SOCIO ECONOMIC IMPACT OF A PRIVATE SUGAR FACTORY

A CASE STUDY OF NATURAL SUGAR AND

ALLIED INDUSTRIES LIMITED

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DECLARATION

I hereby declare that the work incorporated in this thesis entitled, '**Socio Economic Impact of a Private Sugar Factory:A Case Study of Natural Sugar and Allied Industries Limited'** completed and written by me has not been submitted in part or full for any degree or diploma of any other university or examining body.

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CERTIFICATE

This is to certify that the work incorporated in the thesis entitled '**Socio Economic Impact of a Private Sugar Factory: A Case Study of Natural Sugar and Allied Industries Limited'** submitted by Vidyadhar P. Yadav was carried out by the candidate under my supervision for the degree of Doctor of Philosophy. Such material obtained from other sources has been duly acknowledged in the thesis.

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INTRODUCTION

1.1 Sugar Industry

The sugar industry has played an important role in social and economic development of rural areas in India and especially in Maharashtra. It is the second largest agro-based industry in the country, next to Textile industry. The sugar factories have been established in sugarcane-growing areas and have become centres of development for their areas of operation.

The sugar factories have helped decentralization of industries in rural areas. They have also deeply influenced development of agriculture in rural economy. Because of these sugar factories, even small farmers have indirectly become industrialists by virtue of their membership of sugar factories, which produce a number of by-products. The sugar factories have been instrumental in establishing English medium public schools, high schools, colleges etc. They have caused establishment of hospitals, milk dairies, poultry farms, consumer stores, banks, libraries, entertainment centers, workshop, oil mills and super market in rural areas. Similarly, for production of more sugarcane, these factories implemented various lift irrigation schemes, small medium and large water tanks and have provided irrigation facilities to large tracts of lands. Likewise, they have helped in construction of roads in their areas of operation. Due to the establishment of these factories, the businessmen and traders could expand their business. The problem of rural unemployment has also been greatly solved because of these sugar factories.

In this way, the sugar factories have been helping large-scale development of the rural areas. All the above contributions of the co-operative sugar factories have underlined their role in the rural economy.

1.2 History of Sugarcane and Sugar Production

"According to Hindu mythology, the sugarcane crop is related to the God Ganesh and Goddess Laxmi and is a symbol of affluence. India is the original land of sugarcane production." India is the first country, which started sugarcane production. The references to sugarcane in Hindu mythological

books precede any such references from other countries. This is enough proof for India's claim as the pioneer in sugarcane production. There are many references about sugar in Manusmriti. Similarly, sugarcane is mentioned in the Atharvaved.

The technique of producing sugar from sugarcane was developed in ancient India. The first written reference to production of sugar has been found in Sanskrit literature. In Ayurveda, the word "Ikshu" has been used for sugarcane. In Sanskrit language, sugar is called "Sharkara". It is called "Kand" in the Arabaic. This word originated from the Sanskrit word "Kand" and later it became "Candy" in the English language. In Malaya and Indonesia, raw sugar is called "Gula" for which the words "Gool", "Gud" or "Gur" are used in many regional languages in India. The Aryans caused to know about the sugarcane when they came to India. In Kautilya's Artha Shastra (300 years B.C.) sugarcane is mentioned in the list of important crops.

From Aine-Akbari, a chronicle of Emperor Akbar (1950 A.D.) there is information about cultivation of sugarcane and various forms of sugar. When Alexander the Great, invaded India (years 327 B.C.) his soldiers came across sugarcane for the first time. They were the first Europeans to see sugarcane. While returning, Alexander took sugarcane from the Punjab and introduced it to Western countries.

The cultivation of Sugarcane spread from India to Srilanka, Java, China, Egypt, Morocco and Spain. In China during the regimes of 'Cha' and 'Hoan' dynasties, cultivation of sugarcane and production of sugar was started in the provinces of Tonking and Annan. Sugar production on commercial lines was started during the 9^{th} and 10^{th} century. The crusaders introduced sugar first in France from whenre it spread all over Europe.

The Portuguese initially began sugarcane cultivation on the islands of Madeira and St.Thomas. Later on, the Spaniards started sugarcane cultivation on Cannery Island. In his second voyage in 1494, Columbus introduced sugarcane to Santo Domingo from which it spread to Cuba and the Caribbean countries. The Dutch started sugarcane production in Brazil in 1580. After

driving away the Dutch from the West Indies, the Portuguese started sugarcane cultivation and sugar production was started there in 1655. Father, Labat, a traveller noted in 1656 that he saw a three-roller sugar mill in the Windies. The English started sugar production in Barbados and Jamaica in 1643 and 1664 respectively.

Sugarcane cultivation started in California in 1750. Sugar refineries were installed in England, France and Germany during the 16th century. But modern refineries were installed in the beginning of the 19th century. In the middle ages, sugar was very costly and so only kings and the rich people could use sugar. It was believed that sugar contained many remedial properties.

1.3 The Co-operative Movement

"The co-operative movement originated in the west, first in England, with the establishment of the Rochdale Co-operative Society in 1844, which started as a co-operative consumer store. In Germany, the movement was associated with the name of Raiffeisen. In 1848, Raiffeisen experimented with various forms of co-operative association among the villagers, designed to eliminate the middlemen and the moneylender. The Raiffeisen societies were basically self-governing associations of barrowers."

"Co-operative movement in India had its birth in the year 1904 with the passing of the Co-operative Societies Act. The activities started with the establishment of primary credit co-operatives, whose main function was to help small farmers with loans, instead of their beings exploited by the village Savkar. India stands second in world population. The credit of establishing democracy, in the multi-lingual and multi-religious country goes to the architect of modern India, the founder of the co-operative movement and the first prime minister late Pandit Jawaharlal Nehru.

The salient features of our economic system such as the socialistic structure of society, collective development, five year plan, financial planning and democratic administration and pioneered and gifted to us by our first Prime Minister Pandit Jawaharlal Nehru. His policy was to create co-operative federal state, the all round development of the weaker, and tribal sections of society,

equal justice, a preference to the ignored sections and the co-operative movement was placed on the fore front of our economic system. The movement becomes successful in strengthening the weaker sections of our country. Till the independence in 1947, the growth of the movement was not up to the mark. It was unknown in many states, post independence social and financial needs promoted the co-operative considerably. Immediately after Indian independence in the year 1947, the government of India in its industrial policy resolution of 1948, stressed the need for the rapid industrialization of the country by building up a large co-operative sector with the financial assistance of the government. In the successive five year plan of the government of India which is meant for overall development of the country, the co-operative sector was given preference in every field as compare to the private and public sector organizations.

A network of primary agriculture co-operatives has been established at the village level for granting short-term and medium-term credit, supply of agriculture inputs and essentials consumer commodities to the small farmers. In order to supply fertilizers to farmers, Indian Farmers Fertilizers Co-operative Limited (IFFCO) was established to manufacture fertilizers like, Urea and NPK mixtures and distribution of the same through the network of marketing societies. This has been a great success in India, as millions of farmers are procuring their requirement of fertilizers at fair prices from the marketing societies of IFFCO. The village level co-operative societies are affiliated to the District Co-operative Banks and District Co-operative Banks are affiliated to State Co-operative Banks. State Co-operative Bank gets concessional finance from the agriculture credit department of the Reserve Bank of India.

A spectacular development has been achieved through the establishment of agriculture processing co-operatives viz. sugarcane, cotton, oil seeds, food and vegetables. All these activities are financially assisted by National co-operative Development Corporation (NCDC), which is the executive body of the ministry of agriculture and co-operation.

In order to seize exploitation of the millions of consumers in India by

the traders, particularly during the periods of scarcity of essential commodities, a system of public distribution has been introduced with a network of consumer's co-operative societies. Various types of consumer articles and essential commodities are supplied to the consumers at fair prices. There are few thousands of primary consumers co-operative societies and many wholesale consumer societies and a few state consumer federations etc.

Sugar is made from sugarcane, and was discovered thousands of years ago in New Guinea. And then the route was traced to India and Southeast Asia. India was the first to begin with the production of sugar following the process of pressing sugarcane to extract juice and boil it to get crystals. The government of India in 1950-51 made serious industrial development plans and has set many targets for production and consumption of sugar. These plans by the government projected the license and installment capacity for the sugar industry in its Five Year Plans. India is well known as the original home of sugar and sugarcane

Indian mythology supports the fact it contains legends showing the origin of sugarcane. Today India is the second largest producer of sugarcane next to Brazil. Currently there are about 4 million hectares of land under sugarcane with an average yield of 70 tonnes per hectare.

India is the largest producer of sugar including traditional cane sugar sweeteners, khandsari and Gur equivalent to 26 million tonnes raw value followed by Brazil in the second place with 18.5 million tonnes. Even in respect of white crystal sugar, India has ranked no.1 position in 7 out of last 10 years.

The traditional sweeteners of India like Gur and Khandsari are consumed mostly by the rural population in the country. In the early 1930's nearly 2/3rd of sugarcane production was used for the production of alternate sweeteners like Gur and Khandsari. As accordingly because of the better standard of living and higher incomes, the sweetener demand has shifted to white sugar. Currently 1/3rd of sugarcane production is used by the Gur and Khandsari sectors.

In the year 1930 there was an advent of modern sugar processing industry in India which was started with grant of tariff protection to the sugar industry. In the year 1930-31 the number of sugar mills increased from 30 to 135 and in the year 1935-36 production was increased from 1.20 lakh tonnes to 9.34 lakh tonnes under the dynamic leadership of the private sector. In the year 1950-51 the era of planning for industrial development began and Government laid down targets of sugar production and consumption, licensed and installed capacity, sugarcane production during each of the Five Year Plan periods.

India is the largest sugar consumer and second largest producer of sugar in the world according to the USDA Foreign Agricultural Service. Indian Sugar Industry has total turnover of Rs. 500 billion per annum and contributes almost Rs. 22.5 billion to central and state exchequer as tax, cess, and excise duty every year according to the sources of Ministry of Food and Government of India.

Sugar Industry is regarded second after the Textile Industry in India as per the agro-processing industry in the country. The industry currently has 453 operating sugar mills in different parts of the country. Indian sugar industry has always been a focal point for socio-economic development in the rural areas. Today nearly 50 million sugarcane farmers and a large number of agricultural laborers are involved in sugarcane cultivation and ancillary activities contributing to 7.5 per cent of the rural population.

Indian Sugar Industry generates power for its own requirement and even gets surplus power for export to the grid based on by-product bagasse. There is even production of ethanol, an ecology friendly and renewable energy for blending with petrol. Sugar Companies have been established in large sugarcane growing states like Uttar Pradesh, Maharashtra, Karnataka, Gujarat, Tamil Nadu, and Andhra Pradesh and are the six states contributing more than 85 per cent of total sugar production in India. And 57 per cent of total production is together contributed by Uttar Pradesh and Maharashtra. Indian sugar industry has been growing horizontally with large number of small sized sugar plants set up throughout India as opposed to the consolidation of capacity

in the rest of the important sugar producing countries and sellers of sugar, where there is greater concentration on larger capacity of sugar plants.

1.4 Present Status of Sugarcane Crop in India

Sugarcane being an important cash crop is mainly used for large scale sugar production throughout the world. Sugarcane occupied an important role in national economy and involved millions of cultivators, workers and technicians.

India ranks first in total area and production of sugarcane among cane growing countries of the world. The area under sugarcane was steadily increased from 2.21 million hectares in 1931 to 5.03 million hectares in 2011-12. The production of sugarcane in India was 342.20 million tonnes in 2011-12. The productivity of sugarcane in India was observed to be 68.09 tonnes per hectare during 2011-12.

1.5 Present Status of Sugarcane Crop in Maharashtra

Maharashtra state has occupied a well-recognized place of pride on the sugarcane map of the country. The area under sugarcane in Maharashtra is 12.16 per cent of the total area in India. The area under sugarcane was highest in Pune division and the same leads to higher production of sugarcane and sugar in Maharashtra. The recovery per centage was more in the South region such as in Sangli, Satara and Kolhapur than central. The total area under sugarcane has increased from 5.90 lakh hectares during 1999-00 to 9.65 lakh hectares during 2011-12. As regards the production of sugarcane among the states, in Maharashtra it was about 8569 lakh tones in the year 2011-12.

Maharashtra state ranks first in sugar production followed by Uttar Pradesh, Tamil Nadu, Gujarat and Andhra Pradesh. The productivity of sugarcane in Maharashtra was observed to be 89 tonnes per hectare during 2011-12.

1.6 Importance of the Sugar Industry

The sugar industry is playing a crucial role in the development of the rural economy and ultimately of the nation. The industry is largely established in co-operative sector which produces about 56.98 per cent of national sugar

output. On the other hand the sugar industry provides employment to the large number of rural population. As a matter of fact there is no other industry in the country where the interaction between the industry and agriculture is so direct and intimates as in the case of sugar industry. In agriculturally dominant country like ours, sugar industry plays a major role in the process for generation of the rural employment. It exerts a visible influence on a agro-technological, socio-economical and socio-political aspects of the rural masses. Development of the industry especially in the co-operative sector has made possible to awakening rural industrialization and employment for intellectual technocrats, scientists, millions of skilled and unskilled labours.

Sugar industry processing local agricultural produce located in rural area of Maharashtra state has massive and eye catching development impact on rural community. These sugar factories located in different regions of the state, provide a balanced regional development. It has become a powerful instrument in the development and mobilization of natural human and financial resources of the state. A large contribution towards the success of the green revolution and white revolution has been made by these sugar factories which also made provision of medical educational, banking and irrigational facilities in the rural areas.

1.7 Present Status of Sugar Industries in India

Sugar industry is the second largest agro-based industry located in the rural India. There are about 570 installed sugar mills in India today of which 285 are in co-operative sector, 270 in the private sector and 15 in public sectors. The plant size varies from 2500 to 5000 tonnes cane crushing capacity per day.

There has been a rapid growth in the production and consumption of sugar in India during the past 20 years. The sugar Industry in India has grown from an initial installed capacity of 20 million tones cane in 1950 to 50 million tones 1970 rising to 280 million tones currently. About 45 million sugarcane farmers their dependents and a large mass of agricultural labours are involved in sugar-cane cultivation, harvesting and ancillary activities, constituting 7.5

per cent of the rural population besides, about 0.5 million skilled and semiskilled workers, mostly from the rural area are engaged in the sugar processing sector. The sugar industry in India has been instrumental in accelerating the socio-economic development in villages through mobilizing rural resources leading to generation of employment, increase in income and overall improvement in facilities for transport and communication. Further many sugar factories have established schools, colleges, medical centers and hospitals for the benefit of rural population.

A large number of sugar factories have diversified into by-product based industries and they have invested and set up distilleries, organic chemical plants, paper and particle board factories and co-generation plants.

Figure 1.1: Map showing network of Sugar Industry in India.

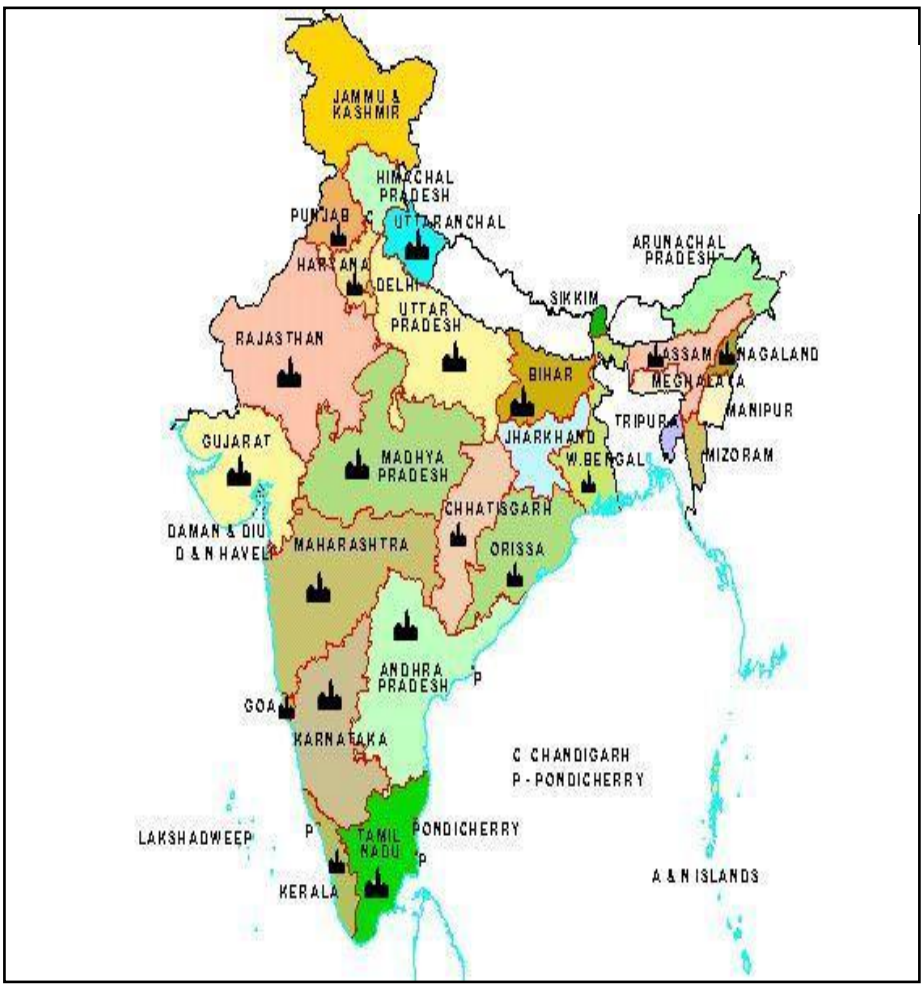

Table 1.1: Growth of India's Sugar Industry

Year	No of factories in operation	Installed Capacity (Lakh tonne)	Actual sugar production (in lakh tonne)
1950-51	139	16.7	11.0
1955-56	143	17.8	18.9
1960-61	174	24.5	30.2
1965-66	200	32.3	35.4
1973-74	229	43.1	39.5
1978-79	299	59.1	58.4
1985-86	339	72.7	70.2
1990-91	377	98.5	120.5
1995-96	415	127.6	164.3
1999-2000	423	161.8	182.0
2000-01	437	168.2	186.0
2001-02	433	176.8	185.3
2002-03	453	180.0	201.0
2003-04 (Estimated)	461	185.0	170.0

Source: Indian Sugar Mill Association

1.8 Present Status of Sugar Industries in Maharashtra

Maharashtra sugar industry is one of the most famous and large scale sugar manufacturing sectors in India. Sugar manufacturing has been growing at a massive pace since past few years and a glance at the latest statistics regarding sugar production reveals that Maharshtra is doing better than other states.

The sugar industry in Maharashtra is widely popular in the co-operative sector since farmers possess a share in the sugar factories. Maharashtra has witnessed an outstanding growth in its sugar industry. Sugarcane is one of the

chief crops among all other crops produce in Maharashtra. A number of sugar industries have been established in Maharashtra. Some of the towns of Maharashtra which have sugar factories are Navapura, Nityanandnagar, kurunda, Mohagaon, Sipora, Varud, Pimpalgaon Sonwadi, Mankeshwar, Halgaon, Indapur, Karanwadi Sheshnagar, Radhanagari and Potoda.

At present, there are 492 sugar factories in India, out of which 55 per cent are in co-operative sector. In Maharashtra, there are about 133 established sugar factories, out of which only 123 are running. Among these 123 sugar factories, 4 are running in private sector producing 2.4 per cent of the total sugar which indicates the speedily development of co-operative movement in Maharashtra. The total crushing capacity of the established sugar factories in India is about 158.4 lakh tones and that of the Maharashtra is about 32.52 lakh tones which are 52.57 per cent of the total.

Average recovery of India is low as compared to Maharashtra. In Maharashtra, average recovery is 11.40 per cent which is the highest as compared to other sugarcane producing states in India. Out of 123 running sugar factories in Maharashtra the South, Central and North regions are having 31, 43 and 49 sugar factories respectively.

Figure 1.2: Location of Sugar Factories in Maharashtra.

Table 1.2: District-wise Distribution of sugar factories in Maharashtra (2009)

Sr. No.	District	Total
1	Ahmednagar	18
2	Nashik	07
3	Dhule	01
4	Nandurbar	03
5	Jalgaon	06
6	Aurangabad	07
7	Beed	09
8	Jalana	03
9	Parbhani	02
10	Hingoli	03
11	Nanded	06
12	Osmanabad	08
13	Solapur	21
14	Latur	11
15	Buldhana	03
16	Yavatmal	04
17	Vardha	01
18	Nagpur	01
19	Amaravati	01
20	Kolhapur	20
21	Sangali	15
22	Satara	10
23	Pune	15
	Total	**175**

Source: Sugar Diary 2011

1.9 Types of Sugar Industries in India

The Sugar industry in India has two sectors including organized and unorganized sector. The Sugar factories usually belong to the organized sector and those producers who produce traditional sweeteners fall into unorganized sector. Gur and khandsari are the traditional forms of sweeteners.

Manufacturing Process followed by the Sugar Industry

- Extracting juice by pressing sugarcane
- Boiling the juice to obtain crystals
- Creating raw sugar by spinning crystals in extractors
- Taking raw sugar to a refinery for the process of filtering and washing to discard remaining non-sugar elements and hue
- Crystallizing and drying sugar
- Packaging the ready sugar

1.10 Size of the Industry

Today, India has 453 sugar mills, out of which, 252 mills are from the Co-operative sector and 134 mills from the private sector. And 67 mills are boosting in the public sector. According to the statistics, there is total number of 571 sugar factories in India as on March 31, 2005 compared to 138 during 1950-51. These 571 sugar mills produce total quantity of 19.2 million tonnes (MT). There has been an increase in the sugar production in India from 15.5 MT in 1998-99 to 20.1 MT in 2002-03.

Today, the total turnover of Indian Sugar Industries is Rupees Eighty Thousand Crores and will be raised within 5 years to Rupees One Lakh Sixty Thousand Crores. The Indian Sugar Industries Ratio of Private Sector is 63.3per cent and Co-operative sector is 39.6per cent and Public sector 3.2per cent. Thus, it shows the importance of sugar industries in private sector and NSAI is one of the units of private sector.

1.11 Total Contribution to the Economy/ Sales

Indian sugar industry has contributed to the GDP considerably. It has provided sugar both in domestic as well as export market.

Table 1.3: Growth of India's Sugar Industry

Year	No. of factories in operation	Installed Capacity (Lakh tonne)	Actual Sugar Production (In Lakh tonne)
1950-51	139	16.7	11.0
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1990-91	337	98.5	120.5
1995-96	415	127.6	164.3
1999-2000	423	161.8	182.0
2000-01	437	168.2	186.0
2001-02	433	176.8	185.3
2002-03	453	180.0	201.0
2003-04	461	185.0	170.0

Source: Indian Sugar Mills Association

Top Leading Companies:

- Balrampur Chini Mills Ltd.
- Bajaj Hindustan Ltd.
- Andhra Sugars Ltd.
- Thiru Arooran Sugars Ltd.
- Dhampur Sugar Ltd.
- Renuka Group of Sugar Industries
- Natural Sugar and Allied Industries Ltd.

The Indian Sugar Industry comes under the classification of “Red" which represents highly polluting industries.

1.12 Latest Developments in Sugar Industry

ISEC is successful in capturing new markets with strategic advantage like Srilanka, Pakistan, Russia and Indonesia etc. here is marvelous achievement for the first time, Indian white sugar was marketed by ISEC for direct consumption in Europe while in the past Indian sugar shipped to Europe was diverted to other destinations. In the year 2000, 10,000 MT was exported in containers for direct consumption in the European countries. The following policy initiatives are taken to boost the Sugar industry:

- Government declared the new policy on August 20,1998 with regards to licenses for new factories, which shows that there will be no other sugar factory in a radius of 15 km.
- Setting up of Indian Institute of Sugar Technology at Kanpur is meant for improving efficiency in the industry.

The sugar development fund was set up with a view to avail loans for modernization of the industry in the year 1982.

1.13 Indian Industries

Classified under RED category	Aluminium industry, Cement industry, Construction industry, Copper industry, Dairy industry, Diamond industry, Fashion industry, Fertilizer industry, Film industry, Granite industry, Health care industry, Jewellery industry, Mining industry, Oil industry, Paint industry, Paper industry, Power industry, Printing industry, Rubber industry, Silk industry, Soap industry, Steel industry, Sugar industry, Textile industry, Tobacco industry, Zinc industry
Classified under ORANGE category	Automobile industry, Cotton industry, Hotel industry, Jute industry, Pharmaceutical industry, Tractor industry, Weaving industry
Classified under GREEN category	Advertising industry, Agricultural industry, Aviation industry, Banking industry, Biotechnology industry, Biscuit industry, Chocolate industry, Coir industry, Cosmetic industry, Cottage industry, Electronic industry, Food Processing industry, Furniture industry, Garment industry, Insurance industry, IT industry, Leather industry, Music industry, Mutual fund industry, Pearl industry, Plastic industry, Poultry industry, Railway industry, Real estate industry, Shipping industry, Solar industry
Industry	Today India has 453 sugar mills those constituting 252 mills from the Co-operative sector, 134 Mills from the private sector and 67 from public sector.
Geographical distribution	Uttar Pradesh, Maharashtra, Karnataka, Gujarat, Tamil Nadu, and Andhra Pradesh
Output per annum	India is the largest consumer of sugar and consumes around 16 million tonnes of sugar per annum.
Market Capitalization	Total turnover of Rs. 500 billion per annum

Maharashtra Sugar Industry is one of the most notable and large-scale sugar manufacturing sectors in the country. The pace of growth of sugar manufacturing has been massive over the past few years. The latest statistics of sugar production in Maharashtra indicates that this state this doing better than the other states in the country.

The Sugar industry in Maharashtra is highly popular in the cooperative sector, as farmers own a portion in the sugar factories. The Maharashtra Sugar Industry has seen a spectacular growth owing to the different conducive in the state. One of the chief crops manufactured in Maharashtra is sugarcane, with a host of sugar industries been set up over the years.

1.14 Some of the towns of Maharashtra which have sugar factories

Navapura, Nityanandnagar, Kurunda, Mohagaon, Sipora, Varud, Pimpalgaon, Sonawade, Khuldabad, Halgaon, Indapur, Karandwadi, Mankeshwar, Pawarwadi, Kadepur, Devdaithan, Sujatpur, Sheshnagar, Radhanagri, Patoda.

1.14.1 Most popular sugar factories in Maharashtra:

- Adivasi S.S.K. Navapur Nandurbar Vibhag Ltd (Tal. Navapura, Dist. Nandurbar)
- Bahganga Sahkari Sakhar Karkhana Ltd. (Bhum, Dist.- Usmanabad)
- Chhatrapati Sambhaji Raje Sakhar Udyog Ltd. (Sambhajinagar (Aurangabad))
- Dongarai Sagreshwar Shetkari SSK Ltd (Kadepur (Raigaon))
- Gurudatta Sugars Limited (Takliwadi, Tal. Shirol, Dist. Kolhapur)
- Jai Mahesh Sugar Industries Ltd. (Pawarwadi, Tal. Majalgaon, Dist. Beed)
- Khandoba Prasanna Sakhar Karkhana Ltd. (Tal. Karad, Dist Satara)
- Mahadik Sugar And Agro Product (Radhanagri, Dist. Kolhapur)
- Nira Bhima S.S.K. Ltd. (Tal:Indapur Dist.:Pune)
- Priyadarshini Shetkari SSK Ltd (Shivaji Chowk, Udgir, Dist. Latur)
- Saibaba SSK Ltd (Tal.Jintur, Dist.Parbhani, At Mankeshwar, Teh.Jintur, Dist.Parbhani)

- Sarvodaya S.S.K. Ltd (Karandwadi, Tal. Walwa, Dist. Sangli)
- Shree Ambadevi SSK Ltd (Nityanandnagar, Dahigaon (Recha) Road, Tal. Anjangaon, Dist. Amaravati)
- Sidhapana S.S.K. Ltd (Patoda Dist. Beed)
- Yogeshwari Sugar Industries limited (Limba, Tal. Pathri Dist. Parbhani)
- Terna Sahakari Sakhar Karkhana ltd. Dhoki, Dist. Osmanabad.
- Manjara Sahakari Sakhar Karkhana ltd. Latur, Dist. Latur.
- Rena SSK Ltd, Renapur, Dist. Latur.
- Gajanan Sahakari Sakhar Karkhana, Beed.
- Vaidyanath Sahakari Sakhar NSAI, Pangari, Parli Vaidyanath. And finally Natural Sugar and Allied Industries Ltd. Ranjani Tal. Kalamb, Dist. Osamanabad.

The cooperative sugar industry in Maharashtra has seen the growth trajectory at its heights with future trading being implemented in sugar manufacturing. Till now, the concept of futures trading has not been made clear to the rural mass of the Maharashtra sugar industry. But the state is hopeful of rendering a helping hand to those who need special guidance on it.

Table 1.4: Crushing of Sugarcane and Per cent Sugar Recovery in Maharashtra during the period from 2001-02 to 2012-2013.

Year	Number of Sugar factories	Crushing of Sugarcane (Lac Ton)	Per cent Recovery
2001-02	135	483.97	11.63
2002-03	159	534.68	11.63
2003-04	136	290.64	10.93
2004-05	101	194.54	11.49
2005-06	142	445.57	11.67
2006-07	163	789.39	11.39
2007-08	173	761.74	11.94
2008-09	144	400.42	11.52
2009-10	141	614.47	11.56
2010-11	164	802.52	11.30
2011-12	170	771.08	11.67
2012-13	170	700.26	11.41

Source: Agrovan, Wednesday 29th May 2013

The Maharashtra sugar industry has been contributing nearly 40 per cent of India's total sugar production. According to the commissioner of sugar there were 170 sugar factories in operation in Maharashtra during 2012-13, of which 108 were co-operative and 62 were private. They have crushed 700.26 lac metric tonnes sugarcane and produced 79 lac quintal sugar with a recovery percentage of 11.41 during current season.

Chapter II

RESEARCH METHODOLOGY

2.1 Introduction

The Methodology undertaken for the study is the key of every scientific study and therefore it is to be elaborated in detail in order to help the readers and other research workers to understand the conclusions drawn from the particular study. In view of this the present chapter discusses in detail the research methodology adopted for the study, analytical procedure adopted for arriving at meaningful results for accomplishing requirements of the objectives of the study and discussion about various concepts underlying the study, sources of the data, collection of data and analysis of data.

2.2 Selection of the Subject

The sugar factories in rural area have played an important role in social and economic development of farmers in the state of Maharashtra. It is the largest agro-based industry in India and especially in Maharashtra. The sugar factories are established in sugarcane growing areas and have become centers of development in their areas of operation.

Natural Sugar and Allied Industries Ltd. plays a vital role in higher standard of living in frustrated farmer's life in its areas. Natural sugar and allied industries i.e. NSAI is located in place of abundant raw material that is best quality sugarcane. Its operational area is within twenty five to thirty kilometers having thirty villages only. Previously, when this sugar factory was not there, due to excess cane, high yield sector there was less demand and low price to this cane in this area which resulted into more number of frustrated farmers and low standard of living.

One fine morning a man stood tall against these odds that was expert in sugar technology and established a private sugar factory with the help of farmers which is today known as Natural Sugar And Allied Industries. [NSAI]

NSAI is a public limited sugar factory registered under the company Act of 1956. It is the first sugar plant completed in February 2000 in a shortest span. The financial support from members by contributing eleven crores as a

share capital and nine crores as a loan from the Vaidyanath Urban Co-operative Bank Ltd. Parali Vaidyanath and Consortium Banker.

The co-operative sugar factories in the state have introduced industrial culture in the rural areas and have helped the sugarcane growing farmers to be successful administration of the industrial organization. In the process there is now considerable professionalism developed in the rural areas with a new outlook, which is turned into industrial entrepreneurs. The administrators of sugar factories have not forgotten their routes; consequently the co-operative sugar sector in the state has become catalyst for all round development in the rural areas through the medium of sugar factories.

Many parts of the state have witnessed development of educational, social and also cultural activities. The sugar factories played a vital role as a catalyst in establishing various educational institutes, primary and secondary schools, dairy and poultry units and also facilities like consumer stores, libraries, recreation centers, petrol and diesel pumps etc. it would be no exaggeration to say that this private and co-operative sugar factories have taken all the welfare activities of the state in their areas of operation. Without their initiation rural area would have been remained undeveloped sector for many years in Maharashtra.

It is generally observed that the district in which more than ten factories have established during the last twenty five years have undergone phenomenal change there is a remarkable difference in the degree of economic growth in the sugarcane belt and in other areas. Many part of the state have prospered, particularly through cultivation of sugarcane. Following the steps of sugar factories like Terana, Manjara, Vikas, Jai Jawan Jai Kisan and Gajanan etc. almost all sugar factories have tried to excel in their social responsibilities. A study of Maharashtra sugar co-operatives cannot be merely an extension of sugar industry but is a micro dimensional social-economic phenomenon. Several research students have made an attempt to analyze their economic effects and impact on rural economy. The present case study is also one of the efforts, it highlights the transformation of the rural economy in the aspect of

agriculture, trade and commerce, industrial employment generational infrastructure development etc. that are consequent upon the private /co-operative sugar factories.

In the present study, The Natural Sugar and Aallied Industries-A Private Sugar Factory, Ranjani. [NSAI] situated in Kalamb Taluka of Osmanabad district in Maharashtra State, this place is stated at border of three districts namely Osmanabad, Latur and Beed which is near Manjara river belt. It is selected for analyzing its social-economic changes, effects and impact of its command area. This is the first private sugar factory established in Maharashtra after de-licensing system announced by the Government of India. This factory obtained IEM in August 1998 and started execution of new sugar plant of 1500 TCD under the leadership of chief promoter-chairman and managing director who was none other than Shri Thombre Bhiravnath Bhagwanrao. This is an industrially backward area of Maharashtra State. Natural Sugar has established new record in sugar industry for shortest period of erection, lowest cost of production and maximum automization.

To utilize electricity produced from the co generation plant to add the profitability of Natural Sugar And Allied Industries installed Ferro Alloys Plant of 6 MVA capacity to manufacture the various alloys for which power is the raw material which consist 50 per cent consumption. The government of India has announced 5 per cent use of Ethanol in petrol on commercial basis. Therefore, NSAI decided to go with ethanol plant immediately and Distillery Project in later stage. NSAI has done excellent work for the socio economic development of the area and this should guide to those sugar factories where the efforts are inadequate. Hence this factory has been purposely selected by the researcher for the study.

2.3 Objectives of the Study

The main objective of the study is to assess the socio-economic impact of the Natural Sugar and Allied Industries Limited (NSAI) in its area of operation. For this purpose the researcher has set the following objectives under the study.

1. To study the working and progress of the Natural Sugar and Allied Industries Limited (NSAI)
2. To study the impact of sugar factory on agriculture and changes in income and standard of living of the farmers in its area of operation.
3. To study the impact of sugar factory on business and changes in standard of living of businessmen in and around the Natural Sugar and Allied Industries Limited (NSAI).
4. To study the Infrastructure development and social welfare activities of sugar factory in its area of operation.

2.4 Hypothesis

The establishment of Natural Sugar and Allied Industries Limited (NSAI) has multiple impacts and has brought about positive socio-economic changes in its area of operation.

2.5 Scope of the Study

To assess the impact of the Natural Sugar and Allied Industries Limited (NSAI) in its area of operation, the researcher has selected the period 2001-2012 for his study. The year 2001 is the first and the year 2012 is last. The researcher has studied various development activities undertaken by the Natural Sugar and Allied Industries Limited (NSAI) in its area of operation.

2.6 Sampling Design

The study was carried on the basis of the factual information at the farm level obtained from selected sample by sugar cane growers. The basic information regarding the sugar cane cultivators. For this purpose a multistage sampling technique was adopted to select the ultimate sample. At first stage constituted the secondary unit the tahsil having adopted the same procedure an ultimate unit of sampling was the producers of sugar cane.

Osamanabad, Latur and Beed are three districts have jurisdiction of NSAI. In the three district command area of operation covered Kalamb and Osmanabed in Osmanabad, Ambejogai and Kej in Beed and Latur in Latur district. Tahsil wise area under cultivation of sugar cane in command area of NSAI is given in Table 2.1

Table 2.1: Tashil wise area under sugar cane in the command area of NSAI

Sr.No.	Tahsil	Ares (Ha)
1	Kalamb	6810
2	Osamanabad	32.01
3	Ambejogai	2149.70
4	Kej	1996.17
5	Latur	2715.95
	Total	**13703.83**

Source: Agriculture officers of respective tashil.

It can be obsereved from table 2.1 that the area under cultivation of sugar cane in command area of NSAI. The total area under sugarcane was 13703.83 hectares in the jurisdiction of NSAI. The maximum area under sugarcane was Kalamb tehsil followed by Latur and Ambejogai tehsil.

2.7 Selection of Villages

Table 2.2: Selected sugar cane cultivating villages in the tahsils

Sr.No.	Tahsil	Ares (Ha)	Selected Villages
1	Kalamb	6810	7
2	Osamanabad	32.01	1
3	Ambejogai	2149.70	2
4	Kej	1996.17	2
5	Latur	2715.95	2
	Total	13703.83	14

Source: Agriculture officers of respective tashil.

It can be seen from table 2.2 that the sugar cane cultivated area of five tahsil is 13704 Ha. The villags have been selected on area basis. According to this criterion 14 villages have been selected from Kalamb, Osmanabad, Ambejogai, Kej and Latur respectively.

2.8 Detail of selected villages

The details of selected villages of the tashils in command area of NSAI is presented in table 2.3.

Table 2.3: Selected villages under sugar cane cultivation in the command area of NSAI

Sr.No.	Tahsil	Name of the Village	Area (Ha)	Per cent
1	Kalamb	Ranjani	18	
		Tugaon	05	
		Ghargoan	06	
		Kasbe Tadavala	09	
		Shriradhon	08	
		Arthadi	05	
		Awad Shirpura	04	
		Total	55	43.65
2	Osamanabad	Wakharwadi	08	6.35
3	Ambejogai	Deola	14	
		Anjanpur	08	
		Total	22	17.46
4	Kej	Batumba	12	
		Dhanegoan	08	
		Total	20	15.87
5	Latur	Tandulja	16	
		Takalgoan	05	
		Total	21	16.67
	Total		126	100.00

Source: Agriculture officers of respective tashil.

The table 2.3 depicts details of selected villages from five tashil Kalamb, Osmanabad, Ambejogai, Kej and Latur. The total area cultivated in selected villages was 126 Ha. Among tashils the major contribution was from Kalamb (43.65percent), Osmanabad (6.35 percentage) Ambejogai (17.46 percentage), Kej (15.87percent) and Latur (16.67 percentage).

