	06 to 10	2	3	2	-	1	1	2	1	1	13	32.50
3	11 to 15	2	2	1	1	1	-	1	1	1	10	25.00
4	16 to 20	1	-	1	-	1	1	1	-	1	06	15.00
5	Above 20	-	-	-	1	1	-	-	-	2	04	10.00
Total		6	6	5	3	5	3	4	2	6	40	100.00

Source: Field Survey

1.12.2 Data Collection and Analysis

The data is unprocessed information related with the study. There are two types of data based on sources where from we can collect the data. One is the primary data and another is secondary data. Primary data is collected from primary source like the people or institute etc., it is in raw form. Whereas secondary data is a data already collected and processed by someone. Secondary data is available in the form of printed record like books, magazines, journals, reports and office records etc.

a) Primary Data

In case of this study primary data is collected from personal observation, interviews and questionnaire.

The personal observation of few agro processing units at the plant is done to understand the production system, technology, quality control system, wastages and output, workers efficiency etc.

Some scheduled interviews are taken of the managers or managing directors or the owners of the business units. The interviews of production manager, finance manager, store keeper, human resource manager, and marketing manager had been taken wherever it is found necessary.

A questionnaire is prepared to collect the data relating to different areas of the agro processing units. This questionnaire contains the questions related to the general information of the business unit, information related with machinery used, information regarding men-power, money used, technology, quality control system, management skills and about the new techniques of restructuring of the business.

b) Secondary Data-

In this study we have used the secondary data which is collected from the following sources-

- a) Different books related with the Agro processed industries, Business process re-engineering, Total quality management, Supply chain management, Six sigma, EPR and few modern management techniques etc.
- b) Journals published at national level and state level like Indian Agriculture, Agro processing Industries, Agriculture Today etc. are also referred.
- c) Magazines like Yojana, Kurukshetra, Udyog-pragati, Entrepreneur, India Today, Udhyojakta etc.
- d) The daily news papers like- Pudhari, Sakal, Lokmat, Agro-one, with some specific articles are also taken into consideration.
- e) Few Thesis of Ph.D and M.Phil (published and unpublished) are also referred.

1.13 Data-Presentation and Data Analysis

a) Presentation of the Data-

The collected primary and secondary data is presented with the help of some tables to classify the data and to group the data. To make it brief and understandable the graphs and comparative charts are prepared.

b) Analysis of the Data-

The statistical techniques of the averages, percentages, correlation and regression are applied at the appropriate place to analyse the data and to interpret it properly.

c) Testing of Hypothesis-

The Spearman's Rank Correlation and T-test are applied to test the hypotheses of the study. This technique of testing of hypothesis is found more suitable in this study.

The result of the analysis of data is interpreted step by step to understand the data and to reach up to the appropriate findings and suggestions. The study is

concluded with proper suggestions to the agro processing industries with the idle model of BPR to accept and to adopt for the future rapid growth by these industries.

1.14 Chapter Scheme

This research thesis follows following sequence of chapters.

Chapter I : Introduction and Research Methodology

- 1.1. Introduction
- 1.2. Definition of Agro Process Industry
- 1.3. Agro Process Industries in India
- 1.4. Status of Agro-based Industries in the State of Maharashtra
- 1.5. Indian Agro Processing Sector – Opportunities & Challenges
- 1.6. Review of Literature
- 1.7. Need of the study
- 1.8. Statement of the Problem
- 1.9. Objectives of the Study
- 1.10. Hypotheses of the Study
- 1.11. Limitations of the Study
- 1.12. Research Methodology
- 1.13. Data-Presentation and Data Analysis
- 1.14 Chapter Scheme
- 1.15. Conclusion

Chapter II : Business Process Reengineering

- 2.1. Introduction
- 2.2. The History of Reengineering
- 2.3. The Concept of Reengineering
- 2.4. Methodological Approach of BPR
- 2.5. The Value Chain Concept
- 2.6. Organizational Aspects of BPR
- 2.7. Information Technology for BPR
- 2.8. BPR and Quality
- 2.9. Implementation Procedure of BPR
- 2.10. Journey towards Modernization
- 2.11. Conclusion

Chapter III : Agro Process Industries

- 3.1. Introduction
- 3.2. Historical Background of Agro Processing Industry
- 3.3. Importance of Agro Processing Industry
- 3.4. Changing Environment for Agro Industry
- 3.5. New Opportunities for Growth of Agro Processing Industries
- 3.6. Agro Production Trends
- 3.7. Post Harvest Losses and Agro Processing Industries
- 3.8. Research & Development in Agro Processing Sector
- 3.9. Commodity Wise Status and Problems of Agro Processing

- 3.10. Major Challenges before Rural Based Agro Processing Industries
- 3.11. Export Trends and Opportunities
- 3.12. SWOT Analysis of Agro Processing Industries in India
- 3.13. Conclusion

Chapter IV : Business Process Reengineering For Agro Process Industries

- 4.1. Introduction
- 4.2. Post-Harvest Technology: Scopes and Importance
- 4.3. Agro -Processing Industry and Status of Post-Harvest Technology
- 4.4. Processing and Value Addition
- 4.5. Agricultural Processing
- 4.6. Rural-Based Agro-Processing
- 4.7. Integrating Business Process Reengineering for Agro Process Industries
- 4.8. Constraints before Agro Processing Industries
- 4.9 Business Process Reengineering Model: A Tool for Efficient Agro Processing Industries ['Nine D' Model]
- 4.10 Conclusion

Chapter V : I T Enabled Agro Process Industries

- 5.1. Introduction
- 5.2. Management Information System (MIS)
- 5.3. Total Quality Management (TQM)
- 5.4. Material Requirement Planning (MRP)
- 5.5. Enterprise Resource Planning (ERP)
- 5.6. Six Sigma
- 5.7. Supply Chain Management (SCM)
- 5.8. Business Process Reengineering (BPR)
- 5.9. Conclusion

Chapter VI : Data Presentation and Analysis

- 6.1. Introduction
- 6.2. Data Presentation and Analysis
- 6.3. Hypotheses Testing
- 6.4. Conclusion

Chapter VII Findings and Conclusion

- 7.1. Introduction
- 7.2. Major Findings
- 7.3. Analysis of Problems
- 7.4. Findings about Preparedness to Implement New Solutions
- 7.5. Multiplicity of Ministries and Agro Process Industries
- 7.6. Conclusion

Chapter-VIII : Suggestions

- 8.1. Introduction

- 8.2. Need for a Change
- 8.3. Suggestions
- 8.4. The Nine-D Model
- 8.5. Implementation of the Nine-D Model
- 8.6. Conclusion

1.15 Conclusion

We can conclude this chapter by saying that the study related with the topic of “A STUDY OF APPLICATION OF BUSINESS PROCESS RE-ENGINEERING FOR RURAL SECTOR WITH SPECIAL REFERENCE TO SELECTED AGRO PROCESS INDUSTRIES IN SANGLI DISTRICT.” is one of the attempt followed with a specific framework as a research methodology which has some set objectives, hypotheses and limitations of the study. There is an effort done by the researcher to focus on agro process industries to restructure them in this competitive world of Liberalization, Privatization and Globalization (LPG) era with the model of Business Process Reengineering (BPR).

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