2.9 Selection of Farmers

The list of farmers from villages cultivating sugar cane was prepared in ascending order according their area of cultivation. The Stratified Random Sampling method is used for selection of farmers. By using this method 126 out of 11756 farmers were selected for the study. Based on the above criteria every third farmer was selected for the study. The selected farmers according to tashils and according to land holding are presented in table 2.4.

Table 2.4: Tashil wise selected sugar cane cultivating farmers

Sr. No.	Tahsil	Small Farmers (0.01 to 2.00 Ha.)	Medium Farmers (2.01 to 4.00 Ha.)	Large Farmers (more than 4 Ha.)	Total
1	Kalamb	27	19	09	55
2	Osamanabad	05	02	01	08
3	Ambejogai	12	07	03	22
4	Kej	11	06	03	20
5	Latur	10	07	04	21
	Total	65	41	20	126

Source: Field survey

It can be seen from table 2.4 that tahsil wise selected sugar cane farmers in command area of NSAI. Out of the total 126 farmers small size farmers selected were 65, medium were 41, large were 20. Of the small size farmers 27 were from Kalamb, 05 from Osmanabad 12 from Ambejogai, 11 from Kej and 10 from Latur. Similarly of the 41 medium size farmers selected 19 were from Kalamb tahsil, 05 from Osmanabad tahsil, 07 from Ambejogai tahsil, 06 from Kej tahsil, and 07 from Latur tahsil,. Out of the 20 large size farmers selected 09 were from Kalamb, 01 from Osmanabad tahsil, 03 from Ambejogai tahsil, 03 from Kej tahsil, and 04 from Latur tahsil,

2.10 Limitations of the Study

The following are the limitations of the study

1. The researcher has not considered the government policies and controls

concerning the sugar industry. Also the problems faced by the sugar industry are not studied.

2. The researcher has excluded from his study the various government schemes in operation for the socio-economic development of the villages under study.
3. The researcher has not considered the social and economic conditions existing prior to the establishment of the Natural Sugar and Allied Industries Limited (NSAI) Source of data collection

To fulfill the set of objective of the study, both primary and secondary sources of data collection were tapped, the details of which are as under:

2.11 Primary Data

The following techniques have been used to collect the primary data :

I) The researcher framed five questionnaires for obtaining information from sugarcane producer members-farmers, sugar factory laboures, Business men and Sugar factory.

II) Interviews

To collect primary data the researcher interviewed the following: Founder of the Natural Sugar and Allied Industries Limited (NSAI), Vice-Chairman, Members of Board of Directors, General Manger, Secretary, Finance Officer, Chief Accountant, Office Superintendent, Chief Agriculture Officer, Labour and Welfare Officer, Chief Engineer, Chief Chemist, Distillery Manager, Civil Engineer, Purchase Officer, Store Keeper and also few employees, Further, officers of the various institutions in the Natural Sugar and Allied Industries Limited (NSAI) area of operation and factory site is also interviewed to collect the required information.

III) Field Visits

The researcher visited the various units of the Natural Sugar and Allied Industries Limited (NSAI) to observe their working and to collect information.

2.12 Secondary Data

Along with primary data, the researcher has also compiled secondary data from various sources. The information about the sugar factory and distillery plants has been obtained from the Annual Reports and official records of the Natural Sugar and Allied Industries Limited (NSAI). Similarly information about the various institutions operating in the Natural Sugar and Allied Industries Limited (NSAI) area of operation and on its site has been collected from their respective annual reports and official records. For this study the researcher has compiled information from the annual reports and articles of Natural Sugar and Allied Industries Limited (NSAI).

For the purpose of collecting data, the researcher visited the following Libraries, Institutions and offices.

1. Gokhale Institute of Politics and Economics, Pune
2. Jayaker Library, University of Pune
3. Office of the Sugar Directorate, Pune
4. Vasnadada Sugar Institute, Pune
5. Vaikunthbhai Mehta Library, Pune
6. District Statistical Department, Osmanabad, Latur
7. Office of the Tahsildar, Kalamb

2.13 Selection of Sample

By Simple Random Sampling, 30 per cent villages were selected among the total villages from Kalamb, Ambejogai, Latur and Kej under area of operation**.** After selection of villages, from each village were selected farmers producer members and other villagers to fill questionnaire and for interview.

2.14 Method of Analysis

For the purpose of analysis of the collected primary and secondary data, various statistical and social techniques have been applied. These are averages, percentages, growth rates etc. techniques. The researcher also has used graph viz. column, bar, line, pie charts etc.

2.15 Chapter Scheme of the Study

The study has been divided in to seven chapters as follows:

Chapter first introduces the nature and is concerned with the growth of co-operative/private sugar factories in India, Maharashtra and in the Osmanabad districts. Besides it spells out the methodology that has been followed and also gives description of Kalamb Taluka and command area of the NSAI

Chapter Second deals with the methodological aspects of the study.It includes selection of the subjects, scope of study, sampling design, collection of data and method of analysis used.

Chapter Third deals with the review of literature which indicates the past research work carried by the other researchers so as to support the result of present investigation.

Chapter Fourth describes the Socio-economic profile of command area of NSAI on industry and commerce which have been studied, it gives narration of the development of the business activities in and around NSAI campus setting up of con-generation and establishment of consumer store, credit society etc.

Chapter Fifth is concerned with the impacts of the NSAI on rural employment. The impacts have been studied direct employment and indirect employment additionally generated in agricultural and tertiary sectors. The wage structure and facilities other than wages and salaries available to the factory workers have also been explained.

Chapter Sixth is devoted to the efforts made by NSAI to develop infrastructure facilities in respect of roads, transport and communication, education, health safety and welfare etc.

Chapter Seventh is concerned with the summary, conclusions and suggestions.

Chapter III

REVIEW OF LITERATURE

A number of researchers have worked on the various aspects of sugar industry such as development, problems of the industry and its prospects, labour situation in the industry, management problems, financial structure, government policy and regional planning for sugar industry area, the importance of sugar factories in the rural economy and such other aspects of the industry have also been probed into.

A brief review of the work done in this context is summarized below

Shirodkar (1967)[1] Concluded that the cooperative sugar factories have provided stability to the agricultural income by reasonable and guaranteed price, which has also resulted an increase in sugarcane production. These cooperative sugar factories provide various inputs to the agriculturists. He suggested that the cooperative sugar factories should be established in backward areas so that the backward area can get a chance of it's all round development since the cooperative sugar factories play the role of agencies for rural development. In his work the impact of cooperative sugar factory on agriculture of the Kolhapur district has been analyzed by the author. The problems relating to organization, finance, raw material, availability have not been dealt with.

Malayadri (1975)[2] stated that the sense of consciousness among people at all the levels has been affected due to the cooperative sugar factory. He has considered the impact of cooperative factory on the pattern of sugarcane cultivation. The effect of the sugar factory on irrigation facilities, mobilization of rural saving, employment in rural areas, labor welfare and growth of rural areas has also been studied.

According to Thaper (1976)[3] some of the peculiar features of the sugar industry are as follows,

a) The industry is seasonal.
b) Duration of season varies from one factory to the other and also from year to year.
c) Sugar content, in cane and its recoveries also varied randomly from one factory to the another and
d) Variation in capital investment.

Apart from the problem of cyclical nature of production of sugar, variations in capital investment and sugar recovery, the sugar industry experiences interstate difference in the cost of production per unit of sugar.

The cost of production per unit as estimated by Pothuwal (1972) [4] in U.P. and Dhanuka (1976) in Bihar varied between Rs. 107.05 and Rs. 270.00 per quintal, the highest and the lowest being in Uttar Pradesh and Bihar, respectively.

Mohite (1976)[5] stated that, the rapid growth of sugar industry has been helpful to a great extent in stabilizing sugar production and in reducing, chronic shortage of sugar in the country. The co-operative form of organization has lent itself on a powerful instrument in the development and mobilization of natural human and financial resources of the state towards sugar industry and has helped in reducing the backwardness of the country by improving the socio-economic conditions of rural areas in the state.

The co-operative sugar factory of 1250 TCD (Tones Crushed per Day) has got the employment potential of 400 permanent workers and 800 seasonal workers in the factory for the harvesting and transport of sugarcane. 6000 male and female, 100 trucks and 800 bullock carts are employed for a period of nearly six months.

Ramesh (1980)[6] stated that the sugar industry in India is the second largest processing industry in the country next to textile only. There are 320 factories producing annually 65.70 lakh tones of sugar. The aggregate assets of the industry are more than Rs. 1300 corers. About 30 million cultivators are engaged in growing sugarcane and supplying the same to sugar factories. The sugar industry disburses about Rs. 800 corers annually towards the sugarcane price. It contributes more than Rs. 300 corers annually to state. It also controls exchanges socio-economic development of rural area. The prosperity of our vast population residing in the villages.

Tupe (1980)[7] studied in detail the impact of the Sanjivani Cooperative Sugar Factory in Ahmednagar district on agriculture, agriculturist, on the lives of agricultural labor, economic condition of factory worker and spread effect of the sugar factory and overall economic change in rural areas. He concluded with the findings that sugarcane being the cash crop, area under sugarcane has increased, the area under irrigation has increased and likewise the change in the cropping pattern and methods of farming have changed. It is argued that the development of agriculture depends on major agro based industries. The real income of the farmer has increased by the author that sugar factory in rural areas has worked as a growth centre.

Mane (1981)[8] stated that sugar co-operatives had blazed trial in efficiency only to accelerate economic improvement of the farmers. There has been increase in

the level of their income saving, investment mostly in productive assets, possession of farm machinery, credit worthiness and employment opportunities.

Anon (1984)[9] showed that India was perhaps the only country in the world with very big co-operative base in sugar industries. Out of the total installed capacity of 67.87 lakh tones of sugar production, the share of the co-operative sector was 36.68 lakh tones.

Rao Birendra Singh (1985)[10] said that the licensing policy for setting up new sugar factories on expansion of existing sugar mills would be reviewed soon in the light of 7th five year plan requirement. However, the minister added that the sixth plan policy of giving licenses, first to co-operative sector followed by the public sector and private sector might be continued.

Jain (1987)[11] revealed that a large number of joint stock sugar mills are concentrated in Uttar-Pradesh. On an average size sugar plant receives cane supplies from as many as about 40,000 growers who have small holding and constitute a significant segment of our rural population. Against, this number of sugarcane growers is much smaller in Maharashtra and Gujrat where the sugar industry is mostly in the co-operative sector. It has to be appreciated that economically backward areas with large concentration of sugarcane growers having small and holding need to be essentially given priority. Whereas in Maharashtra and Gujrat the sugar industry is mostly in the co-operative sector given priority considering in the matter of short term loan for cane development.

Kasar and Tilekar (1989)[12] indicated that the sugar industry has significant impact on the employment of seasonal migrants in Maharashtra. The share of sugar factory employment was to the extent of 45.51 and 75 per cent in the total employment of an average male, female and bullock pair of the migrant household. The seasonal employment provided by the sugar industry enable the migrant households to increase their income to enjoy slightly better position as compared to the non-migrants under study. Therefore, the policy has been endorsed for the installation of agro processing industries based on local raw produce in rural areas in order to generate employment and income opportunities for the economic development of weaker sections.

Jugale (1994)[13] concluded that irrespective of the low wages, the workers are being exploited at various levels. Migration from drought to the destination of sugar belt is a continuous phenomenon. Even if the workers refuse to migrate, the CSE will

be in a very difficult position, because at the local level such labor force is not sufficiently available. The CSFS begin their crushing; they guess the rate of migration to their agreement with the contractors of the workers, which is because of the changed industrial relations. By the way the Sugar Industry is swinging because of growing sickness, lack of quality of raw material, changing attitude of the farmers and unfavorable policies towards Sugar Industry.

Mangal Singh (1996)[14] in his paper viz. 'Sugar Industry in India An Over-view' discussed industry regulation, development of sugar industry In India, government incentives for promotion of new projects and expansion status of technology and up gradation, etc. From this he concluded that the sugar Industry in India is in rapid phase of growth and is poised to maintain its first position as the highest producer of sugar in the world and should be in the export market soon in sizable way in next future.

Weragoda (1997)[15] while studying sugar industry development, trends and challenges in Srilanka indicated that the high cost of establishing new factories and the limited availability of suitable land for sugarcane cultivation a hindrance to the expansion of the sugar sector in Srilanka. However, development of the domestic sugar industry would pave the way for the generation of employment and save foreign exchange to a great extent.

While analyzing the rate of the growth in the production of sugar, the present trend of per capita consumption and the annual population growth, it is evident that Srilanka would continue to be a market for sugar producing countries.

Ambhore (2004)[16] to solve problem of sugar industries both central and state Governments took strong decision to cancel or less excise duty on sugar, to cancel sugarcane purchase tax, to give the subsidy on export, to cancel tax on molasses, etc. The government has also taken decisions to control import of sugarcane from other country and to fewer subsidies on European countries sugar.

Kamat (1965)[17] studied the management of cooperative enterprise with special reference to sugar cooperatives in Maharashtra and recorded various problems related to finance, raw material, personnel, etc., of cooperative sugar factory and concluded that if managed properly, they can play an important role in rural development.

The Government of India appointed a committee to study the problems relating to inadequate supply of sugarcane to sugar factories in Maharashtra in (1975)[18] under the chairmanship of Shri S.V. Sampath. The committee recommended

measures for cane development, proper zoning for sugarcane area and some directives in license to new units.

In 1980 the Government of Maharashtra appointed a committee under the chairmanship of Gulabrao Patil, the Reform Cooperator to study the problems of sickness of cooperative sugar factories in Maharashtra. This committee submitted its report in (1983)[19] and made various recommendations to the government to overcome the problem of sickness of the cooperative sugar factory in Maharashtra. The committee had recommended that state government should give financial help to sick sugar factories in the form of exemption in the cane purchase tax and to take effective steps for cane development. The committee identified the sick cooperative sugar factories from Maharashtra and the reasons of the sickness and made the recommendations to solve the problems of these factories.

The committee which was appointed to make recommendation for the formation of zones for drawl of sugarcane by sugar factories in Maharashtra by the state government of Maharashtra in 1981, submitted its report in (1983) [20]. Besides recommending specific zones for the factories in the state, the committee recommended that sugar factories should undertake effective steps for cane development to which state government should provide necessary banking.

According to Rao (1981)[21], the factors like inability of sugar factory to operate at the rated capacity during the season, quality of the management and over capitalization in cooperative sugar factories in Maharashtra state to become sick.

Hinge (1984)[22] after studying the problems of sick cooperative sugar factories in Maharashtra recommended that the overall inefficiency in managing the sugar production activity is the root cause of the phenomenon of sickness in the cooperative sugar industry. Suitable measures/punishment may be advocated in order to control the present practices of mismanagement in the cooperative sugar factories.

Singh (1984) [23] concluded that it is easy to see that there is enough scope for improving the efficiency of sugar factories by introducing instrumentation and controls. However, it is very important to have the right maintenance staff for maintaining instruments in working order otherwise the investment would be lost. An erratic instrument is more dangerous than no instrument at all. Hence, it is imperative that instruments engineers and mechanics are recruited and trained. There is a lot of resistance when any new thing is introduced anywhere, this is only to be expected. It

is for the top management to support and nurture all modernization returns, so as to increase factory efficiency and productivity.

Srinivasan (1985)[24] concluded that it is a sad and ironic fact that the rapid growth in the country's sugar production and consumption instead of bringing buoyancy has crippled the viability of many units, the chief villain of sickness is the lack of objectivity on the part of parameters. Managerial deficiencies have multiplied the misery.

Venkatraman (1985)[25] delivered a seminar on achieving uniform recovery throughout the season at Bangalore in which he concluded that to increase the sugar production reduces the cost of production of sugar which will ultimately leads to profitability of the mills and at the same time make the farmer get a good price for his cane, it is necessary that the difference between the peak period recovery and the average recovery for the season should be brought to the minimum which is possible only if the recoveries during the early part and the late part of the season are improved.

Various methods towards achieving the goal such as the part played by the variety, its inherent nature, manipulation of the age of the crop at harvest, selective harvesting, timely application of fertilizer, water management.

Ramchandra Reddy (1988)[26] through his paper in financial management the experience of co-operative sugar factories in Tamilnadu pointed out that procuring sufficient amount of working capital has become increasingly difficult under the credit squeeze policies adopted by the Reserve bank of India working capital, therefore should be managed effectively. The Practice of cash management reveals that the cooperative sugar mills in Tamilnadu carry cash balance to meet their day to day obligations.

Daman (1989)[27] defined the term management as it is the area and science of organizing and directing the resources of an enterprise towards the achievement of its objectives. He also indicated that in a cooperative the management structure as a whole consists of components viz., general membership, elected boards or committees and (casually employed) managers.

Chauhan (1993)[28] indicated the problems and prospects of cooperative sugar mills in Gujrat as regards to managers and workers, the problem of purchase tax on sugarcane based on its prices, shifts in governmental policies on licensing of sugar

factories, shortage of sugarcane molasses storage and distribution, efficient disposal and by product utilization, delay of cane payment, low sugar recoveries per hectare.

Narasaiah and Jayachandra (1996)[29] by conducting study on cash management in a co-operative sugar factory exhibited that there must be adequate cash and bank balances to meet day-to-day operations. The amount of cash and bank balances should be raised from long term resources for efficient utilization. For smooth functioning of the factory, it should maintain current ratio above the standard ratio of 2:1. The factory must increase its liquid assets to meet current liabilities. He also stated that, the financial executives should maintain liquidity and profitability more effectively for efficient cash management.

Baviskar (1997)[30] while studying 'Sickness in co-operative sugar factories' indicates that mismanagement is one of the main cause. The performance of the sugar factory is depending on the efficiency and effectiveness of the management. Also there should be positive approach for the overall progress of the factory. Most of the factories are sick due to lack of good management. The impact of decisions taken by management leads to progress or sickness of the factory. It is management's duty to take only such decisions which are beneficial to the factory particularly purchase producers should be followed strictly. Stores inventory should also be according to the norms.

Patil (2000)[31] suggested that efforts should be made to motivate the farmers within jurisdiction under cane development activities nurseries at factory site be expanded so that the seed of high yielding variety will be made available to the cultivators. The inputs like fertilizers be provided by the factory at appropriate time and required quantity. Finance for this purpose also be provided and factory management should maintain numbers of labors in the factory according to norms given by Sekhar Singh. It will reduce the expenses on wages and salaries and other activities.

Keerthipala and Thomson (2000)[32] revealed that the existing cane payment systems adopted by Srilankan sugar companies do not offer incentives for the farm producers to produce high quality cane or for the companies to improve their processing efficiencies no they are designed in split proceed from sugar and by products between farmers and the company in proportion to their economic contributions to the overall cane production and manufacturing process. The authors further developed an alternative formula to overcome these shortcomings, which

increases the cane price for the farmers in three sugar companies and both farmers and companies receive more equitable shares of proceeds.

The Reserve Bank of India in (1961)[33] conducted the study on profit related to the assets of the companies in the sugar industry for the period 1955-1959. This study revealed that the profitability of the companies increases with the size of assets. The study was conducted under the chairmanship of Shri. Gundurao. He is expert on the sugar industry. In this study, the measures of rehabilitation and modernization of sugar factory have also been brought out. Pittie (1975)[34] concluded that the production of sugar from newly established units was uneconomical as setting up of new units was highly capital intensive and the maximum capacity utilization was the only solution for overcoming the problems of low returns from new sugar units.

Ferron (1976)[35] has rightly said that there is a necessity of determining the most economic size of sugar mill in order to safeguard the industry from the problems of diseconomies. The basic consideration in determining the milling capacity of sugarcane mill must, therefore, be illustrated as the basis of production costs and performance figures of factory.

Mittal (1976)[36] recommended rehabilitation and modernization of sugar factory to improve economic position of sugar factory. He stated that economies of sugar factory can be improved by adoption of new techniques to reduce losses of sugar, labor saving devices, fuel saving devices, addition –of preventive maintenance techniques, reduction in stores consumption, utilization of by products and expansion of capacity.

Phadnis (1976)[37] while stressing the need for optimum capacity, Rightly said that as size of plant increases beyond a certain limit there exist diseconomies of scale due to inefficient management of the plant. If the factory runs at optimum capacity, there will be efficient management which ultimately leads to reduce the cost of production and also to maintain consistently high price to cane growers.

Pawar (1977)[38] found that the per unit profitability of sugar production was low in the large sized factories as compared to the smaller ones. The large sized factories, however, were at advantage in economizing manufacturing expenses and overhead costs provided the sugarcane price and excise duty remained the same for all the factories.

Kawade (1977)[39] found that the supplies of sugarcane to the large factories are insufficient in relation to installed capacity thereby resulting into under utilization of installed capacity, low rate of return on capital investment and diseconomies of scale.

Shinde (1981)[40] stated that the escalation in the cost of plant, machinery and civil workers has been a major source of sickness and a new cooperative sugar factory requires 5 years to break even. Till that time it incurs annually a loss of Rs. 25 to Rs. 40 lakh. The losses accumulated rapidly due to high interest rate and the units fall sick.

Athare (1982)[41] found that the rate of return on capital investment was comparatively high in large sized sugar factories. In case of small sized sugar factories, the rate of return on capital investment was observed to be less than the market rate of interest even for productive period of 20 years. In case of the medium sized factories, however, it exceeded the market rate of interest provided the productive period remains at 15 years and above.

Waghmare (1993)[42] while studying performance of Shri. Chhatrapati Cooperative Sugar Factory, Bhavaninagar (Pune) concluded that there was increase in the area, production and recovery percentage of the sugarcane in the jurisdiction of the sugar factory. The sugarcane produced by the members constituted around 70 per cent of the total sugarcane crushed by the factory and remaining 30 percent of the total cane crushed was brought from outside of the operational area of the factory to have full utilization of the installed capacity. It resulted in low cost of production of sugar and better prices for sugarcane to the members.

Rao (1993)[43] concluded that the cost of maintenance has increased at a higher rate of growth than that of growth in sugar production and it is more during 1976-1984. Hence, management and technologists should take necessary steps to rectify the bottleneck so as to improve the efficiency of the industry and to make it competitive in an open market economy.

Dhanuka (1977)[44] found that the government comes to the rescue of an industry only after it becomes considerably sick and thus the recovery from sickness becomes very difficult and expensive too. The sickness in the industry is due to the defective policy of the government while giving the reasons for making sugar the most costly and increasing the losses of sugar factories he revealed that high stock of sugar in inventory was one of the important reasons for this. Hence, according to him inventory control was one of the important factors in sugar factory.

Poturan (1977)[45] studied the possibility of bagasse saving for fuel economy and molasses utilization in fermentation industries and as animal feed. He concluded that through utilization of by products, the revenues of sugar estates can be increased significantly.

Manohar Rao (1980)[46] rightly pointed out that at the current international prices of sugar and molasses, every sugar producing country has a strong reason to convert sugarcane into sugar and molasses to earn foreign exchange required for keeping up the balance of trade. It may be even economical to import crude oil of the foreign exchange earned by export of sugar and molasses. However as the international price of sugar is fluctuating widely and for reducing the dependence on other countries for import of crude oil gradually for political reasons, the sugar producing countries may have to convert the molasses into alcohol and also consider the possibilities of converting a part of the sugar juice into alcohol. He further concluded that it was more economical to convert sugarcane into sugar and molasses and to use molasses as raw material for production of ethyl alcohol. The economies of these activities will, however, largely depend on the international price of sugar, molasses and ethyl alcohol.

Pathak (1981)[47] indicated that in view of the current shortage of sugar and the relative pricing of sugar and alcohol, it is not practicable to either grow sugarcane for alcohol production or to divert more sugar for the production of power alcohol. The escalating petroleum prices and its global shortage can create economic compulsion in future to put more areas under sugarcane so that large quantities of power alcohol can be produced.

Jain (1996)[48] indicated that comprehensive use of sugarcane through its by-products and other value added products is one of the principle lines of action that sugar producing countries are attempting these days. India has made a significant leap in this direction.

Baggase, the residue after extraction of juice is rich in cellulose fiber which is a major source of energy and power besides being the major substitute as raw material for wood and bamboo used in the paper and pulp units. There are a number of captive paper plants in operation in many sugar mills with 30 to 50 tones capacity per day. But they have not been found to be economically viable as compared to the normal size paper plants in sugar factories and this trend is catching up. Molasses the other important by-product of the sugar industry is the store-house of organic chemicals.

These chemicals can be produced in medium scale industry capable of quick exploitation vis-à-vis mega units producing similar organic chemicals based on Naphtha.

Vivek Sarogi (1996)[49] while studying 'Problems and Prospects of the sugar industry' discussed molasses problems. In this he revealed that the large sugar production in 1995-96 has also created a serious problem of disposal unprecedented stocks of molasses has not been adopted in all the Northern Indian states. There the problem of disposal of molasses stocks has assumed serious proportions. In some instances, molasses tanks have burst last summer resulting in a loss of human lives a part from financial problems. If immediate corrective measures are not initiated, many sugar mills, particularly in North India, may be forced with premature closure because of the non-availability of storage space for molasses. Almost their entire available space is already bulging with large molasses stocks.

Mizerska (2000)[50] revealed that provisions of several recent environmental laws enacted in Poland has influenced on the waste produced by the sugar industry. Chemical analysis showed that various types of waste produced by sugar factories can be used for soil improvements. This waste includes sediments from the fermentation process and from waste water and soil washed of harvested sugar beet.

REFERENCES

1) Shirodkar S.L. 1967. Co-operative movement in Kolhapur district, Ph.D. thesis submitted to the University of Poona.
2) Malayadri V. 1975. Socio-economic impact of sugar co-operative, Commerce publication.
3) Thaper B.M. 1976. "Way in sugar industry Sick", Financial Express, Dec. 1975.
4) Pothuwal D.K. 1972, "Cost structure in Indian sugar Industries" Estern Economist, 58: 345-346.
5) Mohite V.J. 1976. Productivity of sugarcane changing pattern. Sugarcane industry of Maharashtra. A Blue print for progress, Govt. of Maharashtra. Pp.15-16.
6) Ramesh M.A. 1980. Adjudication of the performance of sugar factories.
a) Maharashtra Sugar, 6(4): 47-48.
7) Tupe S.D. 1980. The impact of sugar factories on the rural economy – A case study. Ph.D. thesis submitted to the University of Poona.
8) Mane P.M. 1981, "Technological socio-economic and political impact of sugarcane co-operative of rural Maharashtra", Maharashtra Sugar 6(4):47-48.

9) Anon 1984. “Co-operative sugar factories make great stride”, Agriculture Situation in India”, 39(3) : 167
10) Rao Birendra Singh, 1985. “Licensing for new sugar factories to be reviewed”, Agriculture Situation in India 40(4): 277.
11) Jain, S.L. 1987. Sugar development fund. Indian Sugar, 37(1) : 2.
12) Kasar D.V. and Tilekar, S.N. 1989. Impact of sugar industry on employment and income of seasonal migratory farm household in Maharashtra. I.J.A.E., 4(3): 329.
13) Jugale V.B. 1994. Employment and wages of migrant cane cutters and bullock cart workers of sugar co-operatives in Maharashtra. The Maharashtra co-operative quarterly. 78 (1): 15 - 25.
14) Mangal Singh, 1996, “Sugar Industry in India-An overview” Indian Sugar 66(6):385-396
15) Weragoda D. 1997. Sugar industry development trends and challenges in Sri Lanka. Indian Sugar, 42 (7): 461 - 466.
16) Ambhore (2004). Problems of sugar industries.
17) Kamat G.S. 1965. Management of Co-operative enterprise with special reference to sugar cooperatives in Maharashtra. Ph.D. thesis submitted to Poona University.
18) Anonymous, Report on the study team to look into the problems relating to inadequate supply of sugarcane to sugar factories in Maharashtra, 1975. Govt. of India, New Delhi.
19) Anonymous, report of the committee to study the problems of sick co-operative sugar factory in Maharashtra, 1983. Govt. of Maharashtra.
20) Anonymous, Report on the study the committee of expert for making recommendation for formation of zones for drawal of sugarcane by sugar factories in Maharashtra state, 1983. Directorate of sugar, Pune. Pp. 49-51.
21) Rao M. 1981. Latest development in the world sugar industry. Maharashtra Sugar. 6(6) : 45.
22) Hinge V. N. 1984. Problems of sick co-operative sugar factories in Maharashtra M.Sc. (Agri.) thesis submitted to MPKV. Rahuri.
23) Singh A. 1984. Seminar delivered on Automation in sugar Industry in Punjab.
24) Srinivasan K.P. 1985. Sickness in sugar industry causes and remedies management approach. A paper presented at S.I.S.S.T.A. seminar at Banglore.
25) Venkataraman, N.R. 1985. Achieving uniform recovery throughout the season. A Seminar delivered at Banglore.

26) Ramchandra Reddy, 1988. "Financial Management the experience of co-operative sugar factories in Tamil Nadu", Maharashtra Co-operative Quarterly, 72(1):33-34.

27) Daman P. 1989. Management of co-operatives, the concept of management extension. Maharashtra Cooperative Quarterly, 72(4): 249.

28) Chauhan P 1993. Problem and prospects of co-operative sugar mill in Gujrat. Co-operative Sugar. 24(9): 52-56.

29) Narasaiah A. and Jayachandra, D.K. 1996. Cash management in a co-operative sugar factory. A Case study. Indian Co-operative Review, 32(3) : 36-41.

30) Baviskar V.S. 1997. Sickness in co-operative sugar factories. Maharashtra Co-operative Quarterly, 81(1): 23-26.

31) Patil S.N. 2000. Performance, evaluation and management of Tasgaon taluka co-operative sugar factory –A case study. Thesis submitted to M.P.K.V., Rahuri.

32) Keerthipala A.P. and Thomson, K.J. 2000. A Cane payment formula for sugarcane small-holders in Sri Lanka. Sugarcane Research Institute, Uda Walave, Sri lanka.

33) Anonymous Report of committee on Rehabilitation and modernization of sugar industry. Indian Sugar, 46(7): 455-461.

34) Pittie M.N. 1975. Need for capacity utilization. Indian sugar. 25(5): 305.

35) Feron Oliva, D.P. 1976. Sugar industry in Bihar diagnosis and remedy. Indian Sugar. 26 (16): 433.

36) Mittal B. L. 1976. Rehabilitation and modernization of sugar factories sugar technology. Indian Sugar. 26 (5): 281.

37) Phadnis D 1976. Sugar co-operatives with the message. The Maharashtra Co-operative Quarterly, 60 (2): 95.

38) Pawar J. R. 1977. Co-operative sugar units in Maharashtra Economies of Scale. The Economic Times. 16 (330): 5-8.

39) Kawade A.V. 1977. Economics of size and returns to scale in co-operative sugar factories in Maharashtra. M.Sc. (Agri) thesis submitted to M.P.K.V., Rahuri.

40) Shinde J. 1981. Sick sugar factories. Maharashtra Sugar, 6(7): 15.

41) Athare S.V. 1982. Economic evaluation of Maharashtra's Cooperative sugar industry with reference to its crushing capacity and use of by-products. M.Sc. (Agri.) thesis submitted to M.P.K.V., Rahuri.

42) Waghmare M.N.; Jagdale, U.D. and Dangat, S. B. 1993. Performance of Shri Chhatrapati Co-operative sugar Factory, Bhavaninagar, Pune- A case Study Maharashtra Co-operative Quarterly, 2(3): 16 – 20.

43) Rao V. M. 1993. Cooperative sugar industry in India – A Time series analysis. Indian Co-operative Review, 31(1): 154- 157.

44) Dhanuka O.P. 1977. Sugar industry backbone of rural upliftment. Indian sugar, 25(12): 503.

45) Poturan J.M. 1977. Proceedings of XVI Congress. L.S.S.C.T. 6 (3) : 3221-3234.

46) Manohar Rao P.J. (1980), "By-products utilization in Sugar Industry", Maharashtra Sugar, 6 (9): 36.

47) Pathak B.S. 1981. Sugarcane as an energy crop for Panjab. Sugar News, 13(8).

48) Jain S.L. 1996. Indian Sugar Industry. Indian Sugar 46 (6): 377-381.

49) Sarogi, V. 1996. Problems and prospects of the sugar industry. Indian sugar, 46 (7): 455-461.

50) Mizerska D. 2000. Utilization of sugar industry waste in agriculture. Gazeta-Cukrownicza.pp 108(11-12): 205-209.

Chapter IV

SOCIO ECONOMIC PROFILE OF COMMAND AREA OF NSAI

4.1 Profile of the Osmanabad

Osmanabad district is an administrative district in the state of Maharashtra in India. The district headquarters are located at Osmanabad, erstwhile Dharashiv. Temple of goddess Tuljabhavani at Tulajapur is famous in India. The district occupies an area of 7512.4 km of which 241.4 km is urban area and has a population of 14,86,586 of which 15.69 per cent were urban population (as of 2001).

4.1.1 Location

Osmanabad district lies in the Southern part of state. It lies on the Deccan plateau, about 600 m above sea level. Parts of the Manjara and Terna rivers flow through the district. The district is located on East side of Marathwada region within the range latitude 17.35 to 18.40 degrees North, and latitude 75.16 to 76.40 degrees East Most of the district area is rocky while the remaining part is plain. Most part of the district is surrounded by Small Mountain called "Balaghat". Bhoom, Washi, Kalamb, Osmanabad and Tuljapur Tahsil lie in the range of this Balaghat mountain. Some part of the major rivers like Godawari and Bhima come under this district.

This district is surrounded by following districts:

Solapur - South-West, Ahmednagar - North-West, Beed – North, Latur - East Bidar and Gulbarga (Karnataka) – South

4.1.2 Climate

The climate of Osmanabad district is generally dry. The rainy season starts from mid of June and remains till end of September. The climate is humid from October to November. It is winter from mid November to January. From February to March the climate is dry. It is summer from April to June. The temperature of Osmanabad district is low as compared to other district of Marathwada region during summer season.

The average rainfall of Osmanabad district is 730 mm. But the average rainfall recorded during the year 2002-2003 was 542 mm. The highest rainfall recorded during the year 2002-2003 was of Osmanabad Tahsil with 644 mm while the lowest was of Paranda tahsil with 367 mm. The highest temperature

recorded during the year 2002-2003 was 42.1 degree celsius while lowest was 8.0 degree celsius.

4.1.3 Population

As per census 2001 the population of Osmanabad district is as given below:

Total Population of District	:	14,86,586
Male population	:	7,69,368
Female population	:	7,17,218
Rural area	:	12,53,330
Urban area	:	2,33,256
The sex ratio of district is	:	932
SC Population of district is	:	2,45,790
ST Population is	:	27,857

4.1.4 Tahsils

There are eight tahsils in Osmanabad district.

- Osmanabad
- Tuljapur
- Omerga
- Lohara
- Kalamb
- Bhoom
- Paranda
- Vashi

Paranda is historical place known for the Paranda Fort. Kallamb is an important commercial centre of the district and located on the bank of Manjra river. The taluka is blessed by Yedeshwari devi, whose temple is located at Yermala, 20 km from Kalamb.

Tuljapur is a major taluka town, about 30 km from Solapur, 25 km from Osmanabad town and 40 km from Hyderabad national Highway at Naldurga.

Tuljapur is best known for its Tulja Bhavani Mandir. It is said that Tulja Bhavani mata had offered sword to Shivaji Maharaj (not verifiable) and his son

re-built the temple. Omerga is a densely populated taluka in Osmanabad. The Tata Institute of Social Sciences, Mumbai have a School of Rural Development ("the Rural Campus") at Tuljapur.

4.1.5 Neighbouring Districts

Solapur lies to the South-West, Ahmednagar to the North-West, Beed to the North, Latur to the East and the districts of Bidar and Gulbarga in Karnataka to the South.

4.1.6 Transport

A small portion of the Barshi light railway connecting Latur-Barshi-Kurduvadi passed through Northern fringe of Osmanabad district until 2007. The rail track was converted into broad gauge and the track alignment was changed southwards to pass near Osmanabad town. The modified track from Latur to Osmanabad opened for traffic in September 2007. The modified rail track from Osmanabad to Kurduvadi junction became operational in October 2008 and connects Osmanabad to Pune and Mumbai by a shorter rail route than via Latur. Osmanabad is connected to Beed, Latur, Ahmednagar, Pune and Solapur by national highways.

Osmanabad Airport, located 10 Kilometres North of Osmanabad does not have any commercial air traffic. Reliance Airport Developers, who won a bid in 2009 to run the airport on a 95-year lease, plan to use this airport for Aviation Training.

National Highway 9 and National Highway 211 pass through the district.

Brief Introduction to Tahsil Kalamb

Kalamb is one of eight tehsils in the Osmanabad district in the state of Maharashtra, India. Kalamb city is situated on the bank of the Majra river (that borders with Beed district). Kalamb is known for its market yard that is one of biggest agriculture markets in Osmanabad - Yedeshwari Yermala Crops are cotton and sugar cane.

4.1.7 Demography

The total population of Osmanabad is 16,60,311 according to the latest provisional figures released by Directorate of Census Operations in Maharashtra.

This shows an increase of 11.69 per cent in 2011 compared to figures of 2001 census. The initial figures of data shows that male and female were 864,674 and 795,637 respectively. Osmanabad District of Maharashtra comprises an area of 7,569 km^2. As per census 2011, density of Osmanabad District per square km is 219 compared to 196 per km^2 of 2001.

Sex ratio of females in Osmanabad district per 1000 males was recorded 920 i.e. a decrease of 12 points from the figure of 2001 census which puts it at 932.

According to the 2011 census, in Osmanabad district there were a total of 1,99,509 children under age of 0-6, and 2,23,183 according to the 2001 census. Of a total population of 1,99,509, there were 1,07,695 males and 91,814 females. Child Sex Ratio as per census 2011 was 853 compared to 894 of census 2001. Children's proportion in total population was around 1.48 per cent. This figure was around 1.53 per cent as per 2001 census.

In education sector, Osmanabad District is having average literacy rate of 76.33 per cent. Male literacy and female literacy were 85.31 and 66.67 per cent respectively. In all, there were total 11,15,057 literates compared to 8,72,022 literates of 2001 census.

4.1.8 Colleges

Osmanabad city has one Government BAMS College, one Government Diploma College, one Private Pharmacy College and a Private Engineering College also. Another engineering college in Osmanabad District is in Tuljapur. Osmanabad has Government Agriculture college (under Marathwada Agriculture University, Parbhani) near Ter. Osmanabad also has a Sub-Center of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, which includes Department of Management Science, Department of Education, Department of Chemistry, etc.

- Shri Tuljabhavani College of Engineering, Tuljapur.
- Education in Osmanabad
- College of Engineering, Osmanabad
- Government College of B.A.M.S., Osmanabad

- Government Polytechnic College, Osmanabad
- Ramkrishna Paramhans College, Osmanabad
- K.T. Patil College of Computer Science, Osmanabad
- Shri Chhatrapati Shivaji College of Arts, Science, Commerce, Omerga, Dist. Osmanabad
- Shankarrao Patil Junior and Senior College, Bhoom.

4.1.9 Monuments

Tuljapur in Osmanabad district is famous for Tulja Bhavani Temple built by Raje Shahaji. Persons from all over Maharashtra visit the temple for worship. Tulja Bhavani College of Engineering is located near the town.

Kati village in Tuljapur Division has two mosques said to be more than 500 years old. The larger is called Jamia Masjid. The smaller Masjid is older and very small with a mysterious typical architecture.

Naldurg is another historical place in Osmanabad with a beautiful historic fort. Mankeshwar is a place where there is a Hemadpanthi Shiv Temple and goddess Satwai Devi temple.

The district also offers some worth visiting sites to name a few are: Saint Goroba Temple, Dharashiv Caves, Ramling (Temple of Lord Shiva), Wadgaon Siddheshwar (Temple of Lord Shiva), Naldurg Fort and Paranda Fort etc.

Osmanabad City also have famous Darga of Hazrat Khwaja Shamsoddin Gazi(RA). The interiors of darga are decorated with colourful glass pieces which is the main attraction nowadays.

4.2 Profile of the Latur District

Latur city is the district headquarter in Maharashtra state. It is the 16th largest city in the state of Maharashtra. In the last census on 2001, the total population of the district was 20,80,285. Urban population comprises 20.08 per cent of the total population. The current population of Latur urban agglomerate is over 4 lacs.

4.2.1 History

Latur has an ancient history, which probably dates to the Rashtrakuta period. It was home to a branch of Rashtrakutas, which ruled the Deccan from year 753-973AD. The first Rashtrakuta king Dantidurga was from Lattalur,

probably the ancient name for Latur. Anecdotally, Ratnapur is also mentioned as a name for Latur.

The King Amoghavarsha of Rashtrakutas developed the Latur city, originally the native place of the Rashtrakutas. The Rashtrakutas who succeeded the Chalukyas of Badami in 753 A.D called themselves the residents of Lattalut.

It was, over the centuries, variously ruled by the Satavahanas, the Sakas, the Chalukyas, the Yadavas of Deogiri, the Delhi Sultans, the Bahamani rulers of South India, Adilshahi, and the Mughals.

Later in the 19th century it became part of the independent princely state of Hyderabad. In 1905, it was merged with surrounding areas and renamed Latur tehsil, and became part of Osmanabad district. Before 1948, Latur was a part of Hyderabad state under Nizam. The Chief of Nizam's Razakar army Qasim Rizwi was from Latur.

After independence and the merger of Hyderabad with the Indian Union, Osmanabad became part of Bombay Province. In 1960, with the creation of Maharashtra, it became one of its districts. On August 15, 1982, a separate Latur district was carved out of Osmanabad district.

The city is a tourist hub, surrounded with many historical monuments including the Kharosa Caves, as well as Sri Satya Sai Baba Temple.

4.2.2 Geography

Latur is located at 18°24′N 76°35′E18.4°N 76.58°E. It has an average elevation of 631 metres (2070 ft). It is situated 636 metre above mean sea level. The entire district of Latur is situated on the Balaghat plateau, 540 to 638 metres from the mean sea level. Latur district is located between 17°52' North to 18°50' North and 76°18' East to 79°12' East in the Deccan plateau.

Latur District is in the Marathwada region of Maharashtra in India. It is bounded by Nanded District to the East; South-West: Osmanabad District to the South-West; Beed District to the North-West; Parbhani District to the North; Andhra Pradesh and Karnataka to the South-East.

4.2.3 Climate

Average rainfall in the district is 600 to 800 mm. This is usually during the monsoon months from July - October. Moderate temperatures are mainly observed here. The rainfall is unpredictable in tune with the Indian monsoon. Summers here begin from early March to July. Summers are dry and hot. The temperature ranges from 24°C to 39.6°C, though at the peak they may reach 41°C. It is the winter season from November to January Temperatures at the peak drop to single digits but usually they hover around 13.9°C to 21.8°C sometimes lowers up to 11°C. January to March are the months with moderate temperatures.

4.2.4 Rivers and Lakes and Dams

Major rivers of the district are:Manjra, Terna, Rena, Manar, Tawarja, Tiru and Gharni.However, the Godavaris and its branches offer lot of opportunity for damming the streams leading to large number of rivers in Latur district. In 3/9/1993 a earthquake strike it.

4.2.5 Demography

According to the 2011 census Latur district has a population of 24,55,543, roughly equal to the nation of Kuwait or the US state of Nevada. This gives it a ranking of 181st in India (out of a total of 640). The district has a population density of 343 inhabitants per square kilometre (890 /sq mi). Its population growth rate over the decade 2001-2011 was 18.04 per cent. Latur has a sex ratio of 924 females for every 1000 males, and a literacy rate of 79.03 per cent.The primary language is Marathi. Kannada, Telugu, Urdu, Hindi, Bengali and Rajasthani are also spoken

4.2.6 Culture and Religion

Fairs and festivals: Shri Siddeshwar fair at Latur is held every year. Thousands of people attend the Gangaram Maharaj Samadhi every Ekadashi at Hattibet in Udgir tehsil. In January 2011, the first ever 'Latur Festival' was organised on the 10th, 11 and 12 January under the guidance of Shri Amitji Deshmukh. The grand success of this event has now ensured a permanent spot on the cultural calendar. Now this will be an annual fixture. The event is

organised by the Latur Club and managed by Indian Magic Eye Pvt. Ltd.
Ausa, Hattibet, Nilanga, Renapur, Shirur Anantpal, Tambala, Ujani are some of the religious places in Latur district.

4.2.7 Education

Higher education

Latur has developed as a good educational centre in Maharashtra over the years. From Past few Years, Latur have emerged as a strong Educational hub for Secondary School and Higher Secondary School. Students from Latur are always in top spot when it comes to results. In last decade almost all Maharashtra Topers comes from Latur and recognized as latur pattern.

Famous colleges include college of Computer Science and Information Technology(COCSIT), Rajarshi Shahu College, Dayanand College of Commerce, Dayanand College of Arts, Dayanand Science College, Dayanand College of Law, Kesharbai Kale Girls' College, Mahatma Basweshwar College, Udaygiri College, Hawagi Swami College, Mahatma Gandhi College, M.S. Bidve Engineering College, M.I.M.S.R. Medical College, Govt. Medical College, Manjara Ayurvedic College, Dayanand Law College, Maitree Institute of Management and Technology, Sandeepani Technology and Management and several others to name a Dr. Chandrabhanu Sonavane Jr. Science College.

4.2.8 Divisions

Administratively the district is divided 3 sub divisions namely Latur, Nilanga and Udgir and into 10 talukas and 10 Panchayat Samitis. These are Latur, Udgir, Ahmedpur, Ausa, Nilanga, Renapur, Chakur, Deoni, Shirur Anantpal, and Jalkot. Latur city is the administrative headquarters of the district. There are around 945 villages and 786 Gram Panchayats in the district.

There are 6 Vidhan Sabha constituencies in the district. These are Latur City, Latur Rural, Udgir, Ausa, Nilanga and Ahmedpur. The district is divided into 2 Lok Sabha constituencies Latur and Osmanabad.

4.2.9 Economy

Latur was one of the important trading hubs during the time of Nizam of Hyderabad. It is an industrial center as well as agriculture based economy.

Latur is the rising Industrial Hub of Marathwada region. Latur is known all over India for the Quality and Quantity of Pulses that it produces and especially Toor Dal a.k.a. Arhar dal or Pegion Peas. Latur is also a major trading center for Urad, Moong and Channa along with TUR. Also it is known for trading in Oil Seeds mainly Sun-flower and Soya Bean, nutcrackers, locks, brassware, milk powder, ginning and pressing.

4.2.10 Transport

Air

Latur Airport is located near Chincholiraowadi, northwest of Latur city. The Airport was constructed in 1991 by Public Works Department (PWD) and then handed over to MIDC. It was upgraded at a cost of nearly Rs.140 million and is being oprated on a 99 year lease by Reliance Airport Developers (RADPL). There is no scheduled air service currently from Latur airport although the airport sees 14 to 16 aircraft movements a month.[7]

Highways

Total road length of Latur district is 13,642 km. Several State Highways criss cross Latur district. They include NH 204, SH 77, SH 02.

Bus routes to the district headquarters connect 96 per cent of the villages.The municipal bus system operates buses that serve the region and connect places in Latur City. The State Transport bus of MSRTC serves all villages in the district.

Railway Lines

All railway lines through Latur are broad gauge. They belong to Central Railway. Latur railway station was built again when the Barshi railway line was converted from narrow gauge to broad gauge. The railway gauge was converted in September 2007 from Latur to Osmanabad and in October 2008 from Osmanabad to Kurduvadi. Latur is now is connected to Mumbai by a direct train via Kurduvadi. It is connected to Hyderabad but originates at Osmanabad.[8] The important railway stations are Latur, Latur Road and Udgir. The district has 148 km of railways of which 83 km is broad gauge and 65 km is narrow gauge.

4.3 Profile of the Beed district

Beed is a town and administrative headquarters of the district of the same name located in central Maharashtra state of India. According to 2001 census, it is the largest urban area in the district with a population of 1,38,091. Calculated population of 2010 is 1,61,604. It ranks 295th in population in India. Nearly 36 per cent of the district's urban population lives in the town alone. It has witnessed roughly 23 per cent population growth during 1991–2000 decade.

Its official name is Beed, though; Bhir, Bir, Bīr, Bid or Bīd can also be seen sometimes in official and unofficial documents and seals. Some references like Encyclopedia Britannica refer it as Bhir, Encyclopedia Encarta as Bīr and Google Maps as Bir while it is found at World Gazetteer as Bīd. In 1990s during the government of right wing Hindu party Shiv Sena in Maharashtra, Beed town was proposed to be renamed as Champavatinagar, which is said to be its old name.

Beed's early history is obscure. Historians speculate based on archaeological remains that the town might have been founded by the Yadava rulers (1173–1317) of Devagiri (now Daulatabad). Beed town was a part of the State of Hyderabad (*Asaf Jahi Kingdom*) of Nizams. After independence the state was annexed to India in September 1948 following a military action. Beed remained in Hyderabad state until 1956 when it was included in Bombay Presidency. On May 1, 1960 Maharashtra state was created on linguistic basis and Marathi dominant Beed town became part of Maharashtra.

There are several historical buildings located in the town of which Kankaleshwar temple is the most famous. There are remains of citadel wall which protect a part of the old town from rare but violent floods of Bendsura river. As district headquarters, the town has several district and local administrative offices including district and municipal councils, district and session courts and offices of district collector and superintendent of police. Hospitals, schools and colleges including professional training colleges are also located in the town.

4.3.1 Topography and Climate

Beed is situated on the Deccan Plateau 18°59′N 75°46′E18.99°N 75.76°E, on the banks of *Bendsura* river (also called *Bindusara*) which is a sub-tributary of Godavari river. Bendsura originates in the hills of Balaghat range, 30 km South-West of the town near the village of *Waghira*. The river divides the town into smaller eastern and larger western parts. Balaghat Range stretches very close, up to 10 km South of the town making terrain; mainly in the eastern part, undulating. Soil is coarse and rocky largely consisting of basalt. Thin layers of fertile black soil are also seen in the northern part and in the South at the western bank of Bendsura. The town has Semi-arid, hot and dry climate consisting of mainly three seasons. Summers are long, ranging almost five months from mid February to June. Temperatures in summer fall between 31°C (87.8°F) - 40°C (104°F) (1997 average). However, it may reach higher than 40°C in searching summer. May is the hottest month of a year with an average day temperature of 42 °C (107.6 °F) in the district. Winters are short with temperatures ranging within 12°C (53.6 °F) - 20 °C (68°F). December is the coldest month in a year. Occasionally, due to northern cold waves temperature may fall as low as 3°C (37.4 °F) or 4 °C (39.2 °F). Relative humidity in winter is the lowest and December is the driest month in a year with the relative humidity as low as 30 per cent. Rains are scarce and occur only during the Monsoon from mid June to September. Annual average rainfall is 66.6 cm (26.22 inches). The average rain fall has got a drop of 9.6 cm from the averages recorded during 1900s. Average number of rainy days in a year is 41. September gets the maximum rainfall in a year while July has the maximum rainy days. Highest rainfall recorded in 24 hours (19.18 cm) occurred on August 17, 1887.

Bendsura is a rapid and seasonal river. Aiming irrigation and drinking water supply to the town, a reservoir *Bendsura Project* (capacity 7.106 mm^3) was constructed on the river in 1955 near the village *Pāli*, about 10 km south of the town. At some places in the town, the river is narrow and looks like a stream. The lack of vegetation and rocky and undulating terrain contributes to

violent floods in heavy rains. These have repeatedly caused substantial loss of property and life in the history of the town, most recently on July 23, 1989 when a massive flooding of three habitations in the town caused a number of dead or missing and property losses of millions of rupees. Beed falls under Seismic Hazard Zone-III in India according to the new seismic hazard map updated in the year 2000 by the *Bureau of Indian Standards*. Before this update, the town was under Zone-I. Beed District has Taluka: 1.Ashti 2.Beed 3.Kaij 4.Ambajogai 5.Gevrai 6.Majalgaon 7.Parali Vaidyanath

4.3.2 Demography

According to 2001 India census, Beed town had a population of 138,091. Male population is 71,790 and females constitute 66,301. There are 923.54 females per thousand males in the town. Birth rate is 15.9 which is lower than the national average of 22. Death rate is 3 which is lower than the national average of 8.2. Infant mortality rate is 71 per thousand live births which is much higher than the national average of 54.6 deaths for thousand live births. Maternal mortality rate however, is 1 which is extremely lower than the national average of 540. Beed district has got the lowest sex ratio in Maharashtra State. Beed has the lowest male-female sex ratio in the age group of 0–6 years (801 as against 1000 male children) as per the 2011 census. Maharashtra's sex ratio in the age group of 0–6 years is 883 girls as against 1000 boys.

Even this small town is an evidence of India’s religious and cultural diversity. 69.15 km² of land is home for Hindu, Muslim, Buddhist, Jain, Christian and Sikh communities.

4.3.3 Administration

The municipal council (established in 1952) is the administrative body for the town which is directly responsible for the affairs within the town limits which is 69.15 square kilometers presently. The town has been divided into 40 Wards; each ward has its elected representative called 'Councilor'. The councilors elect the 'President' of the council which is always from the party which has majority in the council. The municipal elections are held after every

five years. The district has Superintendent of police whose office is in the town. Two police stations covering eastern and western parts of the town are operational under the superintendent of police.

4.3.4 Transport

The town is accessible only by road. National Highway 211, linking Dhulia to Solapur passes through the town. Maharashtra State Road Transport Corporation (MSRTC) a state owned Transport Company provides bus access to the major towns in Maharashtra and neighbouring states. Some private travel agencies also have services to the major cities of the state. Nearest domestic airport is Aurangabad (133 km); nearest international airports are Mumbai (418 km), Hyderabad (428 km) and Pune (250 km). Nearest railway stations are Jalna (110 km), Parli (120 km), Aurangabad (133 km) and Ahmadnagar (145 km). Auto rickshaw is the only mode of public transport inside town. Roads inside the town are of average width and below average quality. Railway line access is probably the most awaited thing for the people of town.

4.3.5 Economy

Beed has a backward economy with a negligible growth. In 1997, Sarma committee has listed Beed as one of the 100 most backward districts in India. After this listing the government of India and the government of Maharashtra specified Beed town as 'D' zone and declared tax holiday and concessions to lure the investors in the district. Without proper arrangement of water supply and transport facility, this declaration resulted nothing. Economic backwardness is attributed to the lack of natural resources, frequent droughts, lack of good transport facilities and corruption. Economy entirely depends on monsoon dependent agriculture, service sector and small businesses. Beed is one of the poorest districts of Maharashtra with Per capita GDP of Rs 15,303 (about $380) which is lower than the Maharashtra State average GDP Rs 17,079 (about $427). There are some small-scale industries of ginning, PVC and plastic pipes, wood cutting and local based soft drink. Business sector comprises small and medium scale retail and wholesale businesses of daily needs, textile and automobiles. Small business includes roadside shops and

vendors of vegetables, spices, food and snacks, cloths and toys etc. Beed has a good wholesale market of cloths and small vendors from neighbouring towns and districts approach here for purchase.

4.3.6 Education

Milliya campus a minority education center and one of the largest campuses of the town was founded in 1959 by Mir Raunaque Ali. English, Marathi and Urdu are the mediums of education. Many schools and colleges have very good infrastructure and facilities. Primary education is managed by the Zila Parishad (district council), headquarters in Beed. All the secondary schools and junior colleges are affiliated to Maharashtra State Board of Secondary and Higher Secondary Education in Aurangabad. One Engineering institute, Aditya engineering college. It is a private college established in 2001 by Adityabhau Uddheshiya Sanstha. It offers engineering in the branches of computer, information technology and electronics and telecommunication engineering. One Dairy Technology college, one Dental College, one Ayurvedic Medical College, two diploma Engineering Colleges (one is state run), one Homoeopathic Medical College, one Diploma Pharmacy College and one Industrial Training Institute are offering professional education in the town. Other colleges offer arts, science, commerce and vocational faculties up to post graduation level. All the colleges are affiliated to Dr. Babasaheb Ambedkar Marathwada University in Aurangabad. Beed town has the highest literacy rate in the urban areas of the district.

4.3.7 Health

Under its health policy, the state government runs a 300-bed hospital (District Hospital) in the town with some modern facilities like Computed Tomography Scan (CT scan). Hospital receives average 18,000 patients and performs 250 HIV tests monthly. Various private clinics and hospitals and a state run veterinary hospital are also providing services. Prominent among them is Vithai Hospital, which is the Largest Charitable Multi speciality hospital in district, having 200 beds.

One Homoeopathic hospital is running with ‘Sonajirao Kshirsagar Homoeopathic Medical College’. No facilities are available in super specialities like Neurology, Oncology etc. Beed was in headlines throughout the world in August 1994 for the outbreak of Bubonic Plague. To some researchers, though, the disease detected here resembled Plague but could not be substantiated as per WHO criteria.

Chapter V

NATURAL SUGAR AND ALLIED INDUSTRIES LIMITED (NSAI)

5.1 Introduction

Natural Sugar and Allied Industries Limited (NSAI) is the first sugar company in Private sector after delicensing of sugar sector in the year 1998. The Company is situated at Ranjani, Tal. Kalamb Dist. Osmanabad, Maharashtra, India in remote area surrounded by rich sugarcane belt on the banks of Manjara River and Manjara dam, which is a perennial source of irrigation. With more than 5000 individual farmers contributing in formation of Company, in real sense it is "Members Company" NSAI is Oasis in the Desert for this remote area.

5.2 Brief Profile of Company

1. Name of the sugar factory: **Natural Sugar and Allied Industries Limited,** Sainagar Ranjani, Tahshil. Kalamb, Dist. Osmanabad.
2. Installed capacity: 3500 TCD Expanded to 5000 TCD with 19 M.W Co-Generation plant.
3. l. E. M. No. : 1574/SIA/IMO/98, Dt.7-9-98.
4. Company Registration No. : 25-13063, Dt. 24/11/98.
5. Sales Tax Registration No. :
   (A) 413 507/C/37, Dt. 16/03/2000
   (B) 413507/S/200, Dt. 03/03/2000
6. Excise Registration No. : AABCNOS74DXM001.
7. Maharashtra Pollution Control Board Clearance No.:BO/ROA/102/DC/666, Dt.18/08/2000.
8. Environmental Clearance No.: ENV (NOC/1099)1052/CR-13Q/DlDt. 14/06/2000.
9. Plant and Machinery Details: Machinery Suppliers

a) Mills

28"x56"=5 Mills with TRPF: M/c. Binny Engineering Works, Chennai

36”x78”=5 Mills with TRPF: M/s. S.S. Engineers, Pune,

b) Boilers

i) 40 MT, 45 Kg Pressure: M/s. Walchandnagar Industries Ltd., Pune

ii) 30 MT, 45 Kg Pressure: M/s. Walchandnagar Industries Ltd., Pune.

iii) 70 MT, 85 Kg Pressure: M/s. Aalborg Ltd. London

c) Boiling House: M/s. S.S: Engineers, Pune.

d) Turbo Generating Sets:

i) 3 MW Back Pressure: M/s. ABB Ltd,. Baroda.

ii) 6 MW, Condensing: M/s. Triveni Engineering and Industries Ltd.

iii) 13 MW, Condensing: M/s. Siemens Ltd. Vadodara

e) Centrifugal House: M/s. National Heavy Eng. Co-Op. Ltd., Pune.

M/s.Thyssen Krupp India Ltd., Pune

f) Sugar House: M/s, Ravalgaon Sugar Farm, Ravalgaon Dist. Nasik.

5.3 Natural Sugar - A Success Story

5.3.1. Necessity of Natural Sugar in this area

Natural Sugar and Allied Industries Ltd. is located in an area of abundant raw material i.e. best quality sugarcane. Its operational area is within 30 kms. having 145 villages only. Due to excess cane (high yield sector) there was less demand and lower prices to this cane. Thus, no demand, no price, frustrated the farmers. All these conditions necessitated the strong will for establishment of Natural Sugar. It is located at the 100 per cent perennial area of Manjara Dam, which is 15 kms. below the dam location. The area within 30 kms. is irrigated by right and left cannals of Manjara Dam, right and left bank river water and Raighavhan medium project. Hence, the availability of best quality cane is assured even in the draught condition.

Natural Sugar is a public limited Company registered under Indian Company Act. 1956. It is the first sugar plant completed in February 2000 in a shortest span of 9 months and at the lowest cost of Rs.20.00 crores with the strong financial support from farmer members by contributing 11.00 crores as share capital and Rs.9.00 crores as a term loan from The Vaidyanath Urban Co-Operative Bank Ltd., Parali Vaidyanath with other urban banks in consortium.

5.3.2. Activities of Natural Sugar

Natural Sugar has expanded its activities vertically and horizontally within a span of 10 years. Natural Sugar has developed strength in various activities by the year 2010 as follows:

a) Sugar Plant

NSAI installed 5000 TCD new sugar plant in addition to existing 3500 TCD plant. Milling Plant is 36"x78" with most modern technologies absorption, adoption and innovation such as planetary gears and VFD etc. Hence the total milling crushing capacity is 8500 TCD.

b) Co-Generation Plant

With additional 13 MW power generations, the total power generation capacity is 22 MW out of which 8 MW is used for sugar production, 10 MW for Ferro Alloys (Steel) Plant and balance 4 MW for Sugar, Refinery, Distillery, Dairy and other activities. The total 22 MW power is consumed in house for various by-products and ancillary activities.

c) Ferro Alloys (Steel) Plant

NSAI has installed two sub merged arc furnaces having capacity of 6 MVA each. The 10 MW power is consumed by both the furnaces for manufacturing of Ferro Manganese and Silico Manganese from Manganese ore. Ferro Manganese and Silico Manganese are the basic raw material for manufacturing of any sort of steel. The daily production capacity of Ferro Alloys (Steel) Plant is 50 to 60 MT per day.

d) Distillery Project

NSAI has installed Distillery Plant of most modern technology multi pressure-vacuum distillation to process the molasses and produce R.S./E.N.A. 120 Lacs Litres and ethanol 60 Lacs Litres, total to 180.00 lakhs litres per year valuing to Rs. 45.00 crores of sales turnover.

e) Bio-Gas base Power Plant

The Distillery effluent namely spent wash is treated in Bio-Digester having capacity of 20,000 M^3 per day of Bio-Gas generation. The said gas is further purified with H_2S separation plant and pure Methane is used for gas

base power generation engine of 1.5 MW power generations. The exhaust of gas engine is used as fuel for heat recovery boiler and generated steam is used for Distillery process. Hence the 100 per cent recycle of Hazards waste of Distillery effluent i.e. spent wash is treated and "0" pollution concept is 100 per cent achieved with value addition and a strong profit centre from Hazards waste.

f) Sugar Refinery

NSAI has installed most modern sugar refinery plant of 250 Tons capacity per day for manufacturing Refine Sugar of 45 ICUMSA, which will be sulphur free and 100per cent pure sugar as per the International Standard.

g) Bio-Compost Plant

The press-mud, bio product of sugar plant is treated with outflow of Bio-Digester i.e. treated spent wash with additions of micro nutrients and bio culture to enrich the press-mud and converted into high quality bio-compost at the Bio-Compost Plant.

Natural Phosphate – NSAI has installed and commissioned plant to manufacture natural phosphate /Bhuratna Phospo compost fertilizer from bio-compost with addition of nutrients and rock phosphate in 50 kg P.P. Bags, distributing to agriculturists with cheaper rate.

h) Dairy - Milk Processing Project

To have an ancillary activity of milk production to the farmers, they have recently installed most modern and fully automatic Dairy Plant of 50,000 ltr capacity per day. The annual production of milk and milk products will be of 1.50 crores litres valuing to Rs. 37.50 crores of sales turnover.

Presently they are marketing Natural "Amrut" and "Healthy" fresh, pure rich milk with quality Ghee.

i) Software Division

NSAI started full-fledged software division mainly for development of various types of modules for sugar and bio-products industry. The software developed by their division is well proved and accepted by many sugar factories in Maharashtra. NSAI marketing Natural Sugar "ERP" to other Sugar Industries also and made it commercially viable project.

5.3.3. Special Achievements in Sugar Industry for Projection of Environment and Natural Resources.

A) Environmental Protection

To control water pollution of sugar plant, they have installed diffused aeration and bio-digester of advanced system technology and well supported to achieve the required norms of the MPC Board. The treated water is used exclusively for agriculture purpose. MDH fly ash arrestor for boiler chimney, which has 100 per cent efficiency for arresting the fly ash, prevents the air pollution. The collected ash is used to increase the porosity of Press-mud instead of Bagasse, which is resulted in saving of bagasse and value added waste as compost to the farmers.

i) Water Conservation

As the Maharashtra state is passing through a vicious cycle of water scarcity, Natural Sugar has decided to use the water available in sugar cane itself and succeeded since last 5 years to run the sugar plant with water available in sugar cane without availing water from outside sources by recycling and prohibiting miss-use of water with well planned close circuit. This reduces the effluent generation big way.

ii) ISO-9001-2008

NSAI is an ISO 9001-2008 Company by the Quality Assurance Services of Australia. The ISO 9001 -2008 norms are strictly observed and implemented in day-to-day working of the Company. The implementation of ISO 9001-2008 has drastically improved the performance, the quality and efficiency of the Company.

B) Sugar Cane Development Scheme

To increase the yield of sugar cane per acre, initiated a scheme of “Natural Lakhapati Yojana” for Cane development in the region, drip, sub surface, sprinklers, irrigation equipments with farm equipments etc., of optimum use of water, use of bio-compost and Natural phosphate to reduce in organic fertilizers, cane wide spacing plantation schemes, soil analysis schemes, providing fresh high sugar recovery quality cane seeds to follow

advance cane development activities to get maximum earnings. They have introduced mechanical cane harvesters to overcome harvesting labours problems to certain extent. 50 per cent trash is baled and burnt in boiler to save Bagasse and 50 per cent used in the fields for mulching.

5.3.4. Socio Economic Development of Area

With set-up of Natural Sugar, the Socio Economic Development of Kallam Taluka, which is industrially backward region of Marathwada, has started with galloping speed.

a) Approach Roads

They have undertaken new approach roads and all villages are connected with main state high way of Kalamb to Latur.

b) Telephone Exchange

Telephone exchange of 500 capacities is already setup at the factory site with total connectivity with all villages in area by department of telephone, Government of India.

c) Sakhar Shala (Seasonal School)

Neglected aspects of poor labour's children's education is considered on priority and have started Sakhar Shala for them from December 2001.

d) Medical Aid

Free medical aid is provided to all the workers with their family members from dispensary at the factory site.

e) Housing with Free Light and Water

We have provided 150 well constructed houses to the officers and employees with pure drinking water, electricity at free of cost.

f) Natural Palya Pension Yojana

The unique scheme of giving a pension to parents of employee is voluntarily implemented. They are deducting 10 per cent of gross salary of all employees under this scheme and paying directly to their parent monthly. It helps old aged parents to have their own money for survival.

g) Shri Sai Gramin Bigar Sheti Sahakari Patsanstha

A financial facility with 35.00 crores of deposits and 15.00 crores of

loans to the farmers and employees is extended by Pathsantha i. e credit co-operative society since 2003.

h) Natural Bazar Consumer Stores Ltd.

To provide best quality of daily needs from pin to Plano, they have started Departmental Stores within the Company's premises so as to facilitate the employees, farmers and residents within the vicinity of sugar factory.

i) Natural English School and Sai College of Computer Education

To provide best quality education they have started English Medium School from LKG to 4^{th} Class at present and having permission for expansion of classes till 10^{th} standard. To provide Computer and Technical education they have started Sai College of Computer Education for BCA and BCS.

j) Implementing 4 D's

D-Discipline,

D-Devotion,

D-Dedication

D-Determination

Quality Policy

Natural Sugar commits to provide sugar and other allied products of the highest purity at reasonable cost to satisfy our customer's present, future needs and expectations of quality, purity, Reliability and Service.

Natural Sugar also commits to comply with the requirements of the Quality Management System ISO 9001: 2008 and shall take efforts to continually improve its effectiveness through Discipline, Dedication, Devotion and Determination of Management and Staff.

5.3.5 Awards received by NSAI and its Chairman and Managing Director

Various national and international organization have taken note of the extraordinary working of NSAI and their Chairman and Managing Director have been awarded following awards for excellence in performance, achievements in sugar industry and social work.

1. "Marathwada Udyog Ratan Award" presented by International Marathi Chamber of Commerce and Industries at Aurangabad in 2001.
2. "Rashtriya Udyog Ratan Award" presented by International Economic Development Council and Priyadarshini Loknyas, New Delhi on 19/11/2001.
3. "Indira Gandhi Sadbhavana Award" Presented by Global Economic Council, New Delhi on 22/11/2002.
4. "Bharatiya Udyog Ratan Award" presented by Indian Economic Development and Research Association (IEDRA) New Delhi on 21st March 2003.
5. "Year 2004 Rotary Award" presented by Rotary Club of Latur Metro on 02/11/2004.
6. "Year 2006-07 Wayvasaik Utkrushthata Puraskar" Presented by Rotary Club of Pune Metro on 12/06/2007
7. "Latur Gaurav Pursakar" on occasion of silver jubilee of Latur District for outstanding work done for the industrial development of Latur District on 16/01/2008.

8. "Krushi Udhogratna Maratha Samaj Bhushan Pursakar" presented by Maratha Seva Sangh, Maharashtra Rajya at Latur on 01/09/2008.
9. "Chhatrapati Sambhaji Maharaj Rashitray Pursakar" presented by Sambhaji Briged, 5th Mahadhiveshan, Maharashtra Rajya, Nanded on 30/11/2008.
10. "Marathwada Gaurav Pursakar" presented by Marathwada Lokvikas Manch, Mumbai on 27/06/2009.
11. "Shams Award" presented by Urs Hazrat Khawja Shamsuddin Gazi Rah. Osmanabad on 12/07/2009.
12. "Kusumtai Chavan Smruti Pursakar" presented by, Dainik Satyaprabha, Nanded, on 14/07/2009.
13. "State Level Udyogbhushan Puraskar-2011 " presented by, Avishakar Social and Educational Foundation, Kolhapur District, Maharashtra State, on 22/01/2011.
14. "International Level Satish Haware Business Excellence Award-2011" presented by Saturday Club Global Trust Mumbai, on 20/02/2011.
15. "Marathwada Bhushan Samagik Puraskar" presented by, Marathwada Samanvaya Samiti, Pune on 17/09/2011.
16. "Udyog Gaurav Purskar" presented by Laghu Udyog Bharti, Aurangabad on 23/09/2011
17. "Maratha Wishvabhushan Puraskar" presented by Maratha Seva Sangh 14th National Session in Beed on 13/11/2011.

5.4 Dividend

NSAI has introduced the concept of paying dividend on the investment of the members in sugar industry of Maharashtra. NSAI have paid 15 percent dividend to preference share holders from the first year as per commitment. The dividend on equity share was expected only after repayment of term loan by fifth crushing season. However, board of directors have tried their best to pay the dividend even to equity share holders from 2002-03. The board of directors are pleased to recommend the payment of dividend 15 per cent i.e. rupees fifteen per preference share of rupees 100 each and 12.50 per cent i.e.

Rs.12.50 per equity share of 100 each irrespective of the financial crisis in sugar industry. The payment of dividend is historically went for Maharashtra sugar industry by which NSAI is justifying the investors in real sense and inspiring for investment in such projects.

5.5 Cane Development

5.5.1 Pre-seasonal Plantation Scheme

For implementation of the said scheme the subsidy of rupees 25 per MT on pre-seasonal cane plantation is given to the members. Also the financial assistance in terms of loans for cane seeds and cane plantation is made available from Sai G.B.S.S. Patasanstha limited, Sainagar, Ranjani. Some eligible members are provided the low interest rate, financial aids from Bank of Baroda.

5.5.2 Vermy Compost Project

NSAI started the vermy compost project in the factory campus to introduce Bio-Coure forming concept on larger scale. NSAI is providing the vermy culture free of cost to the member farmers for multiplication of the concept among members. NSAI started production of the same in one shade with assistance from Government of Maharashtra.

5.5.3 Water Conservation Projects

Various water conservation projects are in progress in the area of operation. The sludge (fertile soil) from Manajara Dam Project through the Mahatama Jyotiba Phule water and soil conservation programme is given to members to increase the fertility of soil of the members. NSAI have made financial assistance of Rs. 98890 to remove the sludge from Manajara project and to take fields of members during the season. From last three years the financial assistance of Rs.1.00 lakh each is given to remove the sludge from Manajara Dam which is helped to increase the storage capacity of water in Dam It also improves the fertility of land of the members which will increase the yield and quality of sugar cane.

5.5.4 By-Product Projects

NSAI have installed multi fuel Boiler Walchandnagar make having capacity of 30 TPH, so as to run the co-gen power plant with its maximum efficiency and to fulfill steam demand. Being multi fuel and well advanced modern Boiler it requires very less man power to operate the same.

5.6 Contribution to the Non-Conventional Energy Concept (Power from Agro-waste)

The unique concept of power from Agro-waste is innovated and introduced by NSAI. The agro-waste from the members field/farm is collected to use. It as a fuel for multi fuel boiler used for co-gen plant to generate electricity. In the country, Natural Sugar is the pioneer in using huge amount of agro-waste to run the co-gen plant to generate electricity. Ultimately it helps to reduce the unemployment of the local area and give additional source of income to the farmers. NSAI submitted the proposal to government of Maharashtra to start such electricity gen projects based on agro-waste by means of which 1000 MW electricity will be generated which will help to extend the employment of to one lakh rural youth. Farmers will get rupees 1500 crores and additional income from waste and guaranteed sufficient power will be available in rural area. Due to such decentralized power generation 35 per cent to 40 per cent T and D losses of power will be saved.

5.7 Extension of Ferro Alloy Project

In a short span of time Ferro Alloys product have captured the national and international markets and that’s why there is tremendous demand by high rate for NSAI project. That’s why management has taken the decision of the expansion of Ferro Alloys project and completed the commissioning of project well in time. NSAI production capacity has increased from 40 MT to 80 MT per day with this ferro alloy project.

5.8 Energy Conservation

NSAI has availed the expert services from internationally known Confederation of Indian industry (CII), Hyderabad for energy audit and implemented the suggestions of CII for conservation and optimum use of water, steam and power and achieved best performance and productivity.

Chapter VI

RESULTS AND DISCUSSION

The results and discussion chapter is divided in four parts as follows

6.1 Overall Performance of NSAI

6.2 Impact of NSAI on Agriculture Economy

6.3 Impact of NSAI on Employment

6.4 Overall Change During Last Ten Years

6.1. Overall Performance of NSAI

6.1.1 Introduction

In order to study the performance of NSAI Ranjani, it was necessary to identify the different areas of production units in the factory. The different areas of production in the factory were identified in annual report and through personal visits to NSAI. An attempt has been made to study the important information related to these areas in this chapter. Cost and returns structures and managerial efficiency regarding inventory control and utilization of byproducts was attempted with a view that such a type of analysis will bring out the performance of the factory. The performance of the factory under different technical criteria was also dealt with.

The Present chapter therefore deals with the empirical analysis of the areas of production in the sugar factory. Cane crushing, sugar production, molasses, bagasse, steel plant, distillery plant, milk plant, cost of production of sugar, gross returns and the net returns of profit from sugar production activity. Besides this chapter also deals with details of inventory control and utilization of by-product during the years and the technical performance of the factory.

6.1.2 Crushing of Sugarcane and Sugar Production

The crushing of sugarcane and sugar production of NSAI is shown in table 6.1.

Table 6.1: Crushing of Sugarcane and Sugar Production

Year	Crushing of Sugarcane (Lac MT)	Sugar Production (Lac Qtls)
1999-2000	3.5 (100.00)	2.87 (100.00)
2000-01	4.27 (122.00)	3.47 (120.91)
2001-02	3.95 (92.51)	3.44 (99.14)
2002-04	2.62 (66.33)	2.40 (69.77)
2004-05	2.14 (81.68)	2.01 (83.75)
2005-06	3.69 (172.43)	3.61 (179.60
2006-07	8.04 (217.43)	6.42 (177.84)
2007-08	7.80 (97.01)	6.04 (94.08)
2008-09	4.80 (61.54)	4.18 (69.21)
2009-10	7.77 (161.88)	6.71 (160.53)
2010-11	7.85 (101.03)	6.95 (103.58)
2011-12	9.30 (118.47)	7.78 (111.94)

Source: Annual report of Natural Sugar Allied Industry 1999-2000 to 2011-12

(Figures in paranthesis indicate per cent change over preceding year)

Figure 6.1: Crushing Sugar and Sugar Production

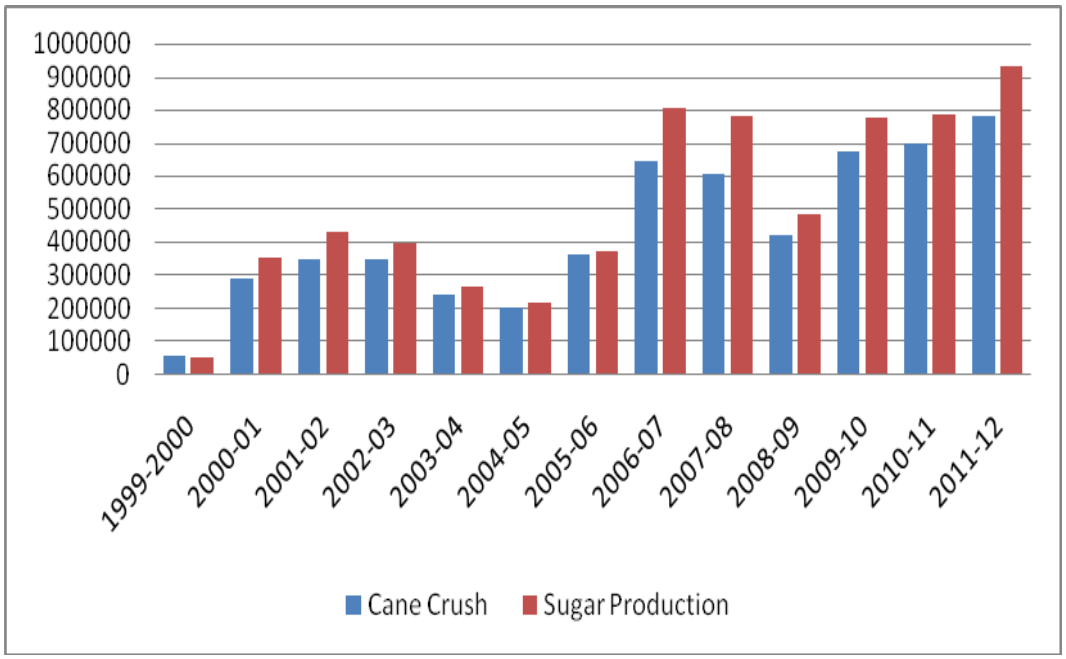


Table 6.1 shows that the crushing of sugarcane increased from 3.5 lac MT in the year 1999-2000 to 9.30 lac MT in the year 2011-12. The high annual growth rate was noticed to the tune of 217.43 per cent in 2006-07 and lowest annual growth rate 66.33 per cent in 2004-05.

The sugar production of NSAI increased from 2.87 Lakh Qtls in 1999-2000 to 7.78 Lakh Qtls in 2011-12. The high annual growth rate was observed 179.60 per cent in 2005-06 and lowest annual growth rate 69.21 per cent in 2008-09 during the study period.

6.1.3 Pol per cent of cane and recovery per cent of cane

The Pol. per cent of cane and recovery of cane of NSAI is shown in table 6.2

Table 6.2: Pol. per cent of cane and recovery of cane

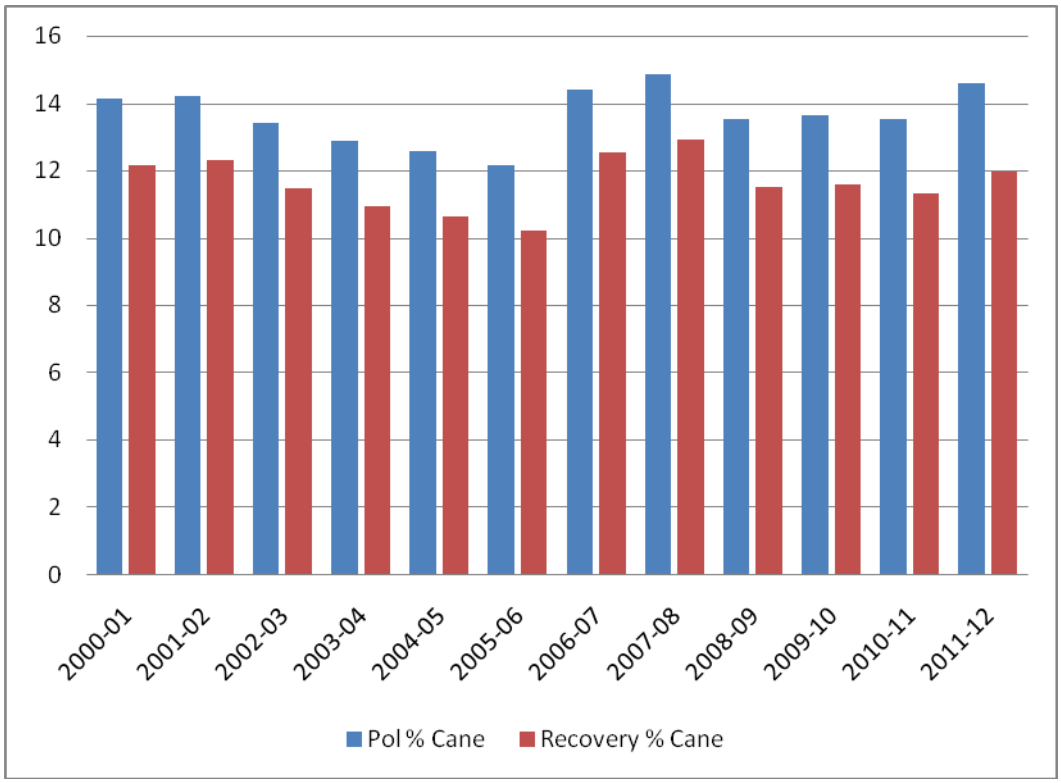
Year	Pol per cent cane	Recovery per cent Cane
1999-2000	14.14	12.14
2000-01	14.22	12.30
2001-02	13.42	11.45
2002-04	12.88	10.93
2004-05	12.56	10.61
2005-06	12.15	10.20
2006-07	14.41	12.52
2007-08	14.84	12.91
2008-09	13.53	11.50
2009-10	13.63	11.58
2010-11	13.52	11.30
2011-12	14.60	11.95
Average Growth Rate	0.25	-0.14

Source: Annual report of Natural Sugar Allied Industry 1999-2000 to 2011-12

It can be seen from table 6.2 that the pol percentage of cane was high (14.84 per cent) during the year 2007-08 while the same was lowest (12.15 per cent) in 2005-06. The average growth rate of pol percentage of cane was 0.25 during the study period.

The recovery of cane of NSAI was high (12.91 per cent) in 2007-08 while it was lowest (10.20 per cent) in 2005-06.The average growth of recovery per cent of cane was 0.14 indicating decreasing trend during the period under study.

Figure 6.2:Pol. per cent of cane and recovery of cane



6.1.4 Molasses

To make molasses, the cane of a sugar plant is harvested and stripped of its leaves. Its juice is extracted usually by crushing or mashing, but also by cutting. The juice is boiled to concentrate it, which promotes the crystallization of the sugar. The result of this first boiling and of the sugar crystals is first syrup, usually referred to in the Southern states of the USA as "cane syrup" as opposed to molasses, which has the highest sugar content because comparatively little sugar has been extracted from the source. Second molasses is created from a second boiling and sugar extraction, and has a slight bitter tinge to its taste. The production of Molasses and sale of Molasses is shown in table 6.3.

Table 6.3: Production and sale of Molasses of NSAI (Figures in MT)

Year	Production	Sale
2000-01	26459.50 (100.00)	26459.5 (100.00)
2001-02	25378 (95.91)	20205 (76.36)
2002-04	25490 (100.44)	20612.46 (102.02)
2004-05	484196 (1899.55)	484196 (2349.05)
2005-06	549032 (113.39)	526172 (108.67)
2006-07	751520 (136.88)	364638 (69.30)
2007-08	723891 (96.32)	378271 (103.74)
2008-09	617283 (85.27)	601928 (159.13)
2009-10	22662 (3.67)	17619.02 (2.93)
2010-11	37269 (164.46)	36728 (208.46)
2011-12	41025 (110.08)	9904.39 (26.97)
Average Growth Rate	155.05	37.43

Source: Annual report of Natural Sugar Allied Industry 1999-2000 to 2011-12

Figure 6.3: Production and sale of Molasses of NSAI

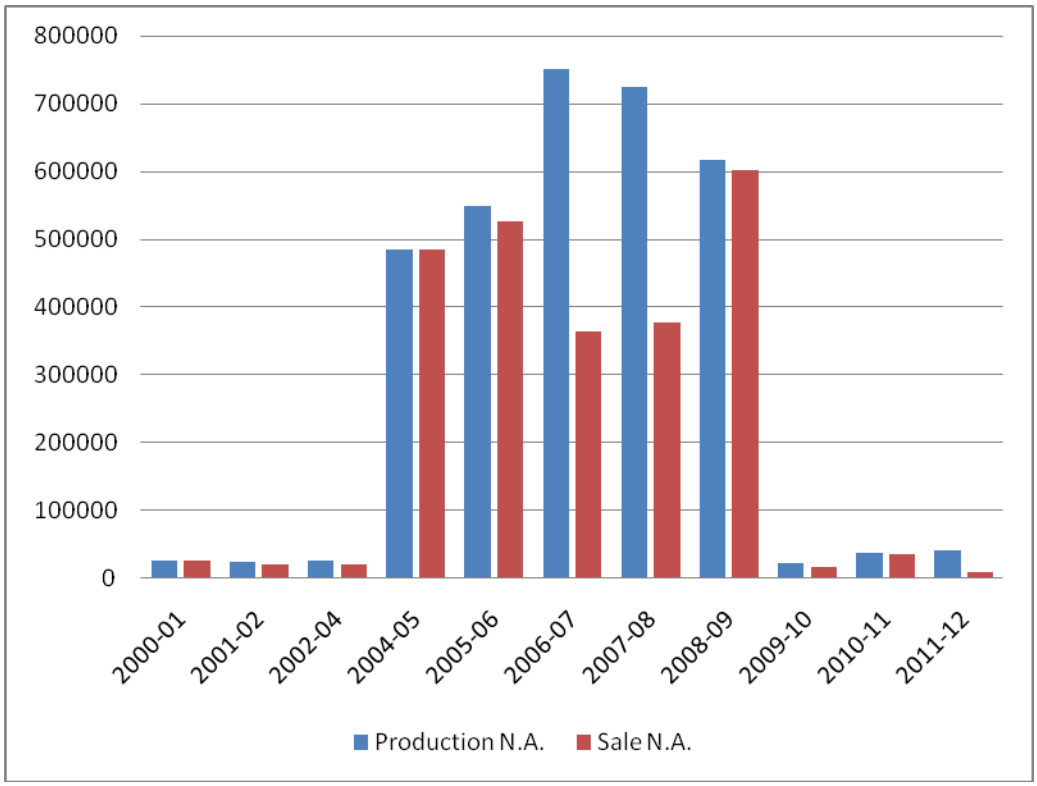


Table 5.3 indicates that the production of Molasses increased from 26459.50 MT in 2000-01 to 41025 MT in 2011-12. High annual growth rate 1899.55 per cent was noticed in 2004-05 and lowest annual growth rate 3.67 per cent in 2009-10. The average growth rate 155.05 per cent in 1999-2000 to 2011-12.

The sale of Molasses of NSAI decreased from 26459.5 MT in 1999-2000 to 9904.39 MT in 2011-12. Sale of Molasses increased up to 2008-09 then it has decreased. In study period high annual growth rate 2349.05 per cent in 2005-06 and lowest 2.93 in 2009-10. The average growth rate 37.43 per cent in 1999-2000 to 2011-12.

6.1.5 Bagasse

Bagasse is the fibrous matter that remains after sugarcane or sorghum stalks are crushed to extract their juice. It is currently used as a bio fuel and in the manufacture of pulp and paper products and building materials.

Agave bagasse is a similar material that consists of the tissue of the blue agave after extraction of the sap. The production, internal/own consumption of Bagasse and sale of Bagasse of NSAI is represented in table 6.4.

Table 6.4: Production, internal/own consumption of Bagasse and sale of Bagasse of NSAI (figures in MT)

Year	Production	Inter/own Consumption	Sale
2000-01	12938 (100.00)	12736 (100.00)	202 (100.00)
2001-02	15847 (122.48)	14738 (115.72)	1109 (549.01)
2002-04	1633845.10 (1033.92)	163928.75 (1112.29)	0
2004-05	25912.11 (15.82)	24738 (15.09)	1174.11 (105.87)
2005-06	30938 (116.93)	28938 (116.98)	1360 (115.83)
2006-07	46859 (154.66)	45748 (158.09)	1111 (18.31)
2007-08	83726 (178.68)	81263 (177.63)	2463 (221.69)
2008-09	102937 (153.40)	100295 (125.53)	3642 (107.27)
2009-10	157909.20 (115.74)	125897.05 (141.60)	32012.14 (1211.66)
2010-11	182763 (115.74)	178273 (141.60)	4490 (14.03)
2011-12	215878 (118.12)	199907.70 (112.14)	15970.30 (355.69)
Average Growth Rate	1668.59	1569.63	7906.09

Source: Annual report of Natural Sugar Allied Industry 1999-2000 to 2011-12

Figure 6.4: Production, internal/own consumption of Bagasse and sale of Bagasse of NSAI

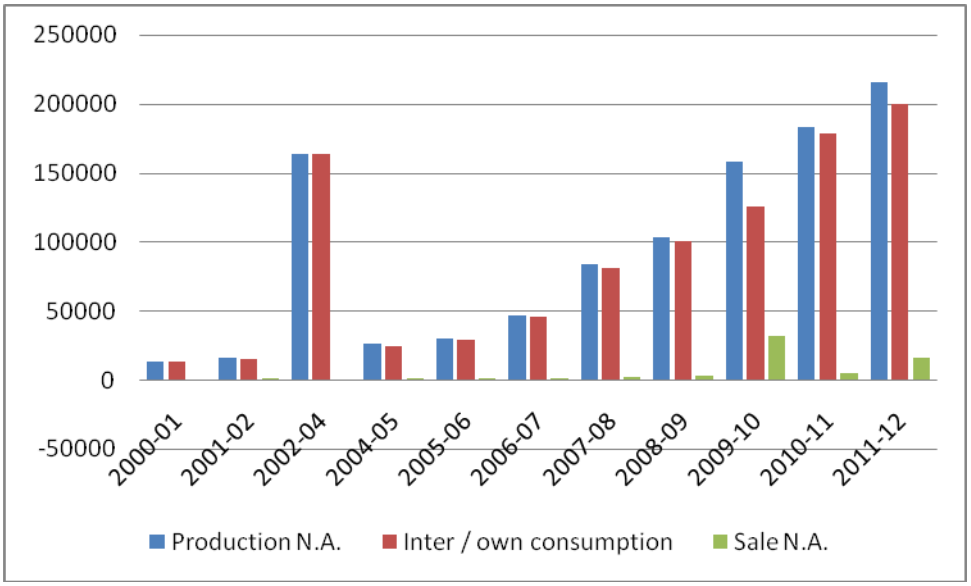


Table 6.4 indicates that the production of Bagasse increased from 12938 MT in 2000-01 to 215878 MT in 2011-12. High annual growth rate 1033.92 per cent was observed in 2002-04 and lowest annual growth rate 15.82 per cent was noticed in 2004-05. The average growth rate of 1668.59 per cent in 2000-01 to 2011-12 was observed.

Internal or own consumption of Bagasse of NSAI increased from 12736 MT in 2000-01 to 199907.70 MT in 2011-12. High annual growth rate 1112.29 MT per cent was noticed in 2002-04 and lowest annual growth rate 15.09 per cent was observed in 2004-05. The average growth rate 1569.63 was noticed during the period 2000-01 to 2011-12.

The sale of Bagasse of NSAI increased from 202 in 1999-2000 to 15970.30 in 2011-12.The high annual growth rate 1211.66 per cent in 2009-10 and lowest 0 in 2002-04. The average growth rate of sales in bagasse was 7906.09 per cent during the period 1999-2000 to 2011-12.

6.1.6 Ferro Manganese

Ferromanganese, a ferroalloy with high content of manganese, is made by heating a mixture of the oxides MnO_2 and Fe_2O_3, with carbon, usually as coal and coke, in either ablast furnace or an electric arc furnace-type system,

called a submerged arc furnace. The oxides undergo carbothermal reduction in the furnaces, producing the ferromanganese. Ferromanganese is used as a deoxidizer for steel.

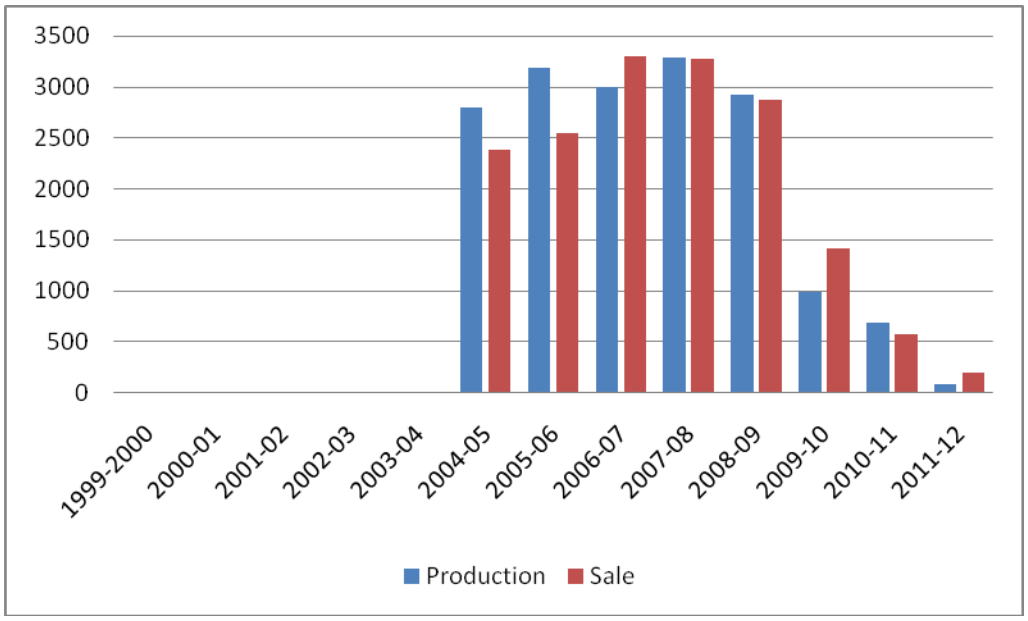
Henry Bessemer invented the use of ferromanganese as a method of introducing manganese in controlled proportions during the production of steel. The advantage of combining powdered iron oxide and manganese oxide together is the lower melting point of the combined alloy compared to pure manganese oxide. The production and sale of Ferro Manganese are presented in table 5.5.

Table 6.5: Production and Sale of Ferro Manganese of NSAI

Year	Production	Sale
2004-05	2793.39 (100.00)	2378.65 (100.00)
2005-06	3192 (114.27)	2549 (107.16)
2006-07	3002.90 (94.08)	3293.90 (129.22)
2007-08	3291 (109.59)	3274 (99.40)
2008-09	2918 (88.67)	2879 (87.94)
2009-10	989.31 (33.90)	1414.55 (49.13)
2010-11	691.31 (69.85)	574 (40.58)
2011-12	92.35 (13.16)	202 (35.19)
Average Growth Rate	3.31	8.49

Source: Annual report of Natural Sugar Allied Industry 1999-2000 to 2011-12

Figure 6.5: Production and Sale of Ferro Manganese of NSAI



It can be seen from the table 6.5 that the production of Ferro Manganese started from 2004-05. The production of Ferro Manganese decreased from 2793.39 in 2004-05 to 92.35 in 2011-12. High annual growth rate was recorded 114.27 per cent in 2005-06 and lowest annual growth rate was 13.16 per cent in 2011-12. The average growth rate of ferro manganese production was 3.31 per cent during the period in 1999-2000 to 2011-12.

The sale of Ferro Manganese of NSAI decreased from 2378.65 in 2004-05 to 202 in 2011-12. In study period high annual growth rate was observed 129.22 per cent in 2006-07 and lowest 35.19 per cent in 2011-12. The average growth rate in sales was noticed 8.49 per cent during the period 1999-2000 to 2011-12.

6.1.8 Silico Manganese

Silico manganese (SiMn), a ferroalloy with high contents of manganese and silicon, is made by heating a mixture of the oxides manganese oxide (MnO_2), silicon dioxide (SiO_2), and iron oxide (Fe_2O_3), with carbon in a furnace. They undergo a thermal decomposition reaction. It is used as a deoxidizer and an alloying element in steel.

The standard grade silico manganese contains 14 to 16 per cent of silicon, 65 to 68 per cent of manganese and 2 per cent of carbon. The low

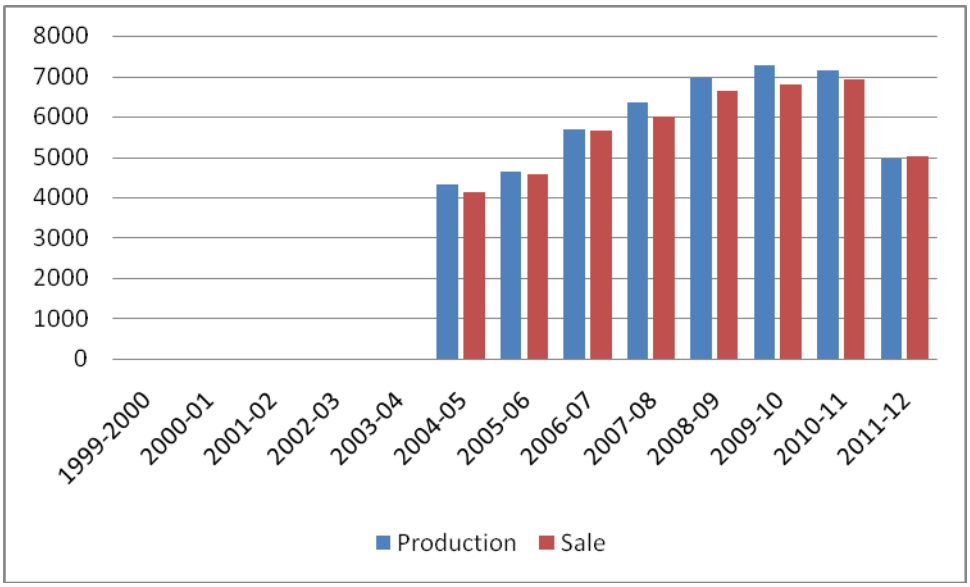
carbon grade SiMn has carbon levels from 0.05 to 0.10 per cent. The production and sale of Silico Manganese of NSAI are depicted in table 6.6.

Table 6.6: The production and sale of Silico Manganese of NSAI

Year	Production	Sale
2004-05	4322.20 (100.00)	4118.40 (100.00)
2005-06	4637 (107.28)	4584 (111.31)
2006-07	5674.45 (122.37)	5660.90 (123.49)
2007-08	6348 (111.87)	5989 (105.80)
2008-09	6943 (109.37)	6635 (110.79)
2009-10	7259.55 (104.56)	6792.60 (102.38)
2010-11	7129 (98.20)	6932 (102.05)
2011-12	4963.50 (69.62)	5018.50 (72.40)
Average Growth Rate	114.84	121.86

Source: Annual report of Natural Sugar Allied Industry 1999-2000 to 2011-12.

Figure 6.6: The production and sale of Silico Manganese of NSAI



It can be observed from the table 6.6 that the production of Silico Manganese started from 2004-05. The production of Silico Manganese increased from 4322.20 in 2004-05 to 4963.50 in 2011-12. High annual growth rate was noticed 122.37 per cent in 2006-07 and lowest annual growth rate was 69.62 per cent in 2011-12. The average growth rate of production of silico manganese was 114.84 per cent during the period 1999-2000 to 2011-12.

The sale of Silico Manganese of NSAI increased from 4118.40 in 2004-05 to 5018.50 in 2011-12. The high annual growth rate was noticed 123.49 per cent in 2006-07 and lowest 72.40 in 2011-12. The average growth rate in salts of silico manganese was 121.86 per cent during the period 1999 - 2000 to 2011-12.

6.1.9 Electricity Generate 12 MW (KWH)

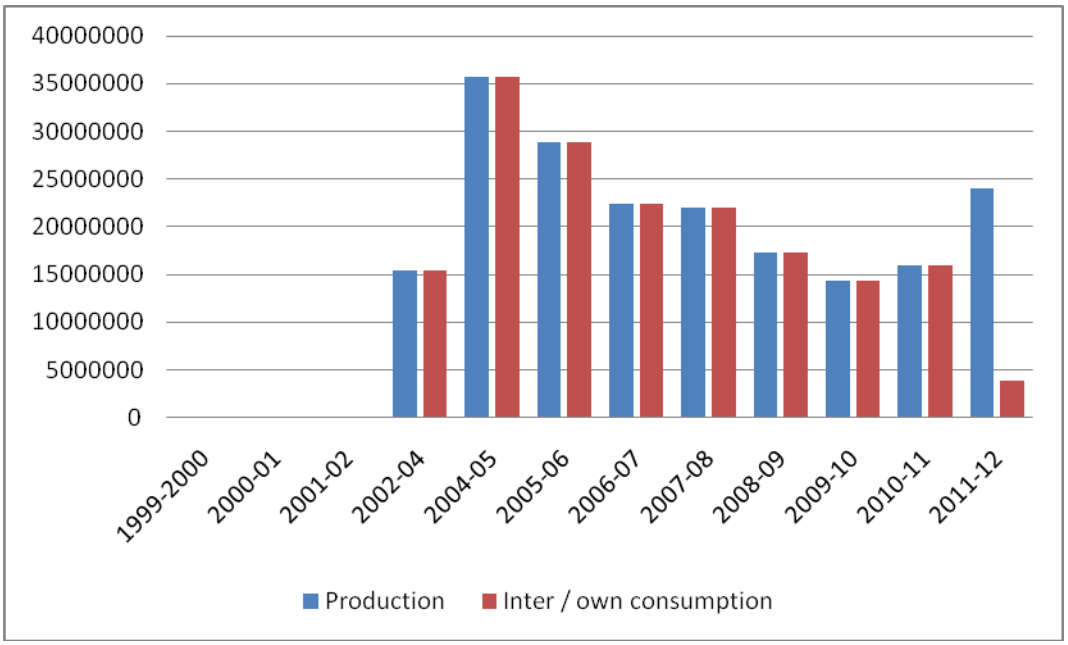
NSAI started electricity generation in 2002-04 with 12 MW (KWH). The production and consumption of Electricity is presented in table 6.7.

Table 6.7: The production and sale of Electricity of NSAI (KWH)

Year	Production	Consumption
2002-04	15455240 (100.00)	15455240 (100.00)
2004-05	35661795 (230.74)	35661795 (230.74)
2005-06	28872430 (80.96)	28872430 (80.96)
2006-07	22426266 (77.67)	22426266 (77.67)
2007-08	21974029 (97.98)	21974029 (97.98)
2008-09	17301842 (78.74)	17301842 (78.74)
2009-10	14416600 (83.32)	14416600 (83.32)
2010-11	16029307 (111.19)	16029307 (111.19)
2011-12	24061874 (150.11)	24061874 (150.11)
Average Growth Rate	155.69	155.69

Source: Annual report of Natural Sugar Allied Industry 1999-2000 to 2011-12.

Figure 6.7: The production and sale of Electricity of NSAI



The table 5.7 indicates that the production of Electricity started from 2003-04. The production of Electricity increased from 15455240 in 2002-04 to 24061874 in 2011-12. The high annual growth rate 230.74 per cent in the year 2004-05 and lowest annual growth rate 78.74 per cent in the year 2008-09.The average growth rate in production of electricity was 155.69 per cent during the period 2002-04 to 2011-12. NSAI has used all electricity produced by them.

6.1.10 Income of NSAI

Income of sugar factories includes is as follows.

Income from sales of sugar: It includes value of sugar production, control sugar sale, open market sugar, open export of sugar.

Other income- It includes sub production of NSAI. Income from sub production from sugar like molasses, bagasse, ferro manganese, silico manganese, reflected sprit, impure sprit, extra neutral alcohol, technical alcohol, special denatured sprit, bio-compost, natural phosphate and ethanol. It also includes interest on deposits, agriculture income, sales of scarp material, modvat, sales of tender form, income of diesel pump, vehicle income, compost, sales of boiler ash, petrol pump, printing press, fertilizer department extra.

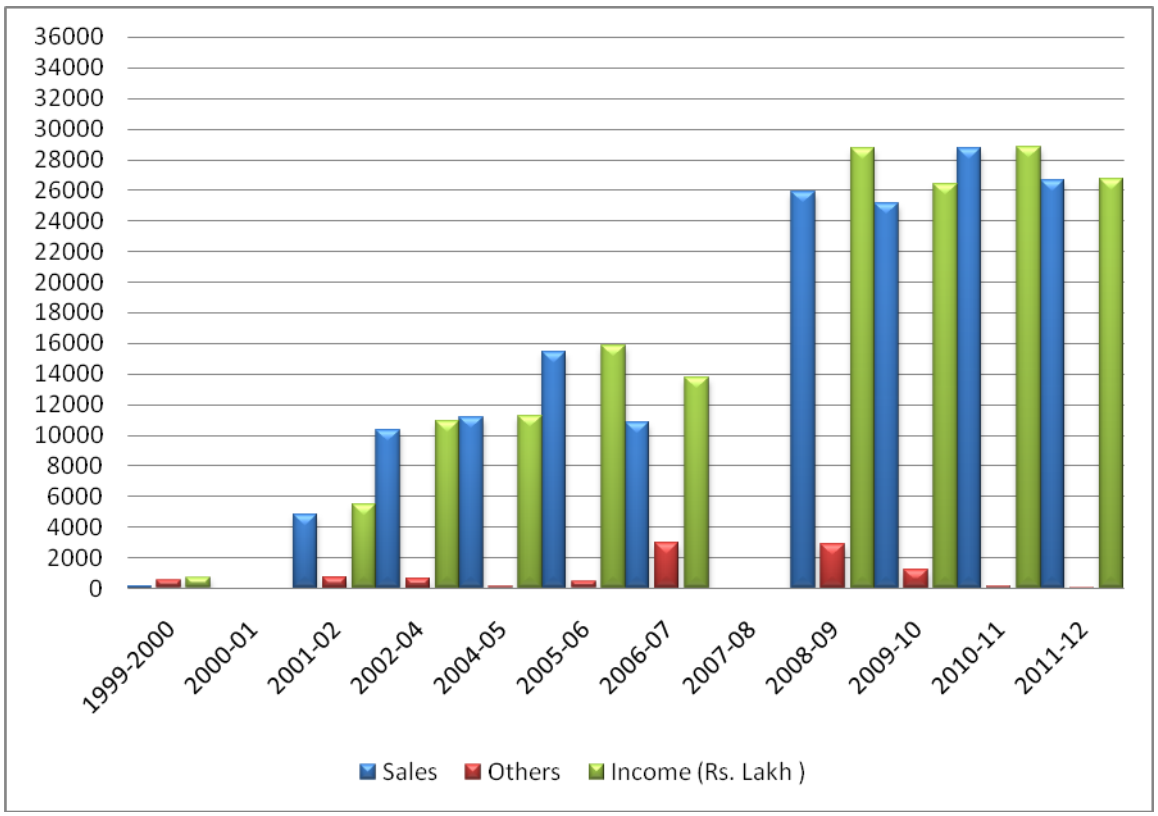
The income occurred by NSAI from all sources is presented in table 6.8.

Table 6.8: Income of NSAI (Rs. Lakh)

Year	Sales	Others	Total
1999-2000	158.42 (23.03)	529.47 (76.97)	687.89 (100.00)
2001-02	4808.91 (87.39)	694.02 (12.61)	5505.93 (100.00)
2002-04	10306.86 (94.18)	636.99 (5.82)	10943.85 (100.00)
2004-05	11169.51 (99.03)	109.71 (0.97)	11279.22 (100.00)
2005-06	15438.12 (97.34)	421.44 (2.66)	15859.56 (100.00)
2006-07	10854.76 (78.71)	2936.08 (21.29)	13790.84 (100.00)
2008-09	25867.17 (89.90)	2905.26 (10.10)	28772.43 (100.00)
2009-10	25177.32 (95.27)	1251.30 (4.73)	26428.62 (100.00)
2010-11	28735.34 (99.60)	113.97 (0.40)	28850.43 (100.00)
2011-12	26642.78 (99.70)	79.53 (0.30)	26722.31 (100.00)
Average Growth rate	1401.48	1.25	323.72

Source: Annual report of Natural Sugar Allied Industry 1999-2000 to 2011-12

Figure 6.8: Income of NSAI



It can be seen from the table 6.8 that the total income of NSAI increased from Rs.687.89 lakh in 1999-2000 to Rs. 26722.31 lakh in 2011-12. Sales income of NSAI increased from Rs.158.42 Lakh in 1999-2000 to Rs. 26642.78 Lakh in 2011-12.

Other income of NSAI was Rs. 529.47 lakh in 1999-2000. It decreases to Rs. 79.53 Lakh in 2011-12. The share in total income of other sources income decreased to 79.53 lakhs during the year 2011-12.

6.1.11 Expenditure pattern of NSAI

Expenditure of sugar factories is as follows.

Purchase of Cane: It includes purchase of cane, Cane development expenditure, Khodki charges, cane cutting and transport of cane, supply of cane and other expenses.

Salary and wages: It includes salary and wages, Bonus, assistance grants, provident fund, other contribution, medical assistance, labour welfare expenses.

Manufacturing Expenditure: It includes repair and maintenance of equipments, chemical expenses, medical store, lab chemicals, packaging expenses, electricity, transport of sugar, repair and maintenance of electric equipments, laboratory expenses.

Administration and other expenditure: It includes meeting allowance of board of directors, meeting expenses, travelling allowance of staff, general meeting allowance, bank commission and charges, post, telephone, audit fee, government fee, education fund, vehicle tax, guest house, expenses on guest, newspaper and periodicals, tree plantation, computer expenses, election expenses, maintenance of building, workers training, advertisement, sugar sell expenses, professional tax, water supply tax.

Interest: Infrastructure, building, machinery, NSAI needs capital. It is collected from shareholders, government of Maharashtra, various financial institutions. They are giving dividend to shareholders. Interest on short, medium and long term loans and capital loans, Interest on deposits.

Excise duty: It includes excise duty and taxes of government.

Others: It includes deprecation of building, machinery, furniture, property.

Expenditure on various heads of NSAI during the study period has been explained in table 6.9

It can be observed from the table 6.9 that the total expenditure of NSAI increased from Rs.910.56 lakh in 1999-2000 to Rs. 26855.64 lakh in 2011-12. The expenditure on purchase of raw material and other material of NSAI increased from Rs.435.45 lakh in 1999-2000 to Rs. 17814.36 lakh in 2011-12. The expenditure on salary and wages of NSAI increased from Rs. 58.70 lakh in 1999-2000 to Rs. 958.32 lakh in 2011-12.

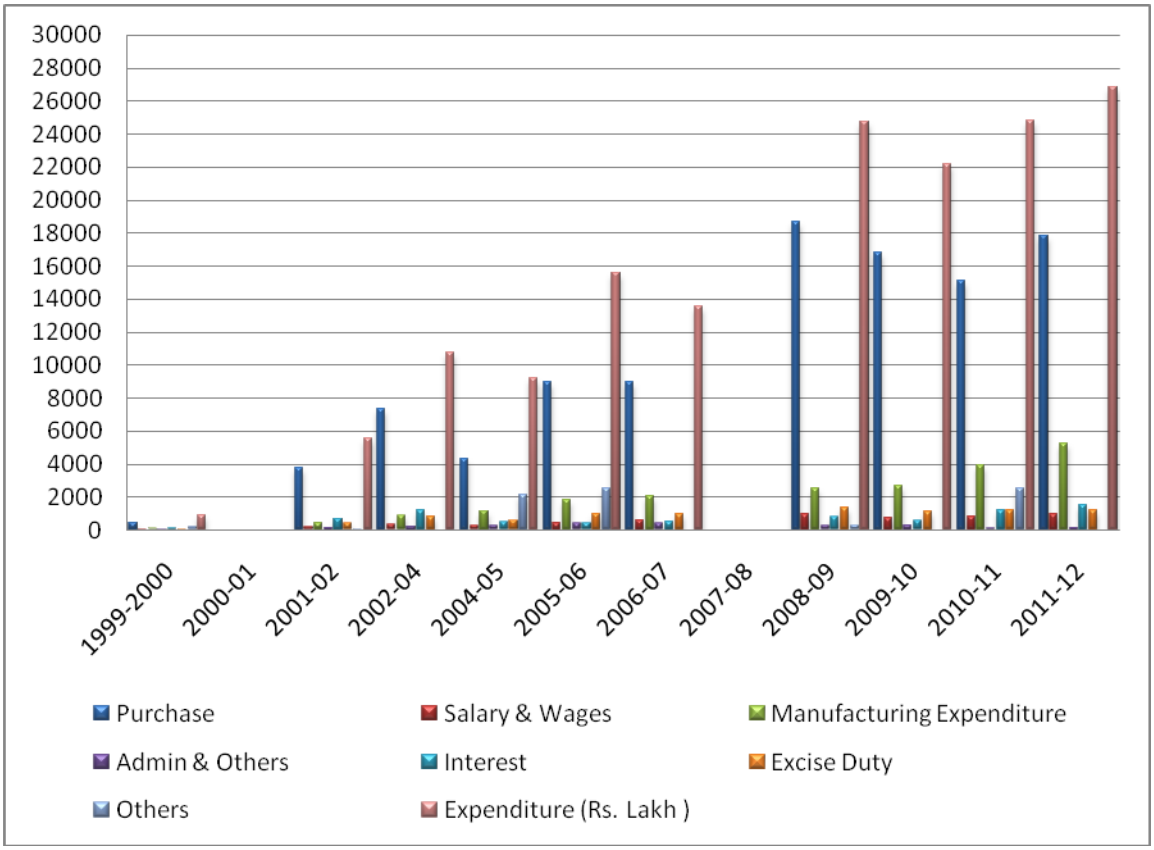
Table 6.9: Expenditure of NSAI (Rs. Lakh)

Year	Purchase Of cane	Salary & Wages	Manufac-turing Expend-iture	Admin & Others	Interest	Excise Duty	Others	Total
1999-2000	435.45 (47.82)	58.70 (6.45)	80.90 (8.88)	27.56 (3.03)	108.40 (11.90)	50.91 (5.59)	148.64 (16.12)	910.56 (100.00)
2001-02	3728.04 (67.21)	186.15 (3.36)	423.92 (7.64)	134.45 (2.42)	684.18 (12.33)	388.25 (7.00)	2.11 (0.04)	5547.10 (100.00)
2002-04	7321.50 (68.35)	337.92 (3.15)	858.69 (8.02)	213.53 (1.99)	1179.86 (11.01)	800.54 (7.47)	NA (0.00)	10712.04 (100.00)
2004-05	4326.46 (47.22)	268.00 (2.93)	1153.43 (12.59)	234.72 (2.56)	471.72 (5.15)	564.59 (6.16)	2143.12 (23.69)	9162.04 (100.00)
2005-06	8994.45 (57.93)	420.94 (2.71)	1809.12 (11.65)	416.12 (2.68)	396.44 (2.55)	986.23 (6.35)	2503.44 (16.12)	15526.74 (100.00)
2006-07	8989.15 (66.36)	607.43 (4.48)	2056.14 (15.18)	410.56 (3.03)	517.61 (3.82)	965.91 (7.13)	NA (0.00)	13546.80 (100.00)
2008-09	18682.40 (75.48)	943.91 (3.81)	2486.65 (10.05)	258.14 (1.04)	773.48 (3.13)	1338.56 (5.41)	267.01 (1.08)	24750.15 (100.00)
2009-10	16768.57 (75.69)	738.83 (3.34)	2706.76 (12.22)	286.31 (1.29)	545.56 (2.46)	1107.49 (5.00)	NA (0.00)	22153.52 (100.00)
2010-11	15106.93 (60.83)	819.01 (3.30)	3924.89 (15.81)	106.21 (0.43)	1167.18 (4.70)	1187.43 (4.78)	2521.20 (10.15)	24832.85 (100.00)
2011-12	17814.36 (66.33)	958.32 (3.57)	5235.40 (19.49)	135.13 (0.50)	1534.37 (4.39)	1178.06 (4.39)	NA (0.00)	26855.64 (100.00)
AGR*	340.92	136.05	539.29	40.86	117.96	192.83	141.35	245.78

* **(**Average Growth Rate**)**

Source: Annual report of Natural Sugar Allied Industry 1999-2000 to 2011-12

Figure 6.9: Expenditure of NSAI



The expenditure on manufacturing expenditure of NSAI increased from Rs.80.90 lakh in 1999-2000 to Rs. 5235.40 lakh in 2011-12.

The expenditure on administration and other expenditure of NSAI increased from Rs. 27.56 lakh in 1999-2000 to Rs. 135.13 lakh in 2011-12. The proportion of expenditure on administration and other expenditure decreased from 3.03 per cent in 1999-2000 to 0.50 per cent during the year in 2011-12.

The expenditure on interest paid by NSAI increased from Rs. 108.40 Lakh in 1999-2000 to Rs. 1534.37 lakh in 2011-12. The proportion expenditure on interest decreased from 11.90 per cent to 4.39 per cent during the period under study. Expenditure on excise duty of NSAI increased from Rs.50.9 lakh in 1999-2000 to Rs. 1178.06 Lakh in 2011-12.

Other expenditure of NSAI was Rs 148.64 lakh in 1999-2000, which increased to Rs. 2521.20 lakh in 2010-11. Zero expenditure on other expenditure in 2002-04, 2006-07, 2009-10 and 2011-12.

6.1.12 Profit and Loss account of the NSAI

The profit and loss account of NSAI during the study period has been depicted in table 6.10

Table 6.10: Profit and loss account of NSAI during the period from 1999-2000 to 2010-11

Year	Profit	Loss
1999-2000	Nil	-2226754
2000-01	20300476	Nil
2001-02	1711130	Nil
2002-04	745341	Nil
2004-05	884717	Nil
2005-06	755611	Nil
2006-07	1998745	Nil
2007-08	4749329	Nil
2008-09	2608118	Nil
2009-10	2124699	Nil
2010-11	1610843	Nil

Source: Annual report of Natural Sugar Allied Industry 1999-2000 to 2011-12

It can be seen from the Table 6.10 the profit and loss of NSAI. The working of NSAI started in1999 and therefore in the initial stage there was a loss to the tune of Rs. 2226754 during first year. After that NSAI's profit has variations. The highest profit was earned Rs. 4749329 in 2007-08. The lowest profit was earned Rs. 745341during the year 2003-04.

6.1.13 Export performance of NSAI

The NSAI has exported sugar and Ferro alloys steel during the study period. The details are presented in table 6.11

Table 6.11: Export of NSAI

Year	Sugar(Rs)	Ferro Alloys (Rs)
2001-02	26897010	0.00
2002-04	69230000	44848796
2004-05	NA	86303257
2005-06	421676749	87593082
2006-07	NA	8544750
2007-08	694694885	280848165
2008-09	361200981	339448229
2009-10	24030300	25990872
2010-11	142848000	91131680
2011-12	268495700	29353254

Source: Annual report of Natural Sugar Allied Industry 1999-2000 to 2011-12

It can be observed from the table 6.11 that the NSAI has started export of sugar from 2001-02 and it was to the tune of Rs. 26897010, which was increased to Rs.268495700 during the year 2011-12. Ferro alloys export was started from 2002-03. This section gives a more foreign currency to NSAI and also India. The highest export of ferro alloys was to the tune of Rs. 33,94,48,229 in 2008-09 and the lowest earning was Rs. 8544750 in 2006-07.

6.2 Impact of NSAI on Agriculture Economy

6.2.1 Introduction

The most important factor of the sugar industry is the close linkage between the factory and cultivators. They are well interlinked. No other agro-based industry can compete with the sugar industry in having great impact and close contact between the agriculturist and the factory. The success of sugar industry like any other processing industry depends on the continuous flow of the raw materials in the required quantity and quality. The fluctuations in sugarcane supply is bound to have an effect on the sugar production, sugar

recovery, capacity utilization and the length of the crushing period from season to season.

Sugarcane is one of the important cash crops grown in India, which provides employment to large number of people and contributing to the growth of the vital rural economy. As an essential commodity, its consumption has increased from 26 lakhs metric tonnes in 1969-70 to 51.08 metric tonnes in 1979-80. Although sugarcane occupies less than 8 per cent of the cultivated area of the country, it has been significant in transforming the subsistence mode of agriculture to commercial farming. It is the third largest crop in the country in terms of value next to rice and wheat (Gothoskar, 1982).

The main objective of the sugar factory is to provide maximum returns to its member-farmers. This could be achieved if the efficiency of the farm production is combined with the efficiency of production in the factory. On this background, we can conclude that it is the prime responsibility of the cooperative sugar factory to ensure stability in the area under sugarcane cultivation in its command area. At present, efforts are being made by the sugar factories to increase agricultural productivity by introducing various measures like development of irrigation facilities, supply of fertilizers provision of improved seeds, credit facilities, technical assistances etc.

The efforts for the agricultural development of the commanding area are an integral part of the activities of the NSAI since its inception. Besides government efforts, the NSAI has also initiated several schemes for agricultural development of the taluka by allocating considerable funds and organization efforts. The activities and programmes of the NSAI have led to tremendous agricultural transformation and initiated a process of multiple developments in the operational area of the NSAI. The process still continues.

6.2.2 Agricultural Development Department

The Agricultural Department of NSAI was established with the start of NSAI. The objective of creating such a department was to develop the agriculture land in the area of operation of NSAI. This department takes cares of implementation of the programme of harvesting and transport of sugarcane.

The Agricultural Department headed by the Chief Agricultural Officers was responsible for cane development as well as cane procurement functions. However, staff spent most of their time on cane contracting and survey, finding out harvesting and transport labour, contracting harvesting labour making arrangement for bullock-carts, trucks, tractors, etc., for transporting of sugar cane. The sugarcane development work was regarded as a secondary function of Agricultural Department. Since the implementation of the cane development programme requires careful planning, close co-ordination, continuous supervision and ongoing evaluation, the Agricultural Department and Agricultural Development Department appointed some additional staff for implementing various agricultural development activities.

The Chief Agricultural Development Officers heads Agricultural Development Department. The staff members assist him though the Agricultural Development Department is separate, it has to work in close co-ordination with the Agricultural Department. The Chief Agricultural Development Officer is put in charge of all the activities undertaken by the NSAI for agricultural development. This department is expected to pay immediate attention to the needs of the member cultivators on the farm front. The staffs of this department are required to act as the friend, philosophers and guide to the small cultivators. This department tries to arouse the interest of the farmers in the use of fertilizers, pesticides, tested seeds, soil testing, improved implements, latest agricultural practices, veterinary preparations etc.

The command area of the NSAI has been divided into several regions, where the Regional Agricultural Officers have been formed for efficient working of both these departments, these regional officers linked with the Agricultural Development for immediate contact and communication.

The Agricultural Development programme undertaken by the NSAI include various facilities like supply of improved seeds and fertilizers, plant protection measures, soil testing, availability of agricultural implements, cattle breeding and extension centers, extension services etc. The NSAI has allocated considerable funds towards these facilities. These facilities have prompted a large

number of farmers to adopt improved agricultural practices. The department has created a new scientific environment for the rural population and has effectively changed their attitudes. Though some of the facilities have been made available by the government and private agencies, a number of farmers in the area prefer to buy agricultural inputs from the Agricultural Development Department because of their close contact with the department and availability of credit facilities.

The contribution of the department is motivating the farmers to adopt modern agricultural technology and this can be proved through a review of the progress report of different programmes initiated by the Department of the Agricultural development of the area. The information of these facilities is collected from the annual reports and from the official records of the department.

6.2.3 Supply of Fertilizers

With the change in cropping pattern, the use of chemical fertilizers has been increased in the area. The high rate of fertilizer consumption is always manifested in higher yields of sugarcane. The use of fertilizers seems to be always high in respect of irrigated crop like sugar cane. An increase in sugarcane area implied larger quantity of fertilizers. Although fertilizers are applied to other crops like Jowar, wheat, cotton Groundnuts etc. their proportion is substantially higher for sugar cane. The NSAI is supplying chemical fertilizers to the farmers on credit since its inception. The dues are recovered from the cane prices. The by-product like press mud is also good fertilizers and improves the salinity of the soil. The members of NSAI get press mud at a low rate. Large number of members are annually benefited by the supply of fertilizers.

6.2.4 Supply of Improved Seeds

The Agricultural Department of NSAI has developed a seed farm, from which quality seeds are supplied to the cane growers. Experiments and trials are taken up by the seed farm, which forms a constant source of scientific information to the farmers. The seed farms also conduct “Hot Water Treatment” to prevent Sugarcane seed from diseases. This treatment improves

the components of yield like height of crop plant, the girth and weight of crushable cane. The treatment of cane sets used for planting is necessary for improving the rate and speed of germination and for protecting the crop from the incidence of seed born diseases and pets. The NSAI has under taken a three tier seed programme' for Sugarcane seed multiplication and its distribution. The first stage of the programme is of foundation seed, which is brought from Sugarcane Research Centre located at Padegon and Manjari (Dist. Pune). The second stage is of certified seeds. In this stage crop obtained from foundation seed is planted for multiplication on selected farms in the area under the supervision of the staff of the Agricultural Department. In the third, stage, a crop raised from certified seed is distributed to farmer for general cultivation. Thus the NSAI is paying considerable attention to larger production and better distribution of qualitative disease free healthy seeds.

The varieties planted in the command area has helped in producing maximum tonnage of Sugarcane per hectare and also ensured higher recovery of sugar. The variety changes in the command area of NSAI are in favour of advanced varieties of Sugarcane released from time to time by the Sugarcane scientist. Thus, the traditional varieties have been replaced by the high yielding varieties.

6.2.5 Plant Protection

The pests and diseases cause severe damage to sugarcane crop. If the incidence is not properly checked the damage may easily be more or less 50 per cent. The experience shows that the field affected severely by diseases, reduces yield by 15 to 20 tonnes of cane even with the prior irrigation and manurial practices. Whenever any pests and diseases like fungi, bacteria, virus etc. makes its appearance on large scale in the command area the Agricultural Department of the NSAI.

6.2.6 Soil Testing

Soil testing is an important tool to advice farmers for judicious, balance and efficient use of fertilizers leading to the most economic returns to them. The NSAI established soil-testing facilities. The soil samples are collected

from different farms and tested in the soil testing laboratories. The scientific guidance about doses of the fertilizers to be given and crops to be grown in a particular farm is given to the farmers from the analysis of soil. There is significant response from the farmers in taking advantage of this facility.

6.2.7 Extension Services

The management of the NSAI undertakes many extension services for educating the framers on modern agricultural practices. Every year at least one seminar is organized on the site. The Sugarcane and agricultural experts from Mahatma Phule Krishi Vidyapeeth, Rahuri and Vasant Dada Sugar Institute, Majari Dist Pune are invited. Modern agricultural technologies are discussed in these seminars. The demonstration of the various aspects of Sugarcane cultivation is also arranged to discuss modern agricultural practices in the presence of staff of the Agricultural Department of NSAI. The staff of Agricultural Department of the NSAI often visit the cane growers and guides them on all aspects of cane cultivation.

In addition to these extension services, it was felt that, the psychological factors would also play its own role in increasing productivity. It was sought to achieve by arranging cane competitions every year among the members. The certificates along with cash award are distributed in the Annual General Body Meeting to cane growers for their achievement in obtaining the highest Sugarcane yield for each type of plantation i.e. Adsali, Suru and Khodwa.

6.2.8 Changes in Irrigation Development

Water is the most important prerequisite for agricultural development. Irrigation is one of the important inputs and socio economic basis of agriculture. It is a sine qua non for intensive and more economic agricultural operation. The success of agriculture depends to a large extent on how successfully water requirements of various crops can be met. An assured source of water supply spells prosperity, creation of employment potential enhanced income, increased capital formation and circular causation with cumulative effect. It is said that water is more valuable than land, because, when water is applied to land it increases its productivity at least six fold renders land

productive, which otherwise would produce nothing. Among various inputs of sugarcane, irrigation is regarded as the most important factor. A twelve-month's sugarcane crop normally requires 30-36, irrigation, spanned at an interval of 10 days in summer and 15 days in the other seasons, with withdrawal of water about 30 days before harvest. As sugarcane requires regular and abundant water supply throughout the year, the farmers cannot depend upon rainfall alone for cultivation of sugarcane. The extension of area under sugarcane is only possible when irrigation facilities are available.

In the area, some land is brought under irrigation with the help of Manjra canal of the Dhanegaon project. However, most of the land was un-irrigated and dependent on the vagaries of monsoon. The sugar factory is trying to increase areas under irrigation. It has constructed some, percolation tanks and wells.

The NSAI helps to get loans through credit society to the farmers for the lift irrigation from Manjra River. A majority of the shareholders of the sugar factory hold 1-3 hectares of land and many of them grow sugarcane on lift irrigation. The factory has also been providing the facility of boring units. It has resulted in increase in area under sugarcane cultivation.

The factory has established a special mechanism of the purpose to speed up the process of credit finance under the scheme. The advisory management committee took the decision regarding the loan proposals quickly. The committee supervises the day to day working of the scheme.

As mentioned in this chapter that there has been a change in the cropping pattern of the Kalamb taluka, sugarcane has become the most preferential cash crop. The old sugarcane cultivators have started sugarcane cultivation on a large scale and thousands of new sugarcane cultivators have entered in to the field. The villages, which were not cultivating sugarcane before the establishment of NSAI, have started cultivation of sugarcane. Most of the farmers are growing sugarcane on small scale under borewell irrigation. More and more farmers have started digging of new borewells for cultivation of sugarcane; the farmers invest their earnings in digging of new borewells.

The number of borewells increased as the cultivated area under sugarcane increased. The NSAI has also been providing boring unit facilities that are made available to the farmers at concessional rates and help farmers to dig new well.

Increase in the number of wells can be attributed to two factors. Firstly, with the establishment of the sugar factory, the small farmers started cultivation of sugar cane. As compared to other crops like Wheat, Jowar, Cotton, Groundnut etc., Sugarcane requires more water supplies. Only when sugarcane gets adequate water supply does it gives higher returns. In order to obtain more tonnage per hectare, the small farmers started digging wells. The bank made available credit facilities on guarantee of the sugar factory for this and other purpose like installation of siphons for watering fields. Secondly, any small landholders could take advantage of the credit facility provided by the factory for digging new wells. Thus the number of wells and area under well irrigation in the region increased substantially.

6.2.9 Irrigation Schemes

The NSAI has given high priority to the creation of irrigation facilities through minor irrigation projects like lift irrigation schemes and construction of percolation tanks. It was devoted a very sizeable amount from its own funds to the development of irrigation facilities in respect of raw material i.e. sugar cane. The irrigation development efforts by the NSAI were not attempted only to encourage the farmers to cultivate sugarcane but also to enable the rural population to participate effectively in the development process and share the fruit of progress. These efforts have contributed in a big way to the expansion of irrigation facilities in the operational area.

6.2.10 Drip Irrigation System for Sugarcane Cultivation

The area under sugarcane cultivation has increased considerably due to existence of the sugar factory. Besides sharing a relatively higher proportion of irrigated area and total irrigation water supplies as wells, the sugarcane crop has been associated with several problems specially in terms of its declining productivity and production resulting from the use of excessive irrigation

water. As water is the most precious commodity in our country, it is imperative that available water should be used very efficiently. It is observed that farmers use lot of water for sugarcane by flow method, which in turn creates problems like water loss, deterioration of soil conditions etc. The traditional flow method of irrigation for sugarcane crop is characterized by uneven distribution of water, which results in poor yield. The technology of applying water to the root zone area of sugarcane through drip irrigation system seems to have caught the imagination of the enterprising and innovative farmers in recent days. There are number of advantages of drip irrigation technology like application of water as per needs of plant low pressure to limited area, saving water up to 50 to 60 per cent by reducing total evaporative, run off and deep percolating losses, minimum soil erosion due to there being not runoff of surface water between crops rows minimum weed growth, saving of fertilizers, better yield and quality of crop etc.

6.2.11 Lift Irrigation

The term lift irrigation refers here to lifting of water from the river courses with mechanical power and supplying it to nearby farms through cement or plastic pipes. The emergence of lift irrigation may be ascribed to the cooperative movement and development of sugar industry in the region. The obstacles of slope are illuminated here as the water is supplied to the fields at a distance ranging from 5 to 25 Km away from the riverbanks. The NSAI undertook the survey of farmers willing to have on their own lift irrigation and has promoted a number of lift irrigation schemes wherever technically feasible. The location of the lift irrigation schemes are selected on considerable of water availability of canals, needs of the farmers, existence of convenient points for lifting water from canals, feasibility connection etc.

Since all these lift irrigation schemes are managed through cooperative societies, they have benefited the poor farmers who are unable to take individual loans. The NSAI has taken care for proper planning and implementation of irrigation plans and has initiated farmers own lift irrigation schemes in the command area.

6.2.12 Changes in Cropping Pattern

Cropping pattern means the proportion of area under different crops at a point of time. A change in cropping pattern implies a change in the proportion of area under different crops. The choice for growing a particular crop in a particular region is an outcome of various factors like soil conditions, climate, rainfall, irrigation facility, size of land holding, change in market price, government policy, availability of inputs, attitudes of the farmers etc. The analysis of the cropping pattern is necessary for identification of the major crops that are grown in the region by its farmers. The farmers generally produce two types of crops, viz. (a) Food, crops and (b) commercial crops or non-food crops.

The study of these two types of crops would reveal the stage of agricultural development and the nature of the company. It is observed that the larger the area under commercial crops, the greater will be the development, indicating the larger scale mechanization in the agricultural sector. Food crop predominance is usually associated with subsistence farming.

The farmers in the area were cultivating mainly food crops like Jowar, Gram and Wheat before the establishment of the NSAI. A considerable area was also devoted to commercial crops. Although the farmers still produce food grains on large scale, the area under food grains has been reduced significantly. Due to the establishment of the NSAI and its adequate support to the member cultivators from cultivation to harvesting of sugarcane, the sugarcane is the most preferred crop in the area.

As mentioned in the earlier discussion, before the establishment of the NSAI the area under sugarcane was very small. The majority of sugarcane was used for gur (Jaggery) production, but as the prices of the gur fluctuated widely, the farmers were not interested in the cultivation of sugarcane. After the establishment of the NSAI, various facilities such as supply of fertilizers and improved seeds, availability of credit, technical guidance etc became available. Irrigation schemes have been promoted by the NSAI to provide additional irrigation facilities to number of villages. The cumulative effect of

these efforts is that there has been significant increase in the area under sugarcane cultivation.

The above discussion shows that non-food crops have increased their relative share in the gross cropped area. The evidence suggests a clear-cut shift from food crops to cash crops like sugarcane. This shift in crops, from food grain to non-food was mainly due to the higher price of non-food crops, commonly known as cash crops. It refers to a change from subsistence cropping to commercial cropping. Of these, the most spectacular increase is in the area under sugarcane cultivation.

6.2.13 Area under Sugarcane

Prior to the establishment of the NSAI, sugarcane was the least important crop in the area. Sugarcane was cultivated in 30-40 villages having assured water supply from rivers. The major portion of the sugarcane was utilized for 'gur' production and rest of the portion was supplied to the cooperative and private sugar mills. The price paid by the sugar mills was not remunerative and sugar production was not very profitable due to fluctuation in the price. Due to these factors, farmers were not interested in the cultivation of sugar cane. Under such circumstances, the NSAI began functioning in a small way. The establishment of the NSAI which gave adequate support to the members cultivators from the cultivation to the harvesting of the sugarcane in the form of provision of fertilizers, improved seeds, irrigation, pesticides, technical guidance etc. The assured market for Sugarcane due to increased crushing capacity of the NSAI, availability of loans from cooperative credit societies, remunerative cane prices paid by the NSAI etc. have attracted farmers towards cultivation of sugarcane.

On the basis of the planting season, there are three types of sugarcane cultivation found in the command area of the NSAI– preseasonal, seasonal and ratoon. The planting of preseasonal crop is done in July to August and the crop is grown for about 18 months and mature during the month of November of the following year. As the crop grows for a long period, it requires larger quantities of manures and more irrigation. Normally it is grown where there is assured

irrigation; such a crop yields more than 150 tonnes per hectare. The planting of seasonal sugarcane is done in December or January and crop gets ready after 12 months. This type of crop gives a good yield of more than 100 tonnes per hectare. The ratoon cultivation is raised on the stable of the harvested crop. In short, when the roots of the harvested crop are allowed to grow up for another crop it is called as ratoon crop. A good crop of this type gives yield of more than 80 tonnes per hectare. As most of the sugarcane cultivation in the command area depends on the tubewell irrigation.

Before discussing the increase in the area under sugarcane cultivation, it is to be noted that the biggest change since the establishment of the NSAI is that if small farmers have irrigation facilities, they are now growing sugarcane throughout the year. Sugarcane is now cultivated in all the villages of the taluka, tough there is considerable disparity in the distribution of sugarcane area from village to village. The area under Sugarcane has registered remarkable increase in the command area of the NSAI.

6.2.14 Improvement in Farm Implements

With the establishment of the NSAI and the consequent change in the cropping pattern, the method of cultivation also changed. The increase in income from sugarcane cultivation has promoted farmers to by modern machine to substitute traditional implements. The farmers have realized that the progressive agriculture is impossible without mechanization and consequently the cane growers are eager to adopt new techniques, making capital investment in modern farm implements.

The number of electric pumps increased considerably. Thus, at present oil engines are rarely used for lifting water. The number of electric pumps increased significantly due to rural electrification and digging of tubewells by the small and marginal farmers for cultivation of sugar cane.

The use of tractors for cultivation of land has been increased due to increase in cultivation of sugarcane. A tractor has become essential equipment for deep ploughing, preparation of furrows required for better sugarcane cultivation. It is also used for transportation of agricultural inputs and the

agricultural products. Most of the large sized farmers are taking them on hire from big farmers. The NSAI has maintained 7 Cane Cutting Machines, which are made available to the farmers as per their requirements. The NSAI has encouraged its members to invest in trucks and tractors by putting these vehicles to use during the crushing season for transportation of sugarcane.

The use of the iron plough is a common phenomenon for deep ploughing of land required for sugarcane cultivation. As a result there has been gradual increase in the number of iron ploughs. The number of tractors in taluka increased considerably. Assured market for sugarcane, increase in the income of farmers for sugarcane cultivation, financial assistance by cooperative bank and awareness of farmers in using mechanical power in field is responsible for the extensive use of tractors. The assured income from Sugarcane encouraged farmers to put huge investment into tractors. The increase in the number of iron plough; electric motors, trucks, tractors etc. indicate the dynamism in the activities of this sugarcane producing area.

In conclusion, the agricultural development programmes undertaken by the NSAI like supply of improved seeds, fertilizers, plant protection measures, soil testing, availability of agricultural implements provision of irrigation, credit facility, extension services etc. have promoted a large number of farmers to adopt improved agricultural practices. The NSAI has created a scientific environment, which effectively changed their attitudes of the rural population.

Due to their contact with NSAI, they became acquainted with improved seeds, fertilizers, modern methods of cultivation functions of cooperative societies etc. The attempts of the NSAI in providing irrigation facilities through promoting farmers own lift irrigation schemes. All these sources together have increased the irrigation potential of the area and have given resilience to the agricultural activities and minimized the impact of draught considerably. Despite the fluctuation in the cane area, it is seen that the area under sugarcane increased. On the contrary, the area under food grains, oil seeds and cotton decreased even after the increase in irrigation facilities. The adaptation of mechanical farming led to a decrease in the number of traditional

implements. The increase in the production of cash crop like Sugarcane led to increase in farm income and consequently investments at the farm level. A by-product of increased Sugarcane cultivation has been the significant increase in land values. The process of change in agrarian conditions and in the attitudes of the farmers is the outcome of the efforts of the NSAI for Agricultural Development of the command area.

6.2.15 Effects of the Sugar Factory on Farmers

In the earlier part of chapter, we have seen over all impact of the NSAI on its command area. It is true that the NSAI has accelerated the economic development in its command area. From the discussion it is clear that the change in the cropping pattern is highly remarkable in respect of sugarcane. Due to the efforts of the NSAI motivating the members to adopt the modern agricultural practices, almost all the farmers are now using fertilizers, improved seeds, pesticides, agricultural machinery, etc. However the farm practices are largely influenced by a number of factors like availability of assured water, size of holdings, economic conditions credit facilities, attitudes of farmers etc. The biggest change is that the small farmers having assured water are now inclined to grow sugarcane. The NSAI has not only created employment opportunities in the industrial units but created considerable employment potential in the tertiary sector also. An increase in the income by way of wages and cane price resulted into higher purchasing power for different goods and services. As a result over the years many farmers have diversified their occupations and entered in the world of business by starting family owned small business units. The change in cropping pattern in favour of Sugarcane has created additional employment in agricultural sector by providing work for more number of days to the agricultural sector by providing work for more number of days to the agricultural labourers. Without the existence of the NSAI, it is hardly impossible to initiate and implement number of irrigation schemes successfully and that too for the benefit of small and marginal farmers. The efforts of the NSAI in providing irrigation facilities have considerably increased the irrigation potential of many villages. In short, the NSAI has initiated the

process of “Green Revolution” in the agricultural sector of the command area by allocating sizable funds and putting in organizational efforts. The traditional and rather poor standard of living of the framers as well as rural community belongs to the area has experienced large change over the years.

The overall change in the economic position of the members of the NSAI is briefly explained in this chapter. In analyzing these aspects, the focus is to study the economic conditions and standard of living of the members of the NSAI and to measure the benefits derived from the NSAI. The information regarding the opinions of the members regarding the working of the NSAI has also been collected to judge its performance, from the viewpoint of its real owners. The information has been collected by carrying out a survey of 150 farmers who are the member of the NSAI.

On the NSAI site, at any time during the day, large member farmers are seen going to and fro in the office of the NSAI. They come to collect their cane payments, to confirm harvest schedule, to consult the administrative staff, to meet the Chairman or the Managing Director and officer staff. There is usually a group of farmers gathered on the campus. The information collected from the farmers was analyzed and accordingly further questionnaires were prepared for the survey. The questionnaires of the types were prepared for the interview one to be administered to the farmers and other to the Managing Director. The main survey was preceded by a small pilot survey in which the hypothesis of substantial impact of a sugar factory on rural economy was finalized. It was decided to follow the random sampling system for the survey.

From the different size groups of holding such as up to 2 hectares, 2.01 to 4 hectares and more than 4.01 hectares. This method is considered convenient and effective to contact 150 farmers, since the sample can capture a cross section of marginal, small and big farmers as well as old and new members of the NSAI from 15 villages and also farmers belonging to different castes, creeds and religions.

When the data on several matters was being collected from various departments of the NSAI farmers were interviewed with the help of

questionnaires as well as through the informal discussion. Every member was personally contacted for the purpose of study. An interesting feature is that almost all the respondents have participated in the interview and respond to all questions. Many of the sample interviews took considerable amount of time.

For the purpose of study, members of the NSAI were classified into the following groups according to their land holdings.

Small Farmers – Less than 2 hectares

Medium Farmers – 2.01 to 4 hectares

Large Farmers – more than 4.01 hectares

Since data collected is based on personal interviews, memory bias of the farmers in one of the important limitations of the study.

However, it is to be noted that an attempts has not been made to study the sources of income, expenditure pattern, standard of living of the members before the commencement of the NSAI, due to a longer reference period. Hence, some of the important changes that have taken place in the life of the members of the NSAI during the last 10 years were taken into consideration. It is hoped that this analysis will give a fair idea about the trend in the standard of living enjoyed by the members of the NSAI.

Some of the major findings from the survey are presented under the following heads :

6.2.16 Farming Practices

Since the mid 1960's traditional agricultural practices were gradually being replaced by the modern technology and farm practices in India. During the last few decades, the Agricultural Universities and various Research Institutions have developed number of improved seeds of various crops. In order to encourage the use of modern agricultural practice by the farmers effort are being made by the various government agencies. There is now a common belief that progressive agriculture is not possible without mechanization of agriculture. The animal and human power has been replaced by machinery. Tractors are used for ploughing. The combined harvest thresher and so on does

reaping and threshing. The old-fashioned wooden plough, sickles etc. have been replaced by machinery.

Here, an attempt is made to find out the extent to which the farmers of the area adopt the modern agricultural practices. Due to the extension in sugarcane area, the application of modern methods of cultivation has increased for various agricultural inputs. The increased income led the farmers to purchase modern implements of agriculture such as cane cutting machine, tractors, trucks, threshers, electric motors, submersible pumps etc. It has already been mentioned that the NSAI provides various services like supply of improved seeds, fertilizers, agricultural machinery and pesticides, soil testing, credit facilities, technical help and guidance etc. Due to the contact of farmers with the staff members of the NSAI the farmers became acquainted with improved seeds, fertilizers, modern methods of cultivation, functions of cooperative societies etc.

It is observed from the survey that all the farmers are using fertilizers, improved seeds of various crops, pesticides and owned essential agricultural implements like the iron plough, harrow, seed drills, electric motors, etc. Some of the medium and big farmers own tractors, trucks, threshers etc.

It is also observed that small and medium farmers still depend on the number of members than hired labours. The amount of labour thus depends on the number of household members working in agriculture. Small and medium farmers employ contractual labour for specialized operations, plus casual workers on occasional basis Annual contractual labours are less employed known as “Saldars”. There are four or even more annual contractual labours observed on few big farms. These Saldars get the security of fixed monthly wages ranging from Rs. 3500/- to Rs. 4000/-. The annual contract labourers are employed to carry out various farm operations, such as tending dairy cattle, housework etc. The contractual labourers are hired especially for cultivation of sugarcane as they are well experienced in, heavy specialized farm operations such as ditching planting, earthling up etc., on a pet acted basis. Such a team is called as “Toli”. These teams generally consist of 4-5 labourers. The

"Mukadam" of the labourers negotiates contracts with the cane growers. Labour cost of contractual teams is high as compared to that of daily labourers.

The farm practices vary according to the land holdings of the farmers. The adequate provision of irrigation change in cropping pattern, credit facilities, increase in the income etc. led a large number of farmers to adopt modern methods of agriculture, which resulted into increased agricultural productivity. Farmers can afford to hire labour for farm operations because of assured income from sugar cane.

As regard the attitudes of the farmers regarding sugarcane cultivations, it is observed that the area left for sugarcane cultivation by the small farmers ranged between 1-2 acres, 3-4 acres in case of medium farmers and 4-8 acres in case of large farmers. It observed that when cane prices fall, big farmers shift quickly over to other crops like wheat, soyabin, vegetables etc. But such a tendency is generally not observed in case of small farmers. The individual contribution of small farmers in sugarcane cultivation is insignificant; collectively they supply about 60 per cent of the total cane supply to the NSAI. Almost all the farmers have been attracted towards cultivation of sugarcane only due to availability of assured market for sugarcane with the establishment of the NSAI. Although the cane prices by the NSAI since last five years have been reported to be un-remunerative due to the increased cost of cultivation of sugarcane, about 40 per cent farmers were still of the opinion that the sugarcane is the only cash crop at present, from which they receive assured as well as lump sum payment. Similarly, uncertainty in the market conditions for vegetables and other crops cause the farmers to refrain from growing other crops. About 15 per cent of the farmers area of the opinion that sugarcane cultivation does not require much supervision as compared to other crops. Availability of adequate irrigation due to wells has also led most of the farmers to cultivate sugarcane. About 70 per cent of the farmers were agreed upon the statement that they have dug wells especially for sugarcane cultivation. Few farmers have also reported certain other incidents. The N-SAI did not harvest when the sugarcane produced by them in time and the farmers had to suffer the

loss. This was particularly so in the years when there was over-planting of sugarcane in the command area. Hence, reasonable assurance needs to be given to farmers, that their sugarcane would be harvested transported and crushed in time by the N-SAI.

The farmers could not obtain the information on the cost incurred on cultivation of Sugarcane because of lack of proper records and absence of accounts maintained by the farmers.

6.2.17 Changes in the Sources of Family Income

An attempt has not been made to quantify family income of the members because most of the farmers could not provide reliable information about their annual income. The purpose is only to consider changes in the sources of income of the members during the last two decades. The sources of income are divided into following six types:

1. Agricultural income
2. Labour – The holders of dry land and small landholders get less income from land, so they have to work as labourers on farms of the large farmers and thereby get wages to satisfy basic needs and to maintain their standard of living.
3. Job – Here, job income means the income from employment in the sugar factory, banks, educational institutions, dairies, private business enterprises and so on. These institutions have come into existence especially due to the establishment of the NSAI and thus, some members of the families could get job in these concerns.
4. Business Income- Business income means income derived from running family owned small business units like grocery shop, vehicle repairing shop, cloth shop, general store, flour mill etc.
5. Dairy Income- Income from dairy means income by supply of milk to dairies.
6. Other Income – It includes income received from hire charges of agricultural implements like threshers, tractors, trucks etc.

The Dairy farming is an important source of income of all categories of the

farmers. All the farmers take advantage of growing network of cooperatives for collecting processing and marketing of milk. The number of small farmers engaged in dairy activity increased considerably in the case of medium farmers. It increased from 4to 12 and as regards big farmers it increased from 5 to 10. Thus, large farmers participate in dairy activity is higher than that of other farmers. There has been a considerable increase in the number of farmers engaged in dairy activity from 20 per cent to 40 per cent during the last ten years.

Another source of income to the farmers is the hire charges on the use of agricultural implements like threshers, tractors, trucks etc. Some medium and large farmers won tractors and trucks. They receive income from hiring tractors and trucks, whereas the medium farmers hire threshers, bullock carts etc. of the total about 12 per cent farmers get income through this source.

Thus, it can be concluded that the occupational diversification has opened more sources of non-agricultural income. There has been considerable increase in the last 10 years in the number of families, who are getting non-agricultural income. Some families, which previously had subsidiary occupations, expanded their occupations and some families have newly entered into these occupations. Thus, it is evident that setting up of the NSAI has brought about substantial changes in the rural occupational structure. It generated multiple occupations in the rural area, which were taken up as subsidiary occupations by large number of farmers in addition to their agricultural occupation. The dependence on a single occupation declined considerably.

6.2.18 Changes in Expenditure Pattern of Sample Households

It is true that the existence of the NSAI stimulated the cultivation of sugarcane and raised agricultural income of farmers. Due to increase in the agricultural income as well as from allied occupations, there has been change in the expenditure pattern of the farmers during the last 10 years. Besides spending reasonable amount on clothing, food, education, medicine, travelling, entertainment etc., The farmer are now spending for productive purpose like

betterment of land, bringing additional land under irrigation, purchase of cattle and agricultural implements etc. Some of the large and medium farmers are spending extravagantly on occasions like births, marriages, festivals and other religious ceremonies.

The change in the pattern of expenditure over the last 10 years of the surveyed farms has been summarized in brief under following heads.

1. Expenditure on Land Development

It was observed that several farmers have spend considerable amount on development of land such as land leveling, deepening old wells, digging new wells, purchase of electronic motors and submersible pumps, pipe lines for irrigation land etc., As sugarcane is a water-consuming crop and income per unit of land from sugarcane is much higher as compared to other seasonal crops, many farmers have made huge investments in brining additional land under irrigation, especially for cultivation of sugarcane. Though canal irrigation is available in certain parts of the command area, due to uncertainty in the supply of canal water, several farmers had also invested in their own tube wells and submersible pumps because of the rising ground water levels. It is also seen that in case of small farmers 30 per cent have spent on land leveling, 70 per cent have spent on deepening of tubewells or digging of new wells and for purchase of electric motors. In the case of medium farmers 35 per cent have spent for land leveling and all farmers have spent for irrigation purposes. The proportion of large farmers is higher in spending for land leveling than others. Thus, it can be concluded that almost all the farmers have made efforts for land improvement with the main objective to raise agricultural income by cultivation of sugarcane.

2. Purchase of Land

In general the land market is tight in the area. This is the result of greater economic security to most of the farmers due to a ready market for sugarcane, provided by the NSAI and also due to high price of land. At present, the price of an acre of land having canal irrigation has reached Rs. 1000000 to Rs. 1500000. Even then it is observed that during the last 10 years, 8 per cent of

small farmers, 6 per cent of the medium farmers and 10 per cent of the large farmers have purchased land. Thus, out of the total surveyed farmers around 24 per cent have spent on the purchase of land.

3. Deposits in Bank

All the farmers are familiar with naming transactions, as the NSAI followed a policy to pay cane price through cooperative banks located in various villages. All the cane cultivators have opened saving accounts with the local banks, which has led them to develop saving habits.

4. Construction of House

During the last 10 years, 30.33 per cent of the small farmers, 40.03 per cent of the medium farmers and 50 per cent of the large farmers have spent on construction of pucca houses. Some of the large farmers have constructed bungalows.

5. Purchase of Vehicles

Factors like increase in trade and commerce, construction of link roads, employment opportunities etc, have led to an increase in the traffic. Apart from contact with the office of the NSAI, the contact of farmers with nearby cities and with the institutions like banks, cooperative societies, government departments etc has been increased. Under such circumstances vehicles have became a necessity for the farmers. Trucks, tractors, jeeps, cars, motor cycles indicate the pulsating activity of this Sugarcane producing area. It is seen that almost all the farmers have spent on purchase of motorcycles, while 20 per cent of the large farmers have spent on purchase of cars during the last ten years.

Thus, it can be concluded that due to increase in the income of farmers, their pattern of expenditure has under gone a change. Now, the farmers are spending both on productive purposes as well as on luxuries.

6.2.19 Changes in the Standard of Living of Farmers

It is an accepted proposition that with an increase in income the standard of living also improves. Whether this has happened in the case of farmers who had increased income after the establishment of sugar factory can be discovered through indicators as change in the housing conditions as also

the changing nature of household equipments. After establishment of the sugar factory, the farmers contact with the nearby cities increased. Some farmers built houses at taluka places and at district places. Those who could not afford the construction of good houses in the cities built houses in villages. This analysis will give a brief account of their standard of living.

A) Housing Conditions

A certain minimum standard of housing is essential for raising the quality of life. For good housing various amenities like water supply, ventilation, latrines, bathrooms, lighting, roads etc. are essential. Generally, it is observed that in rural areas, the houses are lacking in basic amenities mentioned earlier, though there is no space problem for construction of houses. On the whole, the concept of housing is limited to the idea of mere provision for shelter. Today, housing means the provision of comfortable shelter and such surroundings and services as would keep a man healthy and cheerful. On this background, for the purpose of this survey, the houses are classified into the following three categories without taking into consideration the built up area of the houses.

1. Well Built House or Bungalows

These houses are having four or more rooms. These houses are built in bricks with cement plastering and having a cement concrete roof. These houses have a good design and layout and the amenities like water supply, ventilation attached latrines and bathrooms etc available in these houses. These houses may be called Bungalows.

2. Medium Houses

These houses are built of bricks and cement and have cement concrete roof or roof covered with corrugated iron plates. Except bathroom no other amenities are available in these houses.

3. Kuccha Houses

These houses are constructed with bricks and clay and do not have any amenities.

Thus, it can be concluded that the proportion of well built and medium

houses have increased in every category of farmers while the proportion of kuccha houses has decreased. In short, due to increase in the income from Sugarcane cultivation and in the allied occupations, most of the farmers are living in houses in good conditions rather than kuccha houses. From the survey it was found that all types of houses are electrified.

B) House Equipments

The standard of living of a family can be ascertained on the basis of the houses in which the family lives and the types of household equipments, they use, such as equipments of efficiency, comfort and luxuries. Once the income of the family increases, it is expected to spend some part of the income on comfort and on items of luxury. In the survey the farmers were asked about the items of household equipments other than utensils in their houses. The proportion of the families of cultivators in different size groups of holding having various types of household equipments.

1. Table

Out of the total families surveyed, 11.11 per cent of the families from the three size groups of holdings were having a table before the establishment of sugar factory.

2. Chair

Previously only 10.7 per cent of the families were having chair now, this proportion has increased to 70 per cent. The percentage of families having such furniture is quite high in the case of small and big farmers i.e. 70 per cent and 90 per cent respectively.

3. Fan

Prior to the establishment of the sugar factory, there was no family using fans, but now out of the total, 81.60 per cent of families own fans.

4. Radio and Tape

Prior to the establishment of the sugar factory, 29.8 per cent of the families had radio sets. Now the per cent has increased to 88.26 per cent.

5. Television Sets

Only few families had a television set prior to the establishment of the

sugar factory. But after the establishment of the sugar factory almost all of the families have Television sets.

6. Fuel Gas

Only few families had Fuel gas prior to the establishment of the sugar factory. But after the establishment of the sugar factory 61.3 per cent of the families have Fuel gas. The families using Fuel gas area from all the categories of farmers.

7. Refrigerator

Only few families of the farmer had a refrigerator prior to the establishment of the sugar factory. But after the establishment of the sugar factory 20 per cent of the large farmers have a refrigerator each.

8. Air Cooler

Before the establishment of the sugar factory not a single family had an Air Cooler. After the establishment of the sugar factory only 10 per cent families own Air Coolers. The families are from the large category of farmers.

9. Telephone

Prior to the establishment of the sugar factory, there was no telephone facility in any of the homes. After the establishment of the sugar factory, the percentage of the families having telephone including mobile phones are 98 per cent in the case of small, medium and large farmers.

10. Two Wheeler

Previously there was limited number of families possessing motorcycles. Now large number of families posses them. The families having motorcycle are comparatively more in the case of medium and large farmers, as is to be expected.

11. Jeep and Car

Before the establishment of the sugar factory, very few families had jeeps. After the establishment of the sugar factory the per cent of the families owing jeeps and cars increased rapidly.

Thus, from the above discussion we can say that the traditional or the rather poor standard of living of the members of the NSAI as well as the rural

community in general belonging to the operational area has undergone tremendous changes over the years. The farming community, which lived on consumption of poor varieties of cereals with little intake of fruits, vegetables and nutritive diet, today they have accessibility to all type of nutritive food. There are tremendous changes in the consumption pattern, which is largely related to increase in the income levels of the farmers. The poor peasants who lived in Kuccha houses without electricity, inadequate drinking water, poor facilities of transportation and communication, today own pucca houses or even bungalows fully furnished with all modern amenities of life viz. attached bathroom, latrines, dining table, sofa sets etc. Education facilities, both technical and non-technical, are now available at the NSAI site.

There are changes, which have taken place in living style of the farming community because of the establishment of the NSAI.

6.2.20 Advantages of the Sugar Factory

We know that the establishment of the factory or a firm in a particular region, giving the region some advantages directly or indirectly. After the establishment of the sugar factory the farmers in the region were also benefited in several ways.

The advantages of the sugar factory received by the farmers are as follows.

1. Improvement in Transport and Communication

The sugar factory has constructed new roads for the transportation of sugar cane, thereby connecting villages with the cities. The bus services and transport by other vehicles like motorcycles, scooters, trucks, tractors etc have increased a lot. New post office and telephone offices have been opened in this region, about 87.23 per cent of the farmers have reported the advantage of better transport and communication.

2. Adequate and Timely Loans to Agriculture

The farmers were dependent mainly on the cooperative credit societies before the establishment of the sugar factory. Now some branches of other banks like the State Bank of India, Bank of Maharashtra, Latur District central

cooperative Bank have started their branches in the region. Apart from this, the factory has been advancing loans and advantages to the Sugarcane cultivators. The agriculturists in the region get loans from these banks. 94.24 per cent of the farmers have reported about getting these advantages.

3. Inspirations for High Agricultural Yield

Irrigated agriculture and modern method of farming have been introduced to the region to a great extent after the establishment of the sugar factory. The factory arranges demonstrations of fertilizers and irrigation and organizes competitions for the high agricultural yields. In this way, it is found that the factory has been inspiring the farmers towards high agricultural yields. About 76.17 per cent of the farmers have been inspired by the sugar factory to attain higher yields as reported.

4. Timely Availability of Agricultural Inputs

Some private and cooperative supply agencies of agricultural inputs have come into existence after the establishment of the sugar factory. As a result, the farmers can get agricultural inputs in time. About 60.66 per cent of the farmers have reported this advantage.

5. Changes in Subsidiary Occupations

Due to the establishment of the sugar factory; the immigration of labour has increased in this region. The increased income of agriculturists and non-agriculturists has increased the demand for necessities of life and of agricultural inputs. This has provided new opportunities to the farmers for the new subsidiary occupations. About 10.00 per cent of the farmers have started subsidiary occupations.

6. Increase in the Trade and Commerce

The increase in income of the people and, immigration of labour into this region, establishment of new institutions like Banks, Cooperative Credit Societies, Dairies, Alcohol factories construction of new roads and the increase in the transport agencies have all helped in promoting trade and commerce. About 80.63 per cent of the farmers have reccieved advantages of the increased trade and commerce.

7. Availability of Service

Due to the sugar factory, some private and public institutions have come up. Some persons from the cultivator's families could get jobs in these institutions. Similarly many of them have been observed in the services of the sugar factory. About 44 per cent of the families have been thus benefited.

8. Availability of Education Facility

The factory has been providing financial assistance to educational institutions. The factory has also started one more primary school on the factory site. Thus, due to the financial assistance from the factory, these educational institutions are running satisfactorily. The children of the farmers can take education up to graduation with much smaller expenditure on education as compared to education in cities. This advantage is reported by 35.00 per cent of the cultivators. Now a school is also running on the factory site as well!

9. Medical Aid

The sugar factory has started a dispensary of medical services on the factory site. The farmers from the surrounding villages can get cheap and timely medical help. Prior to the factory, there was not a single dispensary in any of the village. As a result, all the people in the region had to run to the taluka place or to any other city to get medical aid. Now, from the survey, it is revealed that at least 15.66 per cent of the families are making use of the medical facilities provided by the factory in addition to their usual practice of going to other places, i.e. taluka or the cities.

10. Provision of Agricultural Implements by the Sugar Factory

It has already been mentioned that the sugar factory provides tractors and bulldozers for cultivation of land and for its development. About 29.15 per cent of the farmers have benefited from these facilities.

11. Benefit of New Schemes Launched by the Factory

The factory bas been initiating and conducting many schemes for the benefit of the farmers like soil testing, lift irrigation, provision of tractors and trucks through banks, supply of improved seeds and fertilizers, etc. About

73.43 per cent of the families have reported this advantage. Thus, with the change in cropping pattern, income of farmer from land has increased. Their total income has also increased due to the increase in the sources of additional income, such as the subsidiary occupations, agricultural equipments and services. Not only money income but also the real income of the farmers has increased after the establishment of the sugar factory. The money income and the real income of their farmers in the third and the fourth categories, has increased more than the money income and real income of the farmers from the first and second categories.

Due to the increase in the income of the farmers their housing conditions have also improved and their ability to purchase the household equipment has increased. Therefore, the standard of living of farmers also has been raised.

Apart from this, the expenditure pattern of the farmers can afford expenditure on the development of land and for the purchase of the shares of Cooperative Credit Societies, Banks, and of the Sugar Factory. Now the farmers can also spend on the construction of houses furniture etc., and can yet save a part of their income.

6.2.21 Opinion Regarding the Performance of the NSAI

The main objective is to assess the performance of the NSAI from the view point of its real owners i.e. members. The opinions of the farmers were collected with help of specially designed questionnaire.

From the survey it is observed that all farmers are of the opinion that due to establishment of the NSAI, their financial position has improved. They also agree with the statement that the NSAI has acted as a nucleus of socio economic development of the area. About 86.40 per cent of the farmers were found to be attending the general body meetings. This level of the participation shows that members are actively participating in the affairs of the factory, the employees cooperative with them. The chairman, M.D. and Administrative Staff provide them with necessary help and cooperation. They are available to answer question, deal with complaint and generally ensure that members are satisfied. About 60 per cent farmers were found to be ignorant about the

problems and difficulties of the day to day organization. NSAI has also made a series of social investment through specially constituted funds for undertaking development programmes. The price paid for Sugarcane is the major factor used by the members to evaluate the performance of the NSAI. All the farmers are not very much satisfied with the recent cane prices'. They were of the opinion that neighbouring factories are paying higher price than NSAI pays those. Most of the members know that which of the nearby factories have paid higher cane prices and which have paid less than the NSAI. About 40 per cent of the farmers expect that the NSAI needs to pay at least Rs.2500 to 3000 per tonne of sugar cane, while about 50 per cent expect the cane price to be more than Rs.2200 to 2400 per tonne of Sugarcane in the prevailing situation to meet increased cost of Sugarcane cultivation.

Despite several complaints by the members, one thing is quite clear from the discussion with members, that due to establishment of the NSAI, there is a phenomenal change in the surrounding area from the point of agricultural, industrial and cultural development, educational awakening, health consciousness and social and economic progress.

6.3 Impact of NSAI on Employment

6.3.1 Introduction

Due to increasing pressure of population on land, the agricultural sector has become over crowded. The seasonal character of the agricultural operation has resulted in an uneven distribution of labour. This waste of labour is primarily due to enforced unemployment and under-employment that exist side by side in the rural area. The agriculture sector is unable to provide continuous work enough for the year. Broadly speaking, Indian farmers remain without any work for about 4 to 6 months in a year except in those places where they have undertaken the cultivation of irrigated crops or where they grow more than one crop in a year. The unemployment in rural areas results in the strain of poverty amongst small and medium farmers. The only solution to the rural unemployment is to divert the rural people to non-agricultural sectors. Through the plan documents and Industrial Policy Resolutions have laid stress on

decentralization of industries by the promotion of agro based industrial units, rapid strides could not be made on this front. The large-scale industrial units come to be made on this front. The large-scale industrial units tended to concentrated in urban centres and even the modern small-scale industrial units tended measures through which decentralization of industries can be achieved is the promotion of agro-based industrial units in rural areas. Economists on various ground advocate the setting up of agro-based industrial units. The existing unemployment and under-employed rural population to urban centres can be prevented. The locally available human and neutral resources can be utilized for the improvement of the income levels of the village economy. These units not create employment in the industrial sector but also in related sectors, such as agricultural and tertiary sectors. In these sectors there are virtues that merit the location of agro-based industries in rural area.

The sugar factories by virtue of their location in rural areas and cooperative character have helped the most desirable process of diverting a part of population from the already overcrowded agricultural sector to industrial sector. These factories have integrated industry with agriculture in the life of the people in rural areas. The sugar factories have not only introduced new technology in the villages but also the optimum utilization of local raw material and manpower. The sugar industry is a labour intensive industries, the production process of sugar industry is simple and requires mostly unskilled and semi-skilled workers and few skilled workers to perform various mechanical operations. Normally, a sugar factory provides employment to nearly 800 to 1200 workers with in the factory. However, during the crushing seasons, which usually extends up to six months, a sugar factory provides employment to nearly 2200 to 2500 people, why may be landless labourers or subsistence farmers from the neighbouring areas. With the setting up of allied industries around the sugar factories to utilize by products have also created additional opportunities of rural employment. Thus the farmers from the villages are getting an additional source of wage income, which is needed to raise their standard of living and help them tide over difficulties caused by the failure of crops.

6.3.2 Direct Employment

6.3.2.1Employment in the NSAI

It is the fact that there is no other large-scale industrial unit for employment opportunities to the people of command area, except the NSAI and its allied units. The employment due to the NSAI was available to the rural people of the surrounding village since its erection during 1999-2000. The NSAI had been erected under the supervision of experts. During the period, about two hundred workers were recruited temporarily for the construction and erection work. The NSAI started in 1999-2000, since then, it has created a new hope for employment among the educated and uneducated people of surrounding area. The factory started with about 200 workers in the first crushing season. There after due to its expansion and diversification of production, more and more workers were needed for the NSAI. Whenever the additional vacancies were created, the management recruited the workers. The selection of the employees in the NSAI was done through the selection committee of the Chairman, Vice-Chairman, M.D., Labour Officer and Departmental heads. The small and medium farmers are benefited mostly by the employment in the NSAI. Except few workers, all the workers are from the command area.

The workers employed directly in the NSAI have been classified into the following four categories on the basis of the nature of their employment.

1. **Permanent Workers**

The workers are engaged on permanent basis and employed throughout the year irrespective of duration of crushing seasons.

2. **Seasonal Permanent Workers**

It is well known fact that sugar industries is a seasonal one and hence some workers are employed only during the period of crushing season, varying according to the supply of sugar cane. Generally, the crushing season lasts for about six months. These workers are also permanent and get full wages during the period of their employment in crushing season. During the off- season, when there is no work for these workers, a Retaining Allowance is paid according to the recommendations of the Sugar Wage Board. It is a sort of compensation to these workers during the off-season. The NSAI maintains a

register of seasonal workers, which includes their names, address, rate of wages, etc. At the beginning of the season, the NSAI serves a notice to all its seasonal workers regarding the date of starting of crushing season and if they join on the side date, they are appointed for that season. They are discharged at the end of each crushing season.

3. Temporary Workers

The temporary workers are appointed for a temporary period and discharged immediately after the expiry of that period. These workers are generally appointed in the factory premises or for the outside care procuring centres on the basis of daily wages.

The direct employment effect of the NSAI can be easily summaries with the help of information and data obtained from the official records of the Labour and Timer Offices. When the NSAI was started with the crushing capacity of 1200 tonnes, very few members of workers were employed. In 11 departments of the NSAI, 185 permanent and 356 seasonal workers were employed. Initially, most of the experienced technical employees were appointed to carry out the production work from outside the command area. But with the passing of the days, outside employees were gradually replaced by the local workers in the subsequent years.

The NSAI had expanded its production capacity from 1200 tonnes to 3500 to 5000 tonnes and 7500 tonnes in present. Due to increase and diversification of production the NSAI needed more and more employees. The increase in the number of membership and area under sugar cane cultivation has resulted into increase in office and administrative work. The NSAI has created separate sections for the efficient implementation of a various department schemes e.g. Agri Development Department has been established to manage the irrigation schemes, construction of roads, K.T., Weirs and percolation tanks. Agricultural Development Department has been established to carry out Agricultural Development activities, and so on. The overall effect was the increase in the number of employees from 544 in 1999-2001 to 976 in 2012, which accounted for an increase of 79.41 per cent over the year 1999-

2001. The data also shows that out of a total of 923 employees, 80 are permanent workers, whereas 543 are seasonal workers. Thus, in the employment pattern of the NSAI shows that permanent employment increased significantly and accounted for about 40.7 of total employment. Seasonal employment accounted for about 48.63 per cent. The period of seasonal employment fluctuates as the length of the crushing season varies every year depending upon the supply of sugar cane. The seasonal and temporary employment provided by the NSAI for about 6 months is the secondary occupation of hundreds of marginal and small farmers in addition to their regular occupation.

6.3.3 Employment in Harvesting and Transport of Sugarcane

Thousands of labourers are provided with additional employment in cutting and transporting sugarcane from the fields to the NSAI site. These are seasonal contract labourers engaged for 6 months in harvesting and transporting of sugar cane. The number of labourers and working days depends upon the availability of sugarcane in a particular crushing season. These workers are generally found in a family unit, consisting of two men, one woman, two bullocks and a cart. The men cut the sugar cane, the woman clean, bundle and load it in the cart or truck and the men drive the cart to the NSAI site. Each unit is paid on the basis of the weight of the sugarcane and distance to be transported.

These labourers work on contract basis and are recruited by the contractors, known as ‘Mukadams’. The mukadams are guarantors to the NSAI for assured supply of required number of labourers at the right time. The mukadams arranges for payment of wages to harvesting workers from the NSAI after deducting his commission.

These workers migrate seasonally to the NSAI from dry villages in the Beed, Dharur and Jamkhed talukas of the Ahmednagar district, and also from other districts like Aurangabad and Jalna. However a few labourers from dry villages in the Osmanabad and Latur, Deola and Kej and Ambejogai taluka are also engaged seasonally in this activity. Most of the harvesting workers are

small and marginal farmers forced to migrate seasonally to the NSAI site due to reasons like poor employment opportunities at their native places, small land holdings, drought conditions, outstanding debts, attraction of free fodder for animals etc.

The harvesting workers organized themselves into a state level union. As a bargaining tactic, the union frequently organized strikes at the start of the crushing seasons, the result is that there has been significant increase in the wages of harvesting workers. At present, tripartite committee appointed by the state government, which renews the rates regularly and finalize the award based on committee's recommendations, is regulating the rates for harvesting and transporting sugar cane. Once the agreement is finalized, it applies to all factories in the state.

The NSAI has generated employment in harvesting considerably. As the duration of crushing season in 1999-2000 was of 87 days, NSAI has generated good enough man-days, of work for hravesting labourers. The number of jobs and working days depend upon the availability of sugar cane in particular crushing season. In conclusion more and more employments opportunities are made available for the harvesting labourers due to change in the sugar cane supply.

6.3.4 Wage Structure of Workers

Prior to 1960, the Minimum Wage Act governed the wage in sugar industry. There was lack of uniformity regarding wage scale and other amenities for sugar workers on an all-India base. The central sugar wage board was appointed in 1997 by the government of India so as to bring about uniformity in wage scales in the sugar industry throughout the country. The recommendation of the First Sugar Wage Board was given effect to in 1960. Since then, the sugar workers are getting wages according to the recommendations of Sugar Wage Boards, appointed from time to time by the government. The wage rates for sugar workers are determined by the Sugar Wage Board for the four regions i.e. Central, North, South and Maharashtra. The rates of wages are fixed on the basis of duration of the crushing season, sugar recovery and cost structure etc.

It is necessary to discuss the wage structure of the workers employed in the sugar factory to examine their level of income. The wage scale determines the purchasing power as well as the standard of living of the workers. At present, the NSAI is paying wages and salaries to its workers as per the recommendations made by the Fourth Sugar Wage Board, 1998.

Apart from the basis wages the workers get other allowances such as dearness, house rent, medical and washing allowances. There has been an automatic increase in dearness allowance due to rise in the price index.

Thus, an important point to be noted here is that about 50 per cent of the workers are unskilled and semi skilled, who are drawn from agricultural labourers from neighbouring villages.

By comparing the wages of agricultural labourers in command area, with those of unskilled workers employed permanently or seasonally in the NSAI, it is observed that the wage rate for unskilled workers in the NSAI is more than double the prevailing daily wage of about Rs. 40 in the agriculture.

Thus, due to better employment opportunities in the NSAI, the status of agricultural labourers has been improved because most of the unskilled workers are drawn from that of ordinary agricultural labourers.

6.3.5 Labour Welfare

If the super structure of industry is to be built on sound foundation then a genuine interest in all round well-being of its employees is essential. There have been laudable attempts in the past to look to the welfare of the employees. But unless these attempts were actuated by more sympathy and new outlook, the aim of welfare work will not succeed.

There is no another aspect of welfare work, which is expressed as “to cultivate industrial welfare is to cultivate efficiency.” But if it is understood and practiced under this influence only without an insight into the feeling and needs of workers welfare work may not serve its purpose.

Apart from the salaries and wages it is also necessary to study the various facilities provided by the NSAI to its workers, some of these facilities are obligatory under the provision of The Labour Act. So far as working conditions inside the factory building such s sanitation, temperature and

ventilation, drinking water toiler, lighting, canteen, rest shelters etc. are concerned, the NSAI has fulfilled the maximum legal requirements.

Since the inception of the NSAI it has made all possible efforts for the betterment of workers and to keep them satisfied by providing wide range of facilities like education, sports, health care, recreation and worship etc. A brief account on this aspect is presented under the following headings.

1. Housing Accommodation

The NSAI has provided housing accommodation to the officers and workers by constructing bungalows and quarters. The quarters are built up with all facilities like drinking water, electricity, roads etc. The accommodation is provided in exchange of house rent allowance.

2. Educational Facility

For the education of workers' children the NSAI has started a pre primary school, a primary school, a high school and public school, in the NSAI campus. All these educational institutions are managed and financed by the NSAI.

3. Medical Aid

The NSAI has marinated a well-equipped dispensary with qualified and experienced doctors and other staff. In this dispensary, facilities for the treatment of minor diseases are provided at reasonable rates to workers and their family members.

4. Consumer Stores

The Central Cooperative Consumer Stores is functioning at NSAI site. The store deals in a wide range of consumer articles, groceries, textile, readymade garments, cosmetics, kerosene, sugar, fertilizers, and all other necessary commodities for the employees and farmers for day to day needs. It sells goods at reasonable prices to the workers of the NSAI even on a credit basis.

5. Canteens

The necessity of a canteen and dining room in factories, guest houses is recognized by the state. The canteen is a vital link between work and rest. In

case of workers it is an urgent need, without which work would suffer. The NSAI started a canteen for the benefits of its employees. The canteen caters for snacks and tea over and above meals in afternoons and nights.

6. Recreational Facilities

Work must be followed by recreation the absence of which may result in fatigue and version for work. If the workers are unable to refresh them, it is bound to affect their mental and physical health, which may result in lower production, more accident discontent, and the quality of output. The NSAI provided facilities for indoor games like carom, table tennis, as well as outdoor games like volleyball and cricket. In addition, library with a reading room is also provided for workers and their families. Various religious and cultural programmes are regularly arranged on the NSAI site. Eminent scholars are frequently invited to deliver talk to enlighten the workers about the current issues in their socio-economic life. 'Bhjanas', Kirtans', etc. are also conducted for spiritual and intellectual development of the workers and other people through entertainment.

7. Availability of Food Grains at Reasonable Rates

The NSAI has opened a fair shop at site. The workers get food grains like Wheat, Jowar, rice and Sugar at reasonable prices. The NSAI also supplies sugar to permanent workers and seasonal workers at concessional rates. For this purpose, it has opened a separate sugar sale centre at the site.

8. Vegetable Market

The NSAI has provided open space for a vegetable market near the factory colony. Many farmers from nearby villages sell their vegetables, fruits, milks etc in this market. Thus the workers get fresh vegetables and fruits daily.

9. Family Pension Schemes

To provide for long-term financial security of the families of workers, the NSAI has introduced family Pension Scheme. Financial support is provided to the family members of the deceased workers at a prescribed rate per month.

10. Bonus

The NSAI pays bonus to the workers as per the payment of Bonus Act

1965 amended from time to time. The minimum bonus to be paid according to the Act is 8.33 per cent of salary and wages. It is the bonus, which provides monetary relief to the workers as it supplements their cash wages once in a year.

11. Workers Participation in Management

Full-fledged participation by the workers in management is possible only through their representation on the Board of Directors. The NSAI has followed a policy to nominate two representatives of workers on its Board of directors. The elected representatives of workers are acting as worker directors and participate in the proceedings of the board meetings on par with other directors. The worker directors serve as a link between the workers and the management. This system of participation has protected the interests of the workers and has created a sense of security among the workers of the NSAI.

12. Workers Training

To impart part time training with the objective of improving the knowledge and skill of workers employed in the NSAI, training courses of three months duration are conducted in the evening at the site.

6.3.6 Indirect Employments

As discussed in this chapter the NSAI has provided employment to large local unskilled, semi skilled workers drawn from agricultural sector. The higher level of incomes of these workers led to a substantial change in the economy of the area. In view of the fact that a greater part of income is likely to be spent on the NSAI site; the development of the tertiary sector was encouraged and the employment. The change in the cropping pattern of the command area in favour of sugarcane has opened additional employment opportunities in the agricultural sector. Thus, the NSAI has not only created employment in the industrial sector but also in related sectors, such as the agricultural and tertiary sectors.

The indirect employment effects of the NSAI are extensive because there has been significant increase in the economic activity in the whole command area due to establishment of the NSAI. Hence the indirect employment effect has been particularly covered in the study. With the

establishment of the NSAI, indirect employment is generated in two sectors viz. the agricultural sector and the tertiary sector. Here the tertiary sector broadly includes the business units and other institutions, which came into existence after the setting up of the NSAI.

6.3.7 Employment in Business Activity

It is mentioned that, with the establishment of the NSAI, many self employed traders and businessmen migrated to the NSAI site to meet the rising demand for various goods and services. The number and diversity of shops expanded near the NSAI colony. The expansion of business activity is stimulated by the growing income of farmers, agricultural labourers and factory workers and also due to greater variety of their needs and requirements. There is considerable increase in the employment in such smaller business unit over the years. Each type of business adds to employment and income of the household. There is considerable increase in the employment in those businesses, which require specialized skills in the workers, e.g. cooks and waiters in hotels are required to cook and serve the food, in tailoring shops skilled persons are required to cut and stitch the clothes, in vehicle repairing shops, experienced mechanics and workers are required for repairing of the vehicle's in engineering workshops welders and fitters are required and so on. Such skilled workers are now getting employment in the command area of the factory with included growth of the commerce and business.

Though most of the business units are totally managed by the family members it is observed that one an average 1 to 2 persons are employed in small business units while the number of workers varies in between 3 to 5 in big business units. As mentioned, number of business units has come up in and around the site. These business units have provided self-employment to around 200 persons. These workers are mostly landless labourers of having small, un-economic and un-irrigated land holdings in surrounding dry villages. These workers are getting a monthly salary ranging from Rs. 5000 to Rs. 10000 depending upon the nature and size of the business unit. Thus the total

employment to more about 300 persons has been generated in the business activities around the NSAI site.

6.3.8 Employment in various Organization and Institution

Number of institutions and offices like workers credit society, trade union, banks, telephone offices, post office, Petrol and Diesel Pump, etc. came into existence on the site with the establishment of the NSAI. The employment opportunities available in these institutions are the indirect employment effect of such institutional development. The information regarding the number of persons were employed in these institutions has been collected form annual reports and through the interviews with the management authorities of the institutions.

6.3.9 Employment in Transportation and Construction Activity

The NSAI has to employ trucks for about six months for transporting sugarcane for each crushing season. The NSAI has encouraged its members to invest in trucks, tractors by engaging these vehicles in crushing season for transporting sugarcane. During crushing season, the truck/tractor owners are paid on the basis of weight of sugarcane and distance transported. During the off-season these trucks are engaged in transporting other goods.

It is generally observed that each truck provides employment to two persons i.e. to a driver and a cleaner. From the records of the Agricultural Department it is noticed that there are about 269 trucks in the crushing seasons. Thus, it can be said that about number of persons are getting employment in truck transportation activity. Due to increase in economic activity, there has been significant increase in the number of all types of vehicles in transportation of goods and passengers, repairing and maintenance of vehicles is incalculable.

Under the diversification programmes of the NSAI, as well as with the expansion of economic activities, a lot of new construction works emerged of the scene. The NSAI site which was a barren tract has grown into a small well planned town, that more so with the expansion of educational and health facilities. During span of the 10 years, the NSAI site has boomed with a rapid growth in trade and commerce, transport, construction etc. the population at

NSAI site is rapidly increasing due to availability of amenities like roads, electricity, banks, educational institutions, medical facilities etc.

The progress in the surrounding area had made such visible impact that the cost of land is now reached up to Rs. 200 to Rs. 300 per sq.ft. This is an indication of growing urbanization and economic prosperity around the NSAI campus. The increasing construction activity has provided employment to large number of skilled and unskilled workers.

Likewise, the infrastructure development by the NSAI is also another steady and continuous source of generating for local skilled and unskilled workers. The infrastructural development in the form of roads, minor irrigation schemes, leveling of land, electrification, construction of the building of offices, godowns, educational institutions, staff quarters, etc. has created employment opportunities to the needy labour. The employment generated in construction activity is incalculable.

6.3.10 Employment in Agriculture Sector

It is well known that the number of agricultural labourers are mostly depends on the cropping pattern. The cultivation of Jowar, Grams, Soybean, Wheat, oilseeds etc. do not require much hired labour for the farm operation, because subsistence agriculture cannot absorb large number of labour throughout the year. Sugarcane crop remain in field from 10 to 18 months, while the duration of other crops is only 4 to 5 months. As such it requires labour over several seasons for various farm operations like ploughing, harrowing, manuring, riding, furrowing, planting weeding etc. in addition labour is need to every 10-12 days for irrigation. The increase in area under sugarcane in command area has resulted into an increase in agricultural labourers.

Prior to the establishment of the NSAI, the sugarcane was the least important crop in the area and it was concentrated only in 15 to 20 villages with assured canal water. With the establishment of the NSAI, there has been considerable change in the cropping pattern and sugarcane has become the most preferential cash crop. The old sugarcane cultivators have started sugar cane cultivation on large scale and thousands of new sugarcane cultivators

entered in the field. Villages where sugarcane never grew prior to establishment of the NSAI are now under cultivation of sugarcane. The farmer having source of irrigation have become the members of the NSAI and started growing more sugar cane. There has been remarkable increase in the number of producer –members from 1999 to 2010. Apart from this there are about 4000 to 5000 cultivators who are not members of the factory. Every big farmer certainly grows more sugarcane and earns a large income from it. The marginal and small farmers earn less income, but the NSAI help in making them viable. However, it is to be noted that the expansion of sugarcane area is not mere event occurring by chance but it is the rewarding accuring very strenuous efforts on the part of the NSAI, as it is providing numerous facilities to the cane cultivators.

In conclusion, more and more employment opportunities are made available for the agricultural labourers due to change in the cropping pattern in favour of sugarcane cultivation.

Apart from the increase in employment in agricultural sector due to increase in sugarcane area there has also been a considerable increase in the demand for agricultural labourers due to extension in irrigation facilities. Due to extension in irrigation, farmers could make additional investment in cattle, farm implement and more valuable crops, like sugarcane. It enabled farmers to use land for more than one crop, which could otherwise not be cultivated efficiently during the period of insufficient rainfall.

The Directorate of Economics and Statistics, Government of Maharashtra undertook the study in 1990, to evaluate the performance of the rural landless employment guarantee programmes implemented in the state from 1983-84 to 19888-89. The study revealed that the additional area brought under irrigation through minor irrigation schemes had created additional employment to the extent of 47 man-days per hectares for the agricultural labourers.

The NSAI has also helped in increasing wages in agriculture sector due to increased demand for unskilled workers in the industry and for cultivation of

sugarcane. Moreover the minimum wage is unenforceable for labourers actually get a minimum daily wage of Rs. 200 for men and Rs. 150 for women depending on the nature of work and season.

Taking all transaction into account, it can be concluded that the change in cropping pattern has been found favorable for agricultural labourers. More and more agricultural labourers are absorbed in the agricultural sector due to increase in sugarcane area, extension in irrigation, livestock development etc. The agricultural workers are now engaged in work for more number of days and economically they are placed in a more sound position than before.

6.4 Overall Change During Last Ten Years

We have discussed the economic impact of NSAI on agricultural development in its command area at length. This chapter is devoted to the spread effects and back washes effects of NSAI on its area of operation. These positive back wash and spread effects of NSAI can be seen through rural infrastructure development such as adoption of new technology in agriculture, irrigation, rural roads and transport services electrification, education and school enrolment and rural housing.

Spread effects, on the other hand, can be seen through growth on industries trade and commerce, employment opportunities and money income we shall discuss this backwash and spread effects of NSAI in its area of operation.

6.4.1 Infrastructure Development

Though the concept of infrastructure has been extensively used in the literature on economic development, yet it has been explicitly defined in precise and generally acceptable manner. A number of interchangeable terms, such as, social overheads etc. have been used to denote services which are generally indentified with infrastructure.

The doyen of Indian Economists, Professor V.K.R.V. Rao has made a very exhaustive categorization of factor of production that constitutes infrastructure. He had divided these factors into nine broad categories as given below:

1. Transport - Road, Transport Equipments, Railways Airports, Shipping ports.
2. Communication - Posts, telegraphs, telephone and cellphones etc.
3. Energy – Electricity, Gas, Bio-Gas oil etc.
4. Intermediate Goods output –Minerals, Metals, Chemicals, Machinery
5. Science and Technology- Basic and applied research laboratories, teaching etc.
6. Increasing Productivity of Natural Resources-Reclamation of land, irrigation, drainage, high yielding bovine forests etc.
7. Finance and Banking –Saving institutions credit and lending institutions capital market etc.
8. Information system – Mass media, libraries , exhibition, books
9. Human Resource Development –Drinking water, Public Hygienic, Family planning, Medical Facilities, Education etc.

Thus in wider sense, the term infrastructure of all public services from health to transportation; communication, power and water supply as well as the agricultural overhead capital as irrigation and canal system.

The role of infrastructure in initiating and accelerating the process of economic development has been well recognized both by the economists and planners. The development plans in India are largely concerned with the building up of infrastructure for creating the necessary pre conditions of economic growth. An investment in infrastructure is also being used as the major strategy for promoting the development of backward regions. However, in India expansion of infrastructure like roads, electricity, drinking water, health and education facilities etc has been largely concentrated in urban are and which also developed into area of social tension. The improvement in urban infrastructure attracted millions of unemployed to big cities, which offer than only slums or pavements. For the rural area, relatively a little attention has been paid by the government for developing infrastructure facilities that has become a great constraint on further growth of our economy.

Besides the government’s efforts, the NSAI has also undertaken number

of welfare activities like provision of irrigation, construction of roads, education, medical services, drinking water, etc. like other factories it has also made a series of social investments, which have not direct pay off in terms of its own profits. Deductions from the cane prices are approved at annual general body meeting. This is a convenient and effective way to raise funds for various welfare activities as each one rupee deduction raises lakhs of rupees, since the members and non members provide many tones of cane every year, from these specially created funds, the NSAI undertakes various welfare activities for the benefit of people in the command area, for example, agricultural development schemes are undertaken through the sugarcane development funds and so on.

NSAI has created eight types of funds and contribution collects large amount through the deduction per tonne of cane crushed every year. The total amount raised towards these funds was Rs. 322.52 lakhs, of which Rs. 179.97 raised for the Area Development Fund, amount Rs. 88.36 lakh for Sugar Cane Development Fund.

The Area Development Fund and Sugar Cane Development Funds are the most important funds because they are utilized for multiple purposes while the remaining funds are utilized for the specific purpose like Earthquake fund, V.I.S.fund, Chief Minister's Fund and Small Scale Saving Fund. The Area Developments are Rs. 179.97 lakhs, accounted for 55.80 per cent of the total fund, and Sugar Cane Development Fund amount to Rs. 88.36 lakhs, accounted for 27.40 per cent of the total funds.

From the very beginning, the NSAI has given high priority to infrastructure development to accelerate the economic growth of the command are and has been allocating considerable amount of funds to this activity. The approach and strategy adopted by the NSAI is reflected in the development of major hands of infrastructure development in the rural areas regards the priority among the different items of infrastructure, irrigation has been given top most priority followed by education, construction of road, and health. For agricultural sector, the role of irrigation is self –evident. The development of roads, communication has been regarded as essential for travelling of bullock carts and trucks from sugar cane fields and also for agricultural and trade

development. The education has an important role in improving the quality of human life and socio cultural atmosphere of the region, likewise, health and drinking water are so the most important social inputs. The backward villages have been identified and a deliberate policy has been followed by the NSAI for developing infrastructure in these villages for removing imbalance apart from the quantitative improvement in social activities like education, health etc.

Due to initiative taken by the NSAI there has been an extensive development of infrastructure facilities in command area operation over the years. The following heads have studied the infrastructure development efforts of the NSAI.

Rural Roads

It is utmost important factor for every sugar factory to obtain a regular supply of fresh sugarcane throughout the crushing season. Sugarcane is to be transported to the factory in the shortest possible time because delay in the same reduces the recovery percentage. Hence, the roads in the rural area call for a special attention for the quick and cheaper transportation of sugarcane.

The Government of Maharashtra sanctions certain amount of grants to the cooperative sugar factories of constructing the road in their jurisdiction. These grants are sanctioned from the sugarcane purchase tax collected from the sugar factories.

As per the District Census Report 1981, it is revealed that 139 villages were not approachable by the Pucca road all seasons, which account for about 87 per cent of the total number of villages in Kalamb taluka. The NSAI has created separate section in the civil works department to look at the construction in the interest of the NSAI to facilitate easy and speedy transport of sugarcane through bullock carts and trucks from any sugarcane fields in any of the villages in the command area to the NSAI site. This activity has also contributed to the socio-economic development of number of villages. However, it is to be noted that the NSAI has constructed the roads in the taluka in only those villages where the link roads are not constructed by the government agencies.

The road constructed by the NSAI have been divided into the following three categories by taking into consideration the material used for construction

1. Non-metalled roads- these are fair weather Kuccha roads constructed with the help of "Murum"
2. Metalled roads- The surface of these roads is made of metal.
3. Tar Roads- These are all season (Pucca) roads, the surface of these roads is made of metal and tar.

The construction of these roads has benefited 84 villages which accounted for 49 per cent of the total number of villages in the taluka. This clearly reveals the drastic change that has taken place in respect of the road development in the taluka due to the effort of NSAI. Due to development of these link rods in the taluka, many villages connected to each other through transportation and communication, which in the case of the rural area is one of the essential conditions for socio-economic development.

To keep the roads in good condition, the NSAI has made investment in rubber tyre carts for transportation of sugar cane. These carts have at least two advantages, first, they can carry a much efforts by the bullocks and second, they do not destroy the roads, which wooden carts did it to a greater extent. These carts are fitted with steel wheels and running on ball bearing. To replace the traditional wooden carts, the NSAI took concrete steps in this direction in 2001. NSAI has introduced 100 rubber tyre carts, during the crushing season 2001-02 starting with initial twenty carts, it increased the fleet to 456 in 2009-10, and to 617 in 2011-12. The rubber tyre carts helped considerable in keeping the rural roads in good conditions. Thus the introduction of rubber tyre carts can be considered to be a radical change in the transportation of sugarcane.

Irrigation

NSAI has taken initiative in providing additional irrigation facilities with the basic objective of strengthening the agricultural base and create self sufficiency in respect of sugarcane production. So far, the NSAI has organized for construction of 7 percolation tanks and repairing on canal schemes, for which had invested Rs. 8 lakh in 2000-01. As most of the farmers have to

obtain water from well to raise the ground water table to supplement the well irrigation, the NSAI has constructed percolation tanks in command area. The lift irrigation schemes (own farmers) have benefited to 5200 hectares land of 34 villages. All these sources together have increased the irrigation potential of Kalamb taluka by 17357 hectares by the end of 2009-10. Apart from the government's efforts the NSAI has made substantial contribution in minor irrigation projects in the expansion of irrigation. Thus, much more area is now under assured sources of irrigation. It is these devlopements in irrigation facilities enhanced sustainability of agriculture and minimized the impact of drought and scarcities.

Housing

The housing problem occupies an important place in the list of industrial labour problems as habitation comes next only to food and clothing. The working conditions and hours of work have direct association with the efficiency of workers, but housing condition affect the health, moral and efficiency of the working force to a great extent. To promote industrial housing in the state, Government of Maharasthra has finalized subsidized Industrial Housing Scheme in 1952 in pursuance of the recommendations of the Central Government. Under these schemes, the government agreed to give subsidy upto 25 per cent by means of loan repayable in fifteen annual installments. The management of the NSAI showed interest in the subsidized Industrial Housing Scheme in 1983-84, so far as Scheme is concerned, it came forward with greater enthusiasm to construct house for factory workers under government scheme. There has been substantial progress witnessed as the scheme had good response from the management of the NSAI.

The NSAI constructed 110 quarters for workers 2001-02 onwards. The details regarding houses built by the NSAI are:

The c type quarters are allocated on to the officer's denoted as Managing Directors, Works Manager, Civil Engineers, Chief Agricultural Officer, General Secretary, and Chief Chemist. There is a small garden with fencing in front of each quarter. D type of quarters are generally provided to

supervisory staff, skilled workers etc. Each house contains three rooms, bathroom and attached latrine. E and F type of quarters are generally provided to Clericals Staff, Agricultural Assistant and other workers etc.

Thus, the NSAI has constructed 130 houses for its workers. The total investment in this activity is a mounted to Rs. 88.89 lakh. The housing accommodation provided to the workers can be said adequate on the ground that most of the workers are drawn from agricultural sector and living in their own houses in nearby villages to look after their farming and other occupations.

The housing accommodation provided by the NSAI is comfortable and hygienic, with water supply, road, streetlight, drainage, playground, recreation, health and education etc. In conclusion we can say that the provision of comfortable housing and such surrounding and services provided by NSAI has helped in keeping the workers healthy and cheerful and there by motivated them to exert greater efforts towards the improvement of industrial production.

Education

Literacy and education is the primary need for social improvement and economic development of a country. Unless people are literate, educated knowledgeable, they will not be able to participate intelligently and effectively in any social, political or economical development. In spite of the remarkable progress in the field of education in India, it is observed that education facilities are mostly concentrated in urban areas, while in the rural areas people find it difficult to access to modern discipline.

In 2001, the facility of secondary education was available in 31 villages out 173 villages of Kalamb taluka. Thus, about 64 per cent villages had no facility of secondary education. As a result majority of children were unable to continue their studies beyond primary level. Under this background, the NSAI thought of establishing a separate education trust to provide educational facilities to the children of the farming community, landless labourers workers etc. This trust was sponsored by the NSAI.

6.4.2 Objectives of the Education Institutions

The Education Institutions has been established with a view to carry out the charitable objects viz. educational activities in the area of operation of the NSAI.

The objectives of the Education Institutions are as follows :

a. To run, maintain and regulate institutions, imparting education at all levels with a view to build up good citizen.
b. To encourage and facilitate the study of educational problems and research in command area of operation.
c. To carry out educational propaganda by means of literature publications, exhibitions etc.
d. To conduct Boarding Houses and Hostels for the students attending the schools from nearby areas.
e. To start libraries and reading rooms

Progress

By realizing the crucial importance of the education in the socio economic development of the area, the NSAI has initiated a good network of educational institutions. Due to efforts made by, primary, secondary ashram school and public school have came at the NSAI site. The position about the number of primary, secondary and public school run by the NSAI through the Education Institutions has consistently maintained a record of excellent results of examination.

Communication System

Communication means the imparting or transmission of information. Quick communication of information is necessary for development of industry, commerce and trade. Though there has been rapid progress of telephone facilities over the last few decades in India, the most important point is that these facilities are concentrated mainly in urban areas. Communication facilities in the rural areas are extremely inadequate besides being inefficient.

The wireless communication system can be usefully adopted in sugar industry for increasing productivity. There is great scope for the use of wireless

system for sugar factories; its rural usefulness lies in rural area where other communication facilities are still under developed. For the NSAI, cane supply is available from areas lying within a radius of about 40 km. as the sugarcane land holdings are small, the NSAI has to deal with a large number of farmers. The senior officers of the NSAI are stationed in the factory campus whereas field staff of the agricultural department is located in each division of the cane area. The field staff comes in regular contact with the sugar cane farmers. They help the cane growers in the cultivation of cane by rendering necessary advice for maximum yield with a view to ensuring regular supplies of bounded cane to the NSAI. Whenever there is any breakdown in the machinery the field officer may have to be contacted without any loss of time for instructions to stop cutting of cane. If this is not done immediately hundreds of tonnes of cane moved to the NSAI would get dried up at the cane yard, resulting in loss of weight, while a decline in source content would mean lower production of sugar. The use of telephone or telegraph system whenever it is available, takes considerable time for contacting the field staff and conveying to them message for stopping harvesting and for recommending cutting of sugarcane. A loss of about Rs. 700, which is the average current cane price paid by the NSAI is caused to the farmers for every one tone of cane lost due to drying.

The Census Report of 1991 shows that out of total 173 villages in the taluka, 48 (27.25 per cent) villages have some kind of post and telegraph amenity and 125 (72.25 per cent) villages do not have such facilities. Hence, it is clear that communication facilities are extremely inadequate in the taluka.

On this background, the NSAI has installed wireless system in its command area in 2001-02. The wireless system was installed with an objective to increase productivity and to avoid considerable losses to the cane cultivators. As there are many restrictions on the use of wireless in the country, the NSAI has installed this system with the prior permission of the wireless planning and co-ordination wing, New Delhi. The wing performs all functions relating to section of site for wireless station and issues licenses for establishment and maintenance of working of wireless station in the country. The main station located at the NSAI site has been linked up with twelve sub stations. These sub

stations are installed in different agricultural zones of the command area of the NSAI. Wireless system help the NSAI to keep close co-ordination and continuous supervision on harvesting and transportation of sugar cane and thereby ensuring regular cane supply for production. This communication system has been found very useful for the NSAI as well as for the large number of the farmers of all kinds of messages can be continuously sent to a vast number of people in short possible time.

6.4.3 Effects on Industry, Trade and Commerce

The present population of "Ranjani village", the NSAI site is about 3602. The NSAI has constructed 110 quarters for its workers and 9 bungalows for its officers. During the crushing season about 6500 workers from other areas are migrated seasonally for harvesting and transportation of sugarcane. On NSAI site at any in a day, large number of farmers are observed going to and from in the administrative offices. Due to these factors the number and diversity of shops expanded in and around the NSAI campus. Heavy traffic on Vinchur-Praksha State Highway crossing the NSAI site has also stimulated the trade and commerce around the NSAI site.

The NSAI has provided all basic amenities like open space, building, electricity, water supply, etc. and supported in number of ways the growth of other co-operative institution in the NSAI site. The NSAI has also contributed certain amount of share capital of these cooperative institutions. The NSAI site like consumer stores, workers credit society supply, transport trading etc. as a result the NSAI site has boomed in the last few decades with rapid growth of trade and commerce.

An attempt has been made in this chapter to analyze the impact of the NSAI on industry, trade and commerce. Here, the industrial development means the setting up if ancillary units by the NSAI to utilize the by-products, while trade and commerce development means the growth of financial, trading transport organizations like banks, consumer stores, credit society, truck transport society, etc within the NSAI campus.

Ancillary Units for Utilization of By-products

The increasing use of science and technology has been continuously exploiting natural resources for industrial growth. In ht e process of development, huge quantities of industrial by products or waste are generated. Their disposal has proved to be uneconomic and hazardous in creating environmental pollution in certain industrial sectors. It is be noted that waste material or by-product can be profitably recycled and utilized for creating more wealth and generating more employment opportunities especially in rural area. In the modern world of competition, proper use of by products is often regarded remunerative for certain industries. “It is well said that rich industries make their country rich by utilizing profitably their wastes, on the other hand the poor industries keep their country poor by not utilizing their wastes profitably”. Utilization of by-products is the most important factor to strengthen the economy of sugar industry, as it plays an important part in determining the margin of profits and its further development. Rational utilization of by-products will help to lower the cost of production of sugar and open new avenues of foreign exchange earnings through exports. The by-products of an industry are those substances, which emerge in the process of manufacture of the main product.

Three important by products of the sugar industry are Bagasses, Molasses and press mud. Bagass is the residue from cane elect after extraction of juice by milling or diffusion. Molasses is dark brown coloured viscous mass out of which further crystallization of syrup is not possible by ordinary means. The production of by-products varies from season to season depending on the quality and variety of sugar cane crushed. Bagagases is accounted for 30 to 35 per cent. Molasses is accounted for 3 to 4 per cent and press mud is accounted for 3 to 5 per cent of cane. Though there are number of possible use of by-products, in India, only 4 to 5 types of products are being produced from sugarcane.

Proposed Plants

The NSAI has proposed to set up a plant for producing Extra Neutral

Alchohol from the rectified spirit. The daily capacity of this plant is of 30000 litres per day. The state government has given sanction to this plant in 2002-03. The Maharasthra Rajya Sahakari Sangh, Mumbai, also took the decision regarding purchase of machinery and the contract for purchase of machinery has been made with M/s Chemical Consultant and Engineers, Pune. The plant has started its production in 2003-04.

Business Development in and around NSAI Campus

Here, the business development means an increase in the number of family owned shops and other occupations. As mentioned dealer, the expansion of business activity is stimulated by increase in population on NSAI site, growing income of farmers and workers, and the greater variety of their needs. For example, essential commodities, medicines, clothing, repairing and maintenance of vehicles etc became essential services and due to which large number of businessmen migrated on NSAI site to meet the rising demand for new additional services. A monthly wage bill of about 44.92 lakhs of the NSAI is the major cause for such development as greater part of wage income is likely to be spent on the NSAI site. The rapid growth of business is an indication of growing urbanization and economic propriety of the NSAI site. The data on this aspect has been obtained by survey based on the spot observations and by taking informal interviews of businessmen.

The number of business in and around the NSAI the large number of retail shops dealing in various commodities have came up at the NSAI site. The list of business shows that all types of shops from grocery shops have came into existence. The retail trades are mostly engaged in grocery shops, general stores, cloth, electrical appliances, household appliances, hotels etc. The number of Pan-bidi shops is significant with the spread of education and setting up of educational like primary school, high school,, public school in the NSAI campus, the book stall and stationery shops came into existence. Due to increase in the standard of living of workers and farmers, the demand for electric fans, television sets, tape recorders, irons, water heaters, table lamps, cables and other electrical goods have increased and shops of this kind have

come up. To meet the growing demand for building material consequent upon the general increase in construction activity around the NSAI site, the shops dealing in hardware and building material have been started. The phenomenal growth in the number of bicycles, motor cycles, scooters, tractors, trucks, jeeps, cars has led to an increase in the number of vehicle repairing and automobile shops. Apart from the petrol pump managed by NSAI, there are other on diesel pumps owned by the NSAI.

Due to increase in the income of people by way of payment of cane price to the famers, salaries to the workers of the NSAI and wages to agricultural labourers, there has been increase in the demand for goods and services in the taluka. As a result, the business activity in the whole taluka flourished considerably with the establishment of the NSAI. Many farmers have diversified their occupations and entered in the world of business by starting family owned small business units in their respective villages and some of them have also started business units at NSAI site. The income from business constitutes a good proportion in the total income of several farmers.

All the business men have been benefited a lot due to the facilities like telephone office, banks, post-office, electricity, roads, hospitals and schools etc. which are available only due to the establishment of the NSAI.

Thus, it can be concluded that the last few decades saw the establishment of several business units at the NSAI site and a marked change could be seen now in their structure, composition and size.

Increase in Bank Credit

Due to the establishment of the NSAI the economic activity has boomed at the NSAI site with a rapid growth in trade, transport, construction etc. Shri Sai Gramin Bigar Sheti Sahakari Patsnatha', and NSAI Multistate Co-operative Credit Society Ltd. catering to the requirements of all the shareholders, farmers ,needy parsons and employs of the NSAI in the area of operation, it has opened its branch at the NSAI site in 2003. This society is working satisfactory and was awarded as 'Adarsh Patsanstha' and given first prize. In the year 2011-12 it is having Rs. 2162.29 lakh capital and loans distributed Rs. 1814.44 lakh and recovery of loans is about 99.79 per cent. The profit of society is Rs.

148.94 lakh and distribute 15 per cent dividend to the shareholders. The business development around the NSAI campus, establishment of number of cooperative institutions and other organizations die to support of the NSAI, increasing income of the farmer and workers. Policy followed by the NSAI to pay cane price to the farmers through bank, huge working capital requirements of the NSAI etc. have stimulated the banking transactions.

Bank Loans to the NSAI

An important of the NSAI is the increase in the bank credit as the District cooperative Bank and other banks and financial institutions through its branch at NSAI site provides the huge amount of working capital needed for the NSAI. The importance of an adequate amount of working capital lies in the fact that as the volumes of business over the years increased and huge amount of working capital is needed for the NSAI to meet the increased bills of wages and to maintain a higher inventory level. The bank provides the working capital to the NSAI by sanctioning cash credit, the head office of the Osamanabad District Central Co-operative Bank to enable the NSAI to release its funds locked up in the stores sanctions hypothecation credit limit. The most important great volume is the finance of pledge credit on sugar stored in the godowns of the NSAI. The head office according to the directives of the state cooperative bank determines the terms and conditions for providing these loans to the NSAI from time to time. The District Central Co-operative Bank through its branch functioning at the NSAI site disburses all these loans to the NSAI.

The NSAI is regularly borrowing large amount of loans to meet it s working capital requirements from the cooperative banks since its inception.

Recovery of Agricultural Loans by the NSAI

As a part of cane development programme to ensure steady flow of required quantum of sugarcane from the command area, the NSAI has provided due attention towards the supply of credit to its member cultivators. The sugarcane being expensive crop, the cane cultivators require capital for various purposes such as, to meet the labaour charges, purchase of seed and fertilizers, hiring charges of farm implements, pesticides, etc. Due to increase in the area under sugarcane, there has been continuous rising demand for agricultural

finance from the cane cultivators. As most of the member cultivators of the NSAI are small and marginal farmers, they do not have capital of their own.

The short-term financial requirements of the cane cultivators of the NSAI are met through loans borrowed from the primary Agricultural Credit Societies and from the Nationalized Banks. At present 70 primary Agricultural Credit Societies are functioning in area of the operation, 15 Nationalized Banks viz. State Bank of India, Bank of Maharashtra, Dena Bank and their branches are also providing crop loans to cane cultivators. Initially the NSAI was also supplying sugarcane finance to member cultivators. The primary Agricultural Credit Societies and Nationalized Banks are providing short-term finance to cane cultivators in collaboration with the NSAI. If the cane cultivators in a village need credit he applies to the concerned credit society in the village. These societies have direct contacts with the cane growers who are their members. The cane cultivators have to obtain certificates from the Agricultural Department of the NSAI regarding the area under sugar cane registered on their names with the NSAI for the ensuring cursing season. The NSAI undertakes a gurantee of recovery of loans taken by the member cultivators, through their cane price. At present, the loan per acre of sugar cane is advanced to cane cultivators depending upon the type of cultivation, i.e. preseasonal, seasonal and ratoon. The Co-operative Credit Societies and Nationalized Banks send the lists specifying the name of member cultivators who have taken the loans, amount of loan and interest thereon to be recovered etc. This facility helps the cane cultivators in getting loans quickly and the Co-operative Credit Societies and Nationalized Banks are also assured of recovery of loans. The Agricultural Department and Cane Accounts section of the NSAI are dealing with this facility.

The quantum of loans recovered by the NSAI is financed by the Co-operative Societies and Nationalized Banks during the last decade. The quantum of loans advanced by Nationalized Banks as observed was much larger during the period 2000 to 2010. The fluctuations in the amount of loan recovered and that of in the number of cane cultivators from whom loans

recovered is due to the variations in the cane area over the years. The Osmanabad District Central Co-operative Bank is also encouraging the Credit Co-operative Societies to advance more and more credit for extending the area under sugar cane cultivation in the district and thereby supporting the sugar industry.

6.4.4 Management

A board of Directors manages permanent and seasonal workers societies. At present, the Board constitutes 11 members, of them 9 board members are elected amongst the members of the societies. The NSAI, from the members of board, nominates two members; Chairman and Vice Chairman are elected. The nominated members are neither allowed to hold the Chairmanship nor even vote for the election of the Chairman. The Board of Directors make all policy decisions in accordance with the guidelines laid down in the by-laws. The two clerk and two manual staff handle the daily routine work. Thus the total members of staff of the permanent and seasonal society are four.

Types of Loans

The societies are advancing loans to the permanent and seasonal workers employed in the NSAI. The societies are advancing of a loan to its members only as general loans. The General loan given to seasonal workers is up to Rs. 25000 and for permanant workers is up to Rs. 50000. The maximum limit of these loans for seasonal workers is Rs. 25000. The loans advanced by the society are fully recovered regularly by the NSAI for monthly wages of the workers. The General loan is recovered in 60 equal monthly installments. The rate of interest charges on these loans depends upon the interest charged on cash credit by The Osmanabad District Central Co-operative Bank.

6.4.5 Social Welfare Service

Welfare facilities rendered by the NSAI find their inspiration in the by-laws as one of the objectives of the NSAI is “to undertake all such activities as are conducive to all round development and welfare of the people residing in the command area”. In the initial period most of the activities were undertaken

for the benefit of members only. However with the advent of its diversified activities, people now reap benefits in general. Over the years, the management of the NSAI has initiated many welfare activities with great enthusiasm. It has provided leadership and utilized huge resources for the betterment of rural community.

The financial burden of such welfare activities is borne by the entire membership of the NSAI through the voluntary deductions to specially create fund namely Area Development Fund, from the cane payments. The welfare department of the NSAI is responsible for formulating welfare policies and programmes besides coordinating, guiding and promoting implementation of the welfare activities.

The following are some of the important social services rendered by the NSAI over the years.

Entrepreneurship Guidance Cell

During the last few decades, large number of first generation entrepreneurs has emerged in India. They have achieved spectacular growth in industry, trade and commerce. Some of them have created everlasting impact in their respective fields and made inroads into the most competitive market. However, a review of the emergence and growth of the entrepreneurship in the country suggests that by and large these entrepreneurs had either their origin in urban area or access to a favorable business climate. As such the spontaneous emergence and sustained growth of entrepreneurship among rural people has been rather limited. There has been a growing realization at policy level that rural poverty and unemployment cannot be mitigated with wage employment alone. The permanent solution to the rural poverty is to promote self-employment in rural non-farm sector, which in other words, would mean entrepreneurial development among the rural youth.

The NSAI has initiated a scheme for guiding new entrepreneurs. It formed “Entrepreneurship Guidance Cell” in 2002-03 at NSAI site. This cell has been organizing entrepreneurship development programme with the help of D.I.C. Nationalized Bank and Government Agencies for young rural

entrepreneurs intending to become self-employed. Projects for self-employment are discussed and prepared by the youth with the help of welfare officers of the NSAI. Five Nationalized Banks have been involved in this scheme right from the beginning that is identification of beneficiary, the, trade and the project. The adequate knowledge and information about government policy, rules and regulations of banks, sources of raw material, marketing formalities of licensing, technical guidance etc. is provided by Welfare Department of the NSAI and also by arranging camps for educated unemployed persons. In case camps, the officers of D.I.C. Nationalized Banks employment exchange and expert from industry and trade guide the entrepreneurs.

Rural Development Cell

Rural development is a continuous process. This process can be facilitated with the interest, initiative and active participation of the people in rural areas. The external agencies including government agencies have to create a conductive environment for facilitating this process. Some of the ingredients of this environment are education and training of rural people, to create awareness in them about the need for development, to handle the new situation and technologies with confidence, to prepare them to better practices and make them available the necessary inputs including financial infrastructure.

The establishment of the NSAI has already had a very substantial socio economic impact on the environment with the setting up of the NSAI, a number of employment opportunities have been locally generated, the economy of the neighbouring area has been upgraded and social amenities have improved and are available for increasing number of people in the area. As a part of total effect of improving the socio-economic environment, the NSAI has set up “Rural Development Cell” to undertake socio-economic action in the surrounding villages. It is the fact that the leaders of the villages in the taluka seek advice from the management of the NSAI for solving their local problems and hence the perceived relationship between the NSAI and villagers is an important factor in motivating the entire village community. Under this circumstance, the management of the NSAI thought to deploy its managerial

and organizational capacity to find solutions to rural problems. The implicit reason is that the NSAI can penetrate deeper into surrounding villages. The establishment of the Rural Development Cell has encouraged several villages for implementing rural development programmes more effectively and speedily, of course, with the help of government agencies.

The dedicated staff members from the Welfare Department of the NSAI manage the cell. The main objective of the cell is to inform people about the various schemes of the government agencies, helping in preparing application, motivating people to organize for group action, offering follow up and liaison services etc. The cell is also engaged in submitting proposals to the government officials for various rural development schemes like 20 point programmes, Jawahar Rojgar Yojana (JRY), Integrated Rural Development Programme (IRDP), Programme for Development of Women and Children in Rural Area (DWCRA) etc. The cell has maintained all the details of several schemes of government in its office technical assistance is provided to people who do not know and understand the schemes of the government and benefits of the same. An important point to be made here is that the overall responsibilities for formulation and implementation of particular scheme is resting with the government officials and the participation of cell is only supplement to the efforts of the government towards rural development. It is assisting in implementing government schemes in the taluka. The cell is lending a helping hand to the government officials in implementing rural development schemes in the area. The main activities and achievements of the cell are mentioned below:

1. The cell has conducted a preliminary survey of forty-seven villages in the taluka to identify and suggest specific schemes to the government agencies.
2. It has arranged village-wise “Gram Sabhas” in the presence of government officials, where in various schemes were discussed.
3. It has assisted forest department in planting trees at suitable places, especially in the surrounding areas of the percolation tanks constructed by the NSAI.
4. It has made efforts in popularizing gobar gas and improved “Smokeless Chhulhas” in the rural areas.

5. With the help of district Rural Development Agency (DRDA), Osmanabad the cell is successful in obtaining sanction for construction of village tanks to store rainwater.
6. The sericulture programme was taken up as a new venture with the aim of supplementing the farm income and to provide additional employment to rural people. The cell is conducting sericulture-training programmes in the village.
7. It has provided support and necessary help to voluntary organizations, sport clubs, youth clubs, mahila mandals etc. working in the taluka.
8. To promote entrepreneurship among rural people, it arranged entrepreneurship development programme with the help of government officials.
9. By maintaining continuous contact with Gram Panchayats and discussions with Sarpanchas, Gramsevaks etc, the NSAI encourage them to undertake development activities like construction of houses, providing drinking water, construction of latrines, etc. for the people belonging to scheduled castes and scheduled tribes.
10. Efforts are made with the help of Khadi and Village Industries Corporation (KVIC) to improve the economic condition of the rural artisans.

Thus, the Rural Development Cell established by the NSAI has been continuously helping the government agencies in providing guidance to the people, which is not normally available under government programmes. The cell tried in its own way to fill in this gap. It has created an atmosphere of close cooperation between rural people and the government officials and awakened consciousness in the people and made them articulate for needs, which they had not felt before.

Contributions to Relief Funds

The management of the NSAI has shown throughout an outstanding sense of national consciousness, which is revealed through its whole hearted participation in government programmes and cooperation during times of cries. During natural calamities, the resources of the NSAI have been useful for

organization relief and other activities. Whenever, there are natural calamities like cyclone, flood, famine earthquake in any part of the country, the NSAI had raised relief funds to help affected people. Apart from this, every year Re. 1 Per tonne of cane crushed is collected for the Chief Ministers Fund.

Financial Assistance for Social Work

Financial assistance is provided often to social organization working in the taluka. Some of the important organizations are Mahila Mandal, Health Club etc. The NSAI also encourage these organizations to arrange social and cultural activities for the benefits of people.

Afforestration

With a view to maintain environmental balance the NSAI has planted thousands of trees on vacant land near the factory colony, roads, offices, schools, percolation tanks etc. The NSAI has maintained 2.45 hectares of nursery to supply trees, plant at reasonable rate. Over the years, more that 1790 trees plants were supplied to the farmers.

Chapter VII

SUMMARY, CONCLUSIONS AND SUGGESTIONS

7.1 Summary

A private sugar factory in the rural area or any agro-based large-scale industry related to sugar factory is looked upon as dynamic growth centre. Therefore, the study of the socio-economic impact of a sugar factory assumes great significance. Sugarcane is a cash crop and the main input for a sugar factory. Therefore, the establishment of a sugar factory increases the economic importance of sugarcane cultivation. It induces increased irrigation facilities, leads to better cropping pattern and thus increases sources of incomes and standard of living of the farmers in its area of operation. With increasing incomes from sugarcane cultivation, farmers invest in modern agricultural equipments and adopt modern methods of cultivation. The change in the cropping pattern in favour of sugarcane creates substantial addition to employment in the agricultural sector. Further it also gives seasonal employment to thousands of harvesting and transport workers during the crushing season. The establishment of the NSAI, provides jobs to many unemployed youth. Their incomes and standard of living also rise. Then it opens up avenues for various businesses and occupations on the NSAI site itself, which increases their incomes and standard of living.

The establishment of a sugar factory leads to installation of Distillery plant, compost fertilizer plant, co-generation plant etc. Further the existence and operation of the factory develops infrastructure facilities such as construction and maintenance of roads, education, housing facilities for the sugar factory's employees, communication system, health and medical facilities, petrol pumps, bus stop etc. Then the factory can create a Development Fund from the deductions made from the farmer's sugarcane bills, and use it for social welfare activities such as tree planting, group marriage ceremonies, contributions to relief funds, cattlecamps, English medium school affiliated to the Central Board of Secondary Education (CBSE),

A Computer College offering BCS and BCA Degrees/ Rural Polytechnic college and other educational institute etc. In this way a sugar factory makes all providing and deep impact on its area of operation. It thus becomes centre of economic, social and cultural development.

7.2. Conclusions

Important conclusions of the research work are classified into eight parts. Working of NSAI and its impact on various factors has also been explained. It is elaborated as follows

7.2.1 General

1. India is the first country, which started sugarcane production. The references to sugarcane in Hindu Mythological books precede any such reference from other countries. Similarly sugarcane is mentioned in the Atharva-veda.
2. The Co-operative movement originated in the west, first in England with the establishment of the Rochdale co-operative Society in 1844, which started as a co-operative consumers' store.
3. Co-operative movement in India has its birth in the year 1904 with the passing of co-operative societies Act. The activities started with the establishment of primary credit co-operatives, whose main function was to help small farmers with loans, instead of their being exploited by the money lenders.
4. India ranked first in the world in sugar production in the year 2000-01.
5. Sugar industry is the second largest agro-based industry, next to textile in India.
6. The first sugar factory in India was started in 1784 by a civilian, crafts, at Sooksagar, which was privately owned. The second sugar factory was started in 1791 in Bihar by L.T. Patterson. Then in 1824 'Late James Fredrick Vivian Minchin' a French gentlemen started a sugar factory at 'Aska' in Orissa.
7. In the beginning of the 20^{th} century the first sugar factory 'Vacuum pan technology' was started in Bihar at 'Saran-Marhora' in 1904.

8. In 1950-51, there were 139 sugar factories in India of which only two (1.11per cent) were in the co-operative sector. In 2002-03, 536 sugar factories have been established of which 311 (58.02 per cent) are in the co-operative sector. Of the factories established in 2002-03, 453 sugar factories were in operation of which 269 (59.38 per cent) were in the co-operative sector.
9. Out of the 269 co-operative sugar factories operating in the country, 145 (53.90per cent) are in Maharashtra State. Thus of the co-operative sugar factories in India, more than half are in Maharashtra State.
10. In 1950-51, of the 13 sugar factories in Maharashtra, only one (7.69 per cent) was co-operative sector. In 2002-2003, of the 160 sugar factories in the state, 145 (90.63 per cent) were in the co-operative sector.
11. In 1950-51, sugar production in Maharashtra was 1.47 lakh tonnes in which the share of the co-operative factories was just 4.76 per cent. In 2003-03, sugar production reached 62.21 lakh tonnes and the share of the co-operative factories went up to 94.78 per cent Maharashtra State ranks first in sugar production in India.
12. With respect to area under sugarcane cultivation and production of sugarcane, Maharashtra ranks second in the country, the first being Uttar Pradesh.
13. After the sugar industries was de-licensed in August 1998 NSAI obtained Industrial Entrepreneurs Memoranda or IEM and started work on a new sugar plant of 1200 TCD.
14. Completed in the year 2000, this 1200 TCD (or tones of cane crushed per day) was the first one ever to be built in an incredibly short span of 9 months and at an amazingly low cost of Rs. 20 crore. Of this, Rs 10 crore was raised through contribution from the farmer and the remaining amount was obtained as a loan.

7.2.2 Profile of Osmanabad District and Kalamb Taluka

1. The area of Osmanabad District is 7512.4 sq.kms. and area wise it is largest district in Maharashtra and covers 5.66 per cent of the total geographical area of the state.
2. The maximum number of landholders is in Osmanabad District. Of the total landholders 17.73 per cent landholders hold less than 1 hectare of land while 3.24 per cent of the holders have 10 hectares and above holdings. Further 79.03 per cent of marginal and small farmers have holdings of less than 2 hectares.
3. Jowar, Wheat, Gram are the main crops grown and sugarcane is the main cash crop in command area of NSAI.
4. In Osmanabad District 24 thousands hectares, in Latur district 48 thousands hectares and Beed district 36 thousands hectares area is under cultivation of sugarcane.
5. Command area of NSAI spread over an area of 145 villages.
6. The population of Kalamb Taluka increased from 1,17,706 in1961 to 3,26,611 in 2001 and is 7.99 per cent of the total district population.
7. Kalamb Taluka has a working population of 1,26,405 persons engaged in various occupations. This is 46.29 per cent of the taluka's population and 8.82per cent of the working population of the Osmanabad District. About 84.32per cent of the taluka's working population are engaged in agriculture and agro-related occupations.
8. The geographical area of Kalamb Taluka is 7.42 per cent of the geographical area of Osmanabad District.
9. Of the total area under irrigation in command area of NSAI, 75.22 per cent is well irrigated.

7.2.3 Natural Sugar and Allied Industries Ltd., Osmanabad (NSAI)

1. The NSAI is situated in the North of Osmanabad District Head Quartar at a distance of 25 k.m 145 villages have been included in the NSAI area of operation.
2. The membership of the NSAI Producer members.

3. For administrative convenience, the operations of the NSAI have been distributed among 16 departments. With the management and Administrative structure the working of all the persons in these departments is coordinated. The NSAI affairs are managed by the Board of Directors from and by the members of the NSAI. The Chairman & Managing Director the Chief officer who looks after the day-to-day management of the NSAI.
4. The face value of a share of the NSAI in 2000-2001 was Rs. 10000 and total cost of plant was Rs. 20 crore. From which Rs. 10 crore were raised as share capital from farmers and remaining amount was obtained as a loan from Banks and financing institutions.
5. During the 10 years from 2000 to 2010, the sugar crushing capacity per day has risen from 1250 MT to 7500 MT per day and yearly sugar production was to the tune of around 2.87 lakh quintals to 7.78 lakh quintals with an average sugar recovery of 11.62 per cent. The growth march of the NSAI has been excellent.
6. The proportion of sugar produced to the quantity of sugarcane crushed is called sugar recovery rate, which is treated as an imported measure of efficiency of a sugar factory. It can be seen that the sugar recovery rate of the NSAI during the period 2000 to 2010, has always been higher than the national average of the sugar factories. The NSAI is certified for ISO-9001-2000 compliance and has a fully computerised system ever since its inception. What's more, it has established a separate software division to develop its own software, which is highly tailored to its needs and is also reasonably priced.
7. The Govt. of Maharashtra has appointed a committee under the chairmanship of late Gulabrao Patil to make a comprehensive study of the sick sugar factories in the state. In this context, the committee put-forth the concept of Health Index Numbers of the sugar factories. It is useful in measuring the health or overall efficiency of a sugar factory. While calculating the health index number, the three factors, viz., crushing

capacity utilization, the proportion of sugarcane crushed from its area of operation to total sugarcane crushed and the sugar recovery rate have been taken into account. Higher the Health Index Number of a sugar factory than 1, greater will be its financial health and viability.

8. NSAI is an area rich in sugarcane which form the principle row material. The operational area of the NSAI covers radius of 25 kilometers and over 145 villages. Within less than decade, NSAI has expanded its activities vertically and horizontally to encompass other areas such as co-generation of power, ferroalloys or steel production, a bio-diesel project comprising distillery for alcohol and ethanol production, bio-compost production plant, sugar refinery and milk processing project.
9. NSAI has ventured into cogeneration of power by installing a high-pressure boiler that produces around 22 megawatts of power. Of this, 13 megawatts are used for sugar production, while the remaining power is sent to the company's ferroalloys division. Earlier, bagasse was used for power generation. When its supply started falling short of the requirement, NSAI turned to agro-waste such as rice husk, cotton sticks, tur sticks and chaff of wheat and soybean. It has since set an example by generating electricity from agro-waste. In turn, it garners enough raw materials to produce electricity.
10. NSAI says that this technology, if tapped on a wider scale, can easily bail us out of power deficits. This is the first, sugar factory to generate its own electricity. This facility generates 6,000 units of electricity per hour or 1,44,000 units per day. This can easily meet the electricity demands of an entire taluka. More importantly, the cost of electricity is an incredible Rs. 1.5-2 per unit.
11. NSAI installed the ferroalloys plant on this guest to make even more productive use of the electricity this plant generates. Showcasing the merits of a unique combination of by-products in the sugar industry, the ferroalloys division of the enterprise is doing roaring business, sourcing its raw material from seven states and exporting its products to customers in

South Korea, Hong Kong, Belgium, Italy, Oman and Pakistan. The company has two submerged arc-furnaces, each with a 13 MVA capacity. One of the two furnaces is run entirely on the power generated by NSAI cogeneration plant.

12. The distillery project has carved a niche for itself in the production of rectified spirit, extra-neutral alcohol, ethanol, and other products. In an effort to utilize molasses, another by-product of sugar production, NSAI installed a 30,000 liter fully automated distillery plant equipped with state-of-the-art technology. At this unit, molasses is processes to manufacture alcohol. The distillery project has a capacity to produce 90 lakh liters each of rectified spirit and ethanol.
13. In this pursuit of growth, NSAI has not lost sight of its social and environmental responsibilities. With the intention to curb pollution, NSAI installed a bio-composting plant that processes all of the environmentally hazardous spent wash with the most advanced press-mud bio-composting technology to produce 25,000 metric tons of bio-compost every year. This is made available to farmers at concessional rates. The underlying objective has been to reduce the use of chemical fertilizer and improve soil conditions.
14. The next milestone in the evolution of NSAI was the installation of a sugar refinery with daily capacity to produce 250 metric tons of 45 ICUMSA (an international unit for expressing the purity of the sugar in solution), sulphur-free and highly pure sugar. Notably, this is the first plant of its type in the state of Maharashtra. Refined sugar has tremendous potential in national and international markets. In 2005, he announced the state's first bio-diesel project with a 10-tonne capacity.
15. To arrest water pollution, NSAI has installed a diffused aeration system based on state-of-the-art German technology and ensures utmost compliance with the standards laid down by the Maharashtra Pollution Control Board. The treated water is used exclusively for agricultural purposes. An MDH fly-ash arrestor has been installed for boiler chimney to

curbed air pollution. The ash thus collected is used to increase the porosity of press-mud. This has also reduced dependence on bagasse and has helped its use by the farmers as compost.

16. The uniqueness of NSAI ingenious solutions is their simplicity. For example, to avoid overburdening they already stretched water resources of the region, NSAI has been running the sugar plant by using the water available in sugarcane itself. In an area notorious for its droughts and water scarcity, NSAI has found an efficient alternative to the expensive buying of water. Sugarcane consists of nearly 15-18 per cent bagasse, 10-13per cent sugar, starch and mineral matters and the rest 70 per cent is water. The water obtained while converting sugarcane into sugar is often disposed of NSAI thought of utilizing this water to meet the factory's requirements.
17. Thanks to the NSAI does not have to buy any water for his otherwise excessively water-intensive work. His philosophy is Water saved is water generated. Every bit of water is captured and reused by doing everything from preventing leakages in pipelines, to trapping the exhaust and steam of the boilers. Further, well-planned closed circuits ensure that water can be made available for recycling and there is no misuse or loss of water. As a result, the effluent generated has come down to 10 cubic meters per hour, which is only a fourth of what it would have been otherwise. His efforts have inspired farmers to actively save water while cultivating sugarcane.
18. A departmental store has been established to cater the agrarian and other daily needs of the people here. A rural medical facility has been made available to the people through the area's primary health centre. NSAI lead has also seen the establishment of a co-operative credit society named Shri Sai Gramin Bigar Sheti Sahakari Patsanstha ,which has deposits of more than Rs 33.39 crore and has already disbursed loans of more than Rs 18.14 crore to the area's farmers and NSAI employees to help them and improve their quality of life.
19. It has built 204 houses for its officers and employees. These houses have provisions for pure drinking water and electricity is provided to the

residents free of cost. It has also started a unique pension scheme for the parents of its employees. It deducts 10 per cent of the gross salary of its employees and pays directly to their parents every month. This helps them lead better lives.

20. The Chairman and Managing Director Shri B. B. Thombre has been the recipient of several awards and accolades, such as the Marathwada Udyog Ratan Award presented by International Marathi Chamber of Commerce and Industries at Aurangabad in 2001, the Rashtriya Udyog Ratan Award presented by the New Delhi-based International Economic Development Council and Priyadarshini Lolnyas in 2001, the Indira Gandhi Sadbhavana Award presented by the New Delhi-based Global Economic Council in 2002, the Indian Economic Development and Research Association's Bharatiya Udyog Ratan Award in 2003 and the Latur Gaurav Puraskar in 2008. NSAI also runs a textile mill and grows and exports grapes.
21. NSAI 's mantra is to leverage one's intellect in combination with hard work as the only way making it big through competitive times such as these. It has imbue the co-operative movement with ideals of professionalism and ironed out all likely flaws and weaknesses of the co-operative machinery to pursue the mission of superior quality and participatory benefits.
22. Most importantly, NSAI's vision has not been limited to individual gains alone. On the contrary, is bringing the benefits of its enterprises to a much wider constituency of stakeholders in this venture. Even in terms of the technologies it has harnessed, it has been proactively sharing it's know – how with other to rest on its laurels, NSAI continues to be driven by discipline, commitment and an untiring sense of selfless service in demonstrating to the world that anything is possible with faith, passion, resolve and purpose.

7.2.4 Impact of the NSAI on Agriculture

1. Right from its beginning the NSAI have been making efforts for agricultural development in its area of operation. The NSAI has a separate

Agricultural Department through which it has implemented various schemes of sugarcane development. These include supply of improved seeds to the farmers. Through its sugarcane research project, it has conducted training courses for farmer members to increase sugarcane production. It has supplied Gypsum to them for salivated and ill-drained lands and helped to raise soil fertility. It was planned sugarcane cultivation for steady supply of fresh sugarcane to the NSAI. It has also supplied compost manures, press mud, green manure, raw jute and dhencha seeds etc. to the members to increase sugarcane production. It has provided members with chemical fertilizers, insecticides etc. It has also provided finance to its members for deepening of old wells, digging bore wells, for paying quotation amount for electricity connection, for paying dues of electricity bills and for paying irrigation water bills to the irrigation department. It holds seminars and meeting for its members to guide them about sugarcane production every year.

The sugarcane producers have benefited from the above schemes in the area of operation of the NSAI. It has helped in increasing the area under sugarcane cultivation and thereby sugarcane production.

2. The NSAI has implemented five water resources development scheme to increase the area under sugarcane from the village in its area of operation, which cannot avail of the waters of Manjra Canal. This has benefited a lot of farmers and more acres of land from rainfed villages have been brought under irrigation. Further the NSAI has completed surveys of lift irrigation projects, which may irrigate large numbers of acres of land of farmers. It has also carried out surveys of various places for constructing Kit-wares/ bandharas so that the rainwater will be stored and in turn, it may raise water levels of the wells in the adjoining areas. The construction of some bandharas has been completed and the work is nearing completion at the remaining places. Therefore, large number of acres of land helped in increasing area under sugarcane.

3. The NSAI has provided crop loans to sugarcane growers from Shri Sai Gramin Bigar Sheti Sahakari Patsanstha and NSAI Multistate co-operative Credit Society Ltd. athrough the primary co-operative credit societies in its area of operation. It has guaranteed repayment of the loans through the sugarcane bills of its members. Consequently, more farmers have turned to sugarcane cultivation and the area under sugarcane has expanded significantly.
4. The establishment of the NSAI has changed the cropping pattern in command area which is dominated by the sugarcane. During the same period, the area under cereals, cotton, spices, oilseeds has decreased.
5. The sugarcane productivity has been adversely affected due to many causes such as lack of adequate water, absence of crop rotation, soil erosion, due to mono-cropping over long periods, lack of manures, and unbalanced use of chemical fertilizers. However, as compared to the areas of operation of the neighboring sugar factories, the productivity of sugarcane in NSAI's area is satisfactory.
6. After the establishment of the NSAI , the sugarcane growers in operational area started buying modern implements for agricultural operations and discarded traditional implements. The farmers started using animal driven iron ploughs for deep ploughing for sugarcane. The number of iron ploughs in area of operation increased considerably. Likewise, there has been increasing use of tractors for sugarcane cultivation. The NSAI also implemented scheme for farmers to buy trucks and tractors by providing loans for the same. This has also provided them with work of sugarcane transport.
7. After the establishment of the NSAI, farmers have been getting higher incomes form sugarcane than from crops. Due to this more and more farmers have started using electric pumps increased. During the period 2000 to 2010, the electric pumps increased considerably. It can thus be concluded that there has been increasing use of modern implements in

agriculture and mechanization of agriculture has occurred in command area.

7.2.5 Impact of NSAI on Producer Members:

1. There has been change in the sources of incomes of the farmers in the NSAI's area of operation during the period 2000 to 2010. Agriculture has been the main source of income of all the farmers. In 2000-2001. 4.21 per cent of farmer's families received income from employment. In 2005-06, 29.32 per cent of farmer's families received income from employment. More members from marginal, small and medium farmer's families have received employment income than big farmer families. Further, in 2005, 44.21 per cent farmers worked as agricultural labourers. In 2001-02, the proportion was reduced to 20.35 per cent. Then in 2000-2001, 4.9 per cent of farmer's families received income from business source (cycle repairs shops, hotels, grocery shops etc.) It can thus be seen that due to the establishment of the NSAI, there has been increase in the sources of income of the farmers during the period under study.
2. With the establishment of the NSAI, there has been increase in the incomes of the farmers in its area of operation, which, in turn, has changed their pattern of expenditure also. The farmers in the NSAI's area of operation spend their income on food, clothing and utensils and such other items of domestic use. In 2001-02, 29.12 per cent of the farmers spend their income on leveling of land, 88.07 per cent of them spent their income on for digging wells, pipelines and electric pumps. Then 32.63 per cent of them used a part of their income for buying land, 86.32 per cent on purchase of cattle and construction of cattle sheds, 51.23 per cent on house construction, 31.93per cent on furniture, 56.14 per cent on purchase of vehicles. A part of the increased income was spent by 75.79 per cent of the farmer's families on items such as marriages of their sons and daughters, education and other functions and festivals. Then 18.95 per cent of them kept a part of their income in bank deposits.

3. With the establishment of the NSAI, area under sugarcane was increased which resulted in increased incomes of the farmers. This naturally led to improvement in their standard of living, which got reflected in the improvement of their housing conditions. Before establishment of NSAI only 4.56 per cent of farmers lived in cement concrete houses. After establishment of NSAI this proportion increased to 23.86 per cent. Before establishment of NSAI 31.93 per cent of the farmers occupied houses of medium conditions but after establishment of NSAI this figure went up to 64.91 per cent and also a large number of farmers now live in cement concrete and medium condition houses and many of them have made improvements in their houses like bungalows.

   Similarly there has been increase in the range of household equipments used by the farmers. After establishment of NSAI 84.21 per cent of the famers had TV sets; 23.86per cent had CD players, 27.02 per cent used fuel gas; 17.19 per cent; had refrigerators, 12.98 per cent had air coolers and large numbers of farmers used telephone. Before establishment of NSAI no farmers family had any of the above household equipments. Before only 4.56 per cent of farmers owned motorcycles. However after establishment of NSAI 44.56 per cent of them owned motorcycles, jeeps/cars.

4. The NSAI has provided a number of quality services to the farmers in its area of operation and they have benefited greatly from them. The NSAI ensure timely supply of credit to agriculture and 96.14 per cent of the farmers have availed of this facility. Then 89.12 per cent of the farmers received timely supply of agricultural inputs. Further 84.9 per cent of the farmers have been actively encouraged by the NSAI for increasing sugarcane production. The NSAI implemented a number of irrigation schemes, which have benefited 36.25 per cent of the farmers. The NSAI held a number of sugarcane production seminar and farmers rallies in which 37.89 per cent of farmers participated. Then 15.44 per cent of the farmers have benefited from the Bore-well scheme of the NSAI. Further, 36.84 per cent of the farmers have been benefited by the well repairs

scheme. The returnable financial assistance extended by the NSAI for Electricity connection quotation and payment of dues of electricity bills has helped 17.19 per cent of the farmers. Similarly 28.07 per cent of the farmers have been given returnable financial assistance to pay the water charges of the irrigation departments. The various educational facilities provided with the support of the NSAI have been used by the children of 97.89 per cent of the farmers and 5.96 per cent of the farmers families have availed of the medical aid facilities extended by the NSAI. Then, members of 39.30 per cent farmers families have secured employment in the NSAI and the various institutions supported by the NSAI. After the establishment of the NSAI, 28.77 per cent of the farmers have started new businesses. During the period of 10 years from 2000 to 2010, 15.79 per cent of the farmers have taken advantage of the NSAI tractors and trucks scheme. All the farmers in the NSAI's area of operation are now following modern methods of cultivation and using modern agri. implements like iron ploughs, tractors, harrows, showers, electric motors, submersible pumps etc.

7.2.6 Impact of the NSAI on Employment Generation

1. After the establishment of the NSAI, there was increase both in the area under sugarcane cultivation in its area of operation as also in its crushing capacity. The distillery plant was also subsequently installed. This resulted in increasing the number of employees of the NSAI from 262 in 2001 to 932 in 2012. In year 2001-02, of the total employees, 50per cent were permanent employees, 2.63per cent seasonal employees and 47.37 per cent temporary employees. Of the 145 villages in its area of operation, persons from 145 villages (100 per cent) have been given employment and 90 per cent of persons in its area of operation have been provided with jobs. Out of the total employees of the NSAI, 10per cent are from area of operation but from outside of command area. Comparatively, they get higher wages than the agricultural labourers. The employees are now receiving wages and salaries as per the recommendations of the Fourth Sugar Wage Board.

2. Classifying the employees of the NSAI according to their land holding, it is found that 35.71per cent of them are small landholders, 28.57 per cent are medium landholders, and 24.60 per cent are landless labourers. Only 11.12 per cent of the employees are big landholders. Thus small, medium landholders and landless labourers constitute 88.89per cent of its workforce and they have a new source of income.
3. In addition to the employment in the NSAI, 84.92 per cent of the families of the employees have new sources of incomes by way of jobs, business, dairying etc. in addition to wages and salaries.
4. Along with employment in the NSAI and new sources of income, the incomes of the employees increased, which increased their wants and consequently there has been change in their pattern of expenditure. The NSAI employees spent the increased incomes for various purposes as detailed below. The percentage relates to the proportion of employees spending money on particular item to total employees.
5. Land development 70.32 per cent, purchase of land 56.29 per cent purchase of cattle 30.24 per cent , house construction 60.25 per cent, purchase of furniture 46.98 per cent, purchase of vehicles 75.43 per cent marriages, education of family members and festivals 48.73per cent, bank deposits 44.13 per cent.
6. Due to the establishments of the NSAI about 2440 workers get jobs for about 140 days in every crushing season in harvesting and transporting of sugarcane. These workers come from the rainfed areas Beed, Osamanabad, Latur, Nandad and Parbhani. They are mostly marginal, small and medium landholders. They migrate from their areas to the sugar factory areas in search of employments during the crushing season. The workers engaged in harvesting and transporting of sugar have their organization at the state level and their wage rates are fixed by the State Govt. During the year 2011-12, 1220 male workers and 1220 female workers were engaged in this activity The NSAI supplies every year tire fitted bullock carts on rental basis to these workers.

7. With the starting of the NSAI, the cropping pattern in command area has undergone significant change. Area under sugarcane has expended and it has become a cash crop. During the period 2000 to 2010, area under sugarcane went up from 9871 hectares to 21525 hectares a rise by 218 per cent. Further, the NSAI implemented various irrigation schemes like water resources development scheme, bandharas, K. T. Weirs which irrigated an additional area of 4520 hectares.
8. Right form 2009, the NSAI has been actively engaged in developing dairy business. Now it has become an important subsidiary occupation of the farmers. Because of all these developments, a large number of labourers are employed in agriculture and agro-related activities and their wages have also risen.
9. With the establishment of the NSAI, there has been extension of irrigation facilities in command area and farmers have started taking more than one crop every year. They are also using more modern implements and agriculture has been mechanized. Educated youth are now cultivating land by using modern methods. This has resulted in additional demand for agricultural labourer. Further large employment opportunities have cropped up in sales, maintenance, repairs and spare parts etc. of these implements. The persons engaged in this business are getting good income and their standard of living has risen.
10. A number of shops and businesses have been establishment on and around the NSAI site from the starting of the constructions work of the NSAI. In 2012 there has been The Natural Bazar on the NSAI site.
11. After the establishment of the NSAI, a number of offices and institutions have been established on the site. They include branch of Shri Sai Bigar Sheti Sahakari Patsansta, Nasi Multistate Co-operative Credit Society Ltd., Wrokers co-operative Credit Society, Sakhar Kamgar Trade Union, Natural Milk, Primary school, college, etc. These institutions have come into existence due to the establishment and support of the NSAI and they provide employment to 1279 persons on the site.

12. During the crushing season, the NSAI provides work to 260 trucks and tractors and 700 bulkcarts to transport sugarcane. About 520 drivers and cleaners get jobs in every crushing season. A large number of buildings have also been constructed on the NSAI site, which have created job opportunities on a large scale.
13. The total number of agriculture labourers in the NSAI's area of operation, 87.94 per cent is original residents of the area and the remaining 12.06per cent labourers come from outside its area of operation and they have migrated for jobs created due to the establishment of the NSAI.
14. The agriculture labourers families in NSAI's area of operation, 60per cent agriculture labourers draw additional income from other sources such as land, employment, dairy, etc and 40per cent of the families are wholly dependent on the jobs provided by other farmers. Only due to the establishment of the NSAI the sources of income for the agricultural labourers have been increased.
15. Though the wages of agricultural labourers have increased after the establishment of the NSAI, the prices of essential commodities have also shoot up and so there has not been appreciable improvement in their standard of living. However, during the period 2000-01 to 2011-12, because of the NSAI, various other sources of income became available to them apart from agricultural labour wages. This is evident from the fact that many of them now use modern domestic equipments like TV sets, music system, air coolers, air-conditioners, motorcycles and cars etc. Such labourers with diversification of incomes have spent the additional income of productive purpose also. The agricultural labourers, 9.21per cent have spent their income for land development, 6.98 per cent on purchase of land and 5.40 per cent on bank deposits. Then 19.68 per cent of them have purchased cattle, 7.62 per cent have constructed houses, 3.81 per cent have bought furniture and 4.44per cent have used the additional income for marriages and education of their children.

16. Thus, the agriculture labourers have reaped many direct and indirect benefits from the NSAI. About 67.10per cent of the agriculture labourers families avail of educational facilities made possible due to the NSAI. Then 34.60per cent of the agricultural labourers families have benefited by employment to their members in the NSAI and in order institutions that have NSAI's support. Further 38.10per cent of such families have availed of the medical facilities made possible by the NSAI.

7.2.7 Impact of the NSAI on Business

1. Bagasse and molasses are the important by-products of a sugar factory. From 2003-04 to 2011-12, the NSAI sold bagasse to the co generation plants of other factories and earned income of Rs. 66.59 lakh.
2. The NSAI started its distillery plant in 2009 for production of rectified spirit and Extra Neutral Alcohol. During the period 2009-10 to 2011-12 the NSAI sold the products worth Rs. 50.25 crore and earned profit of Rs. 11.78 crore. This has enabled the NSAI to pay higher prices to sugarcane growers.
3. The compost fertilizer plant started by the NSAI produced 1 lakh metric tons of compost fertilizer. It was sold to the cane growers fetching an income of Rs. 73.51 lakh to the NSAI.
4. The NSAI has also commissioned the plant producing carbon dioxide. This will help in reducing air pollution and will bring to the NSAI an annual amount of Rs. 4 lakh as royalty fee.
5. The NSAI has just completed installation of co-generation project with an outlay of Rs. 47 crore. The project is estimated to produce 15 megawatt of electricity. This project will provide regular power supply (24 hours) to the factory. The NSAI is also making plans to produce ethanol.
6. After its establishment, the NSAI encouraged and supported a number of co-operative societies one of which is Shri Sai Gramin Bigar Sheti Sahakari Patsantha Initially its share capital was Rs. 8.57 lakh. By 2011-12 the share capital reached the figure of Rs. 200 lakh. At the time of its establishment, the bank had deposits of Rs. 3.47 crore and by 2011-12 Rs.

33.39 crore, it has disbursed loans of Rs. 21.62 crore among 2047 needy borrowers and helped solve the financial problems of farmers, traders, agriculture laboures etc.

7. NSAI Multistate Co-operative Credit Society Ltd. Started in Nov 2012. Its share capital was Rs. 1.34 lakh. Upto March 2012 the bank had deposits of Rs. 50 crore and it has disbursed loans of Rs. 0.12 crore among 23 needy depositors.
8. Through the efforts of the NSAI, Natural Bazar has been established at the factory site in 2010. It sells at reasonable prices goods of quality, such as groceries, clothes, stationery, electric goods etc. The daily average sale of the stores is arount Rs. 3000 to Rs. 4000. The consumers store has supplied credit cards to producer members, factory employees, teaching and non-teaching staff of the Education Society to buy the goods of their choice on credit. The store has also recently opened branches at Latur.
9. Another constructive activity of the NSAI is the establishment of Workers co-operative Credit Society for its employees. The society plays an important role in meeting the credit needs of the workers. The loan disbursement of the society shot up from Rs. 2.18 lakh in 2002-03 to Rs. 109.26 lakh in 2011-12. The society has not only earned profit every year but it has increased every year.
10. With a view to develop dairy business in its area of operation, the NSAI establishment Natural Milk. It opened many milk collection centers in a number of villages. With persistent efforts of the NSAI, from 2011 the milk collection from 133 villages on 14 routes. This gave a fill up to milk production form every village in the NSAI's area of operation. In the year 2012-13 the average monthly milk collection was just around 550000 litres.
11. There has been a large growth of population on the NSAI site after its establishment, The rising income levels of the farmers and the NSAI employees increased their wants and demand for various goods and services also rose rapidly.

12. During the period 2002-03 to 2011-12, the NSAI exported 1,66,796 quintals of sugar and earned for the country foreign exchange worth Rs. 190.86 lakh.
13. With the establishment of the NSAI, there has been heavy turnover in the business of harvesting and transport of sugarcane. In the 2011-12 the NSAI spent a total amount of Rs. 18 crore on this account.

7.2.8 Impact of the NSAI on Infrastructure Development and social welfare Activities

The NSAI with prior consent of its members has created 'Area Development Fund' by deducting some amount from their sugarcane bills, A number of social and cultural activities are carried out in its area of operation from this fund.

(A) Infrastructure Development

1. The NSAI has been making all efforts to built roads and keep them in good repairs so that the harvested sugarcane is immediately transported to the factory in trucks, tractors and bullock carts. It has constructed some roads in its area of operation by spreading murum and sand; some have been laid with broken stones and some with broken stones bound with tar. A few bridges and culverts have been built on few roads. This has benefited all the villages in the NSAI's area of operation.
2. In 2009, the NSAI established Education Society. Its object is to bring about educational facilities to the children of famers, factory workers, agricultural labours and businessmen etc. The society runs 1 English Medium public school, 1 Science Senior College. A total of 450 students have been enrolled in these institutions. The society has the staff strength of 23 teachers and non-teaching staff. Due to these efforts of the NSAI, the children of farmers, workers, businessmen have been provided with education at local level.

   As a supplement to this work, the society has built separate hostels for male and female students and also for working women. By the end of 2011-12, the NSAI has invested about Rs. 20 lakh for educational facilities.

3. The NSAI has provided 150 housing quarters for its employees. They are also provided with drinking water, roads, electricity, playgrounds, and educational facilities. An amount of Rs. 19.05 lakh has been spent for these facilities.
4. A well–spread communication system is very essential for raising sugarcane productivity and for timely crushing of sugarcane. Each of the 25 departments of the NSAI This facility helps both the NSAI and the sugarcane producers in raising sugarcane production.
5. The NSAI has established a well-equipped dispensary to cater to the needs of its workers, their family members as also the general public in its area of operation. In the 2011-12, the NSAI organized health camps.
6. The NSAI has appointed special staff to help the sugarcane farmers in its area of operation and advise them about formation of Gobar gas plants. It gives them technical guidance and assists them in preparing loans proposals with subsidies. Loans have been obtained by 193 farmers from NSAI area of operation for Gobar gas plants.
7. The NSAI started a petrol and diesel pump in 2001 at the NSAI site to supply diesel to trucks and tractors transporting sugarcane and also for the convenience of the public in its area of operation.
8. The NSAI has provided a bus stop with permanent shed at the NSAI site. This bus stop is very useful to the members, farmers, factory workers, and traders etc, who visit the NSAI regularly
9. The NSAI has taken in hand construction of a marriage hall building.
10. Various institutions have come up on the NSAI site with the encouragement and support of the NSAI. These institutions provide a great many social services to the public in the NSAI's area of operation.

(B) Social Welfare Activities of the NSAI

During the period 2001-02 to 2011-12, the NSAI has carried out the following social welfare activities

1. It has performed group inter-caste and inter-religion marriages of 25 couples and spent Rs. 51000 for these group marriages. Each couple is presented with a set of stainless utensils valued at Rs. 2000.
2. During the last 10 years the NSAI has been enthusiastically carrying out tree plantation programmed and has so far planted and protected 24659 various types of trees.
3. The NSAI has always gives financial helping hand to the Govt. and affected persons at the time of natural disasters such as floods, famines, cyclones, earthquakes etc. in any part of the country
4. During the period 2001-02 to 2011-12 the NSAI implemented a scheme for the educated unemployed in its area of operation. Under the scheme, loans were made available from the banks for purchase of 96 tractors and 21 trucks. The youth have been given the work of transporting sugarcane.
5. Under the 20 point programmed of the Govt. of India, the NSAI provided 17 landless labourers from 10 villages in its area of operation with huts at a cost of Rs. 5.50 lakh.
6. The NSAI has covered all its members with life insurance scheme-Janata Accident Insurance Policy to help the heirs of an unfortunate member meeting with an accident. The NSAI has provided various sports facilities at the NSAI site. It has also opened an Extra Mural Education Centre, which arrange for lectures of experts on various topics.
7. The NSAI has erected on the NSAI site, sai temple and guest house building for the visitors of NSAI.

7.3 Testing of Hypothesis

The NSAI has an overall impact on the rural economy. The NSAI has proved a boon to the people in its area of operation. There has been consistent rise in the income levels and standard of living of the farmers, factory employees, agricultural labourers and businessmen on the NSAI site. Also there has been increase in rural employment. Further, the NSAI has deep impact on the irrigation facilities, co-operative movement, educational institutions, communication system, health and medical facilities as well as

cultural activities etc. The researcher framed the following hypothesis of testing: “The establishment of the NSAI has multiple impacts and has brought about positive socio-economic changes in its area of operation.’’

To test the above hypothesis the researcher got the respective Questionnaires filled in from sugarcane farmers, NSAI employees, agricultural labourers, businessmen and NSAI officials. The researcher also personally interviewed them for this study. Then various statistical data were collected from the annual reports and records of the NSAI and analyzed them. Further, the researcher also went through the studies carried out by the experts and the experienced eminent persons.

After considering all the aspects, it has been observed that the NSAI has provided irrigation facilities in its area of operation which result the irrigated area has been expanded. Then the NSAI implemented various schemes for sugarcane development for supply of improved seeds to sugarcane farmers, supply of fertilizers on credit, agricultural loans etc. All these efforts have resulted in increased area under sugarcane in the NSAI’s area of operation. The sugarcane farmers have adopted modern methods of cultivation. Agricultural operations are being increasingly mechanized. It is also observed that due to the establishment of the NSAI the incomes of the sugarcane farmers in its area of operation have increased and thereby improved their standard of living. Similarly there has been a large employment opportunity for the people in its area of operation in the NSAI and its by-product plants. Then a large number of people have been engaged in sugarcane harvesting and transporting and in the various shops and establishments that have come up on and around NSAI site. There has been increase in the sources of income of the families of NSAI employees, which in turn raised their standard of living. Likewise, the sources of income of the agricultural labours have also increased.

The NSAI has established distillery plant, compost fertilizer plant, and carbon dioxide gas plant. Also a large number of co-operative societies have also been established with encouragement and support of the NSAI various trading, occupational and business activities have flourished on the NSAI site.

The incomes and standard of living of the families engaged in them have also changed a lot.

Due to the establishment of the NSAI, various infrastructure facilities have increased. They include roads, educational institutions, housing quarters of its employees, communication facilities, medical aids, social institutions etc. The NSAI has implemented a large number of social welfare activities , such as group marriages, tree planting of forestation, cattle camps, financial help to educated unemployed, Sugar schools, Zunka Bhakar Kendra, Cultural programmers for its members as also in the general public in its area of operation. Due to formation o f the NSAI on it has brought about positive socio-economic changes in the area of operation. The impact of the NSAI on various factors is detailed in the Chapter No. V to VI. Important conclusions are also recorded in Chapter No. VII.

By adopting the selected research methodology, the hypothesis that the socio-economic impact of the NSAI on the various factors in its area of operation has been positive, stands proved, it is also cleared from the related chapters and conclusions part of the research work. It is proved from the study that the same path can be followed by others for the overall development of rural India.

7.4 Suggestions

1. The NSAI produces sugar from the sugarcane. Its crushing season generally lasts for about 140 days a year. If the NSAI adopts beet sugar technology, it can operate throughout the year and will also provide employment to a large number of people in its area of operation and help to reduce unemployment problem to some extent. It shall also increase its profits and benefit its members with rise in their incomes.
2. The NSAI has paid the maximum cane price of Rs. 2250 per ton. However, it is observed that the producer members are demanding cane price in the range of Rs. 2800 to Rs. 3000. The sugarcane price depends on the price of sugar and other incidental costs. Therefore, it is necessary for the NSAI to

reduce its operational expenditure, which will enable it to offer higher price to sugarcane.

3. During the period, 2001-2 to 2011-12, the yield of sugarcane production per hectare has been declining in NSAI's area of operation. The NSAI should introduce new varieties of sugarcane and new methods of cultivation so that the yield of sugarcane per hectare increases. This will enhance the incomes of the cane-growers. At the same time, the farmers should be persuaded to follow scientific rotation of crops and not to take sugarcane production continuously from the same land. They should also be guided about balance use of fertilizers and appropriate use of water.
4. The NSAI arranges for the facility of soil analysis to the farmers in its area of operation through the research centre of various places. If the NSAI establishes its own soil analysis laboratory, it will help farmers to raise fertility of the soil and they can use proper doses of fertilizers and water according to the type of the soil.
5. The useful lift irrigation scheme should be started by the NSAI which will be more beneficial to farmers and shareholders of NSAI.
6. The NSAI has to procure a large number of workers for harvesting and transporting of sugarcane. The NSAI has to incur every year huge expenditure to get the workers from outside the Taluka and the District. If use of more harvesting machines is introduced, it will help to procure fresh sugarcane from the fields in the minimum possible time, which in turn will help to raise sugar recovery rate. Economy in the expenditure of harvesting and transport workers will be affected.
7. In order to improve the knowledge and skills of the directors, the NSAI should offer introductory course and comprehensive training programmers and mercantile and co-operative laws and by-laws of the NSAI. At the same time it should be made obligatory for the directors to complete such training programmes.
8. Because of the expanding irrigation facilities provided by the NSAI, the area under sugarcane has consistently expanded in the NSAI's area of

operation. Farmers should introduce drip irrigation to sugarcane crop and save the water. However, the expansion is less in rainfed areas than in irrigated villages. The NSAI should strive to provide more irrigation facilities to the rainfed villages so that there will be increase in both the sugarcane area and thereby incomes of the farmers.

9. The NSAI harvests mature sugarcane for crushing. However, this is done according to sowing-dates. Instead, the samples of sugarcane should be tested for sugar recovery in the NSAI's laboratory before harvesting. This will ensure that only the mature cane is harvested. This will give more returns to the farmers.
10. The landholder NSAI employees in the area of operation who are not members of the NSAI should be persuaded to become members of the NSAI.
11. The NSAI has constructed 150 staff quarters on the NSAI site. However, taking into consideration the number of employees, the facilities are inadequate. More housing accommodation should be provided to the employees.
12. With a view to provide services on a large scale to the public in the NSAI's area of operation, efforts should be made to open branches of co-operative consumers stores and credit societies in every village in the NSAI's area of operation.
13. The NSAI has encouraged and established a number of co-operative societies to cater to the various needs of the people. The NSAI should make all out and consists at efforts to strengthen these societies and spread the co-operative movement.
14. The NSAI should utilize its an entrepreneurial skills and leadership for development of organized ancillary industries in its area of operation, such as piggery, hatcheries, bakery, cattle feed plant, artificial insemination centers etc. With such development, the incomes of small, medium and other farmers can be increased substantially.

15. The NSAI does not have sufficient storage capacity for its molasses with the result it gets spread out in the NSAI's surrounding areas and polluting there. To put an end to this pollution, arrangements should be made to carry the molasses through pipeline to such place where it will not be a hazard to public health.
16. It should purchase sets of blasting and boring machines for making more water available to the wells and thereby help the farmers.
17. The NSAI has opened a dispensary on the NSAI site. However, it cannot admit indoor patients. The NSAI should open a full-fledged and well-equipped hospital to treat indoor patients for the employees, agricultural labourers and general public.
18. A few of the rainfed villages in the NSAI's area of operation have to depend on water tankers for supply of water during summer season. The NSAI should implement drinking water schemes for such villages and solve the problem forever.
19. To ensure self-development of the people in its area of operation, the NSAI should try to inculcate in them awareness of their rights as well as duties and responsibilities.
20. The NSAI should establish a small library with books, periodicals in regional language giving information about recent developments in production of sugar and sugarcane cultivation. This should be supplied to the employees, members and sugarcane producers etc. for their guidance.
21. The NSAI should set up Agro Service Centers in its area of operation for giving service and repair facilities to the farmers. These centres can also be utilized for distribution of improved seeds, fertilizers, pesticides, lubricants, motor winding facilities. Then machinery required far digging wells and the technical guidance of ground water search, tractor spare parts should be provided through co-operative agencies at reasonable prices.
22. The NSAI should arrange for libraries in all the village in its area of operation. These will help in spreading literacy and educational development of the people.

23. The NSAI should arrange for more training camps for farmers to guide them about dairy and poultry businesses.
24. The NSAI should develop habit of thrift among the people in its area of operation. They should be persuaded to save for the future and encourage them to develop banking habits.
25. The NSAI should set up an Entrepreneurship Guidance Cell to increase self-employment opportunities for the educated unemployed youth in its area of operation.

BIBLIOGRAPHY

I. Books:

1. Agarwal. R. N., Sugar Industry in India. Popular Prakashan, My Recollection, Bombay, 1976.
2. Arora R. C., 'Industry Rural Development' S. Chand and Co. Pvt. Ltd., New Delhi, 1979.
3. Arora R. C., 'Industry Rural Development' S. Chand and Co. Pvt. Ltd., New Delhi, 1978.
4. Attwood D. W., Raising Cane – The Political Economy of Sugar in Western India, Oxford University Press, Delhi, 1993.
5. Attwood D. W., and Bhaviskar B.S., Who Shares? Co-operative and Rural Development, Oxford University Press. Delhi, 1988.
6. Bapat N.G., 'Economic Development of Ahmednagar District' 1881-1960, Progressive Corporation Pvt. Ltd., Bombay, 1973.
7. Baviskar B.S., "The Politics of Development of Sugar co-operatives in Rural Maharashtra." Oxford University Press, Bombay, Calcutta, Madras, 1980.
8. Bhattacharya S. N., 'Rural Development in India and other Developing country', Macmillan and Co., London, 1978.
9. Beachey R. W., 'The British West Indies Sugar Industry in the late 19th Century', Oxford Basil Blackwell, 1957
10. Dandekar V. M., (ED), Economy of Maharashtra Samaj Prabodhan Sanstha, Pune, 1973.
11. Dandekar V. M. (ED), Writings and Speeches of Professor D. R. Gadgil on Co-operation, Orient Longman Limited, Bombay, 1975.
12. Deer Noel, 'History of Sugar', Vol. I Chapman and Hall Ltd., London, 1949.
13. Desai Vasant, Fundamentals of Rural Development, Himalaya Publishing House, Bombay, 1991.
14. Datta Ruddar and Sundaram, K.P.M Indian Economy, S. Chand and company Ltd., New Delhi, 2002.

15. Gadgil D. R., 'Sugar co-operative in Maharashtra', Published by the National Federation of co-operative Sugar Factories Ltd., New Delhi, 1961.
16. Gandhi M.P., 'The Indian Sugar Industry': It's Past, Present and Future, Book Co. Ltd, Calcutta, 1934.
17. Gavade P. N., and Dr. Patil J.F., 'Sugar co-operatives in the Twenty First Century'. Edited by R. Salvaraju, Vikas Publication House Pvt. Ltd, 1999. (Co-operative in the new Millennium.)
18. Gavade P. N., and Dr. Patil J. F., 'Problem and Prospects of Sugar Industry in 21st Century' Indain Co-operative Review, Vol. XXXVIII, No. 4 April 2001.
19. Inamdar N. R., Government and co-operative Sugar Factories, Popular Prakashan, Bombay, 1965.
20. Jadhav M. V., Sugarcane Cultivation – A Regional Survey, Himalaya Publishing, Bombay, 1965.
21. Jain S. C., 'Rural Development Institutions and Strategies', Rawat Publication, Jaipur, 1985.
22. Joshi B. M., Infrastructure and Economic Development in India, Ashish Publishing House, New Delhi, 1990.
23. Jugale V. B., 'Sugarcane Pricing Policy, Procedure and Operations' Atlantic Publication, New Delhi, 2000.
24. Kamat G. S., Management Of co-operative Sugar Factories in Maharashtra. Maharahtra Rajya Sahakari Sangh, Pune, 1982.
25. Kamat G. S., New Dimensions of Co-operative Management, Himalaya Publishing House, Bombay, 1987.
26. Kharche R. M., Management of Sugarcane Development in Co-operative Sugar Industry, Maharashtra Rajya Sahakari Sangh, Pune., 1979.
27. Krishnamurthy J. 'Rural Development Challenges and Opportunities', Rawat Publications., Jaipur, 2000.
28. Kulkarni B. D., 'Role of the Co-operative Sugar Factories in Rural Development' (An interdisciplinary Study) Nehru Institute of Social Sciences Tilak Maharashtra Vidyapeeth Gultekadi, Pune December 1993.

29. Kulkarni D. G., 'Tropical Sugar', Dhyanjoti Prakashan, Pune, 1971.
30. Kumar Chittaranjan, Sugar Industry Management, Deep and Deep Publications, New Delhi, 2000.
31. Mamoria C. B., Agricultural Problems of India, Kitab Mahal, Allahabad, 1985.
32. Mathur B. L., 'Rural Development and Co-operation' RBSA Publishers, Jaipur, 2000.
33. Misra Kamal Kant, 'Sickness in Industry in Maharashtra', Suneja Publication New Delhi 1985.
34. Mohite Y.J., 'Sugarcane Industry in Maharashtra', A Blue Print for Progress Government of Maharashtra, Bombay, 1974.
35. Mustafa M., Labour Problems and Welfare – A study of Sugar Industry, Deep and Deep Publications, New Delhi, 1990.
36. Puranik A.D., Socialism and co-operation, Maharashtra Rajya Sahakari Sangh Publication, 1973.
37. Sharma Somnath, Socio-Economic Study of Agro – Industries, Mital Publications, New Delhi, 1992.
38. Singh R.S., Sugar Industry, Capital Publishing House, Delhi, 1988.
39. Sinha B. P., Co-operation Instrument for Socio-Economic Justice, Himalaya Publishing House, Bombay, 1992.
40. Sinha R. V., Sugar Industry in India, Deep and Deep Publications, New Delhi, 1990.
41. Tripathy S. N., 'Sugar Co-operatives and Rural Change', Discovery Publication House, New Delhi, 1998.
42. Tupe S.D., Sugar Co-operatives and Rural Change, Dwarka Prakashan, Pune, Jan. 1992.
43. Venkaiah V., Impact of Agro-Based Industries on Rural Development, Himalaya Publishing House, Bombay, 1987.

II. Reports

1. Annual Reports of the Natural Sugar and Allied Industries Limited. Ranjni, Tal Kalamb, Dist. Osmanabad, for the year 1999-2000 to 2011-12.
2. A Pamphlet Published by the Natural Sugar and Allied Industries Limited. Ranjni, Tal Kalamb, Dist. Osmanabad, for the year 2000-01.
3. Annual Reports of Shri Sai Gramin Bigar Sheti Sahakari Patasanhstha for the year 2003-04 to 20011-12.
4. Pamphlets published by the Natural Bazaar Consumers Stores Limited during the study period.
5. Reports submitted by the Natural English School and Sai College of Computer Education.
6. Reports published by Dairy-Milk processing project of Natural Sugar And Allied Industries Limited.
7. Performance of Sugar Factories in Maharashtra Seasons 2001-02 and 2002-03, Published by Vasantdada Sugar Institute , Manjari, Dist – Pune.
8. A silver Jubilee Souvenir, Vasantdada Sugar Institute (1975-2000), published by the Vasant Dada Sugar Insititute in 2000.
9. 43rd Annual Report – 2002-03, National Federation of Co-operative Sugar Factories Ltd., New Delhi.
10. 47th Annual Report of Maharashtra Rajya Sahakari Sakhar Karkhana Sangh Ltd., Mumbai, 2002-03.
11. Co-operative Movement at a Glance in Maharashtra- 2001 (Part – II) 38th Issue published by office of the Commissioner for Co-operation and Registrar of Co-operative Societies, Pune.
12. Challenges and opportunities before sugarcane industry in Maharashtra in the next 10 years published by Vasantdada Sugar Institute, Manjari, Dist- Pune.

III. Articles Published in Newspapers and Journals

1. Anand D. P., 'Finance and Accounting for the sugar industry', Indian Sugar, 1975.
2. Ahmed Fakhrudin, 'Government and Sugar Industry', Co-operative sugar.,Vol.3, No. 11, July 1972.

3. Bahi R. R., 'Problem of Sugar Industry', Co-operative Sugar, Vol.3, No.11, July 1972.
4. Bhalerao and Nath, "Co-operative Sugar Factories in India" Co-operative Sugar October 1985.
5. Bhor. J. R., "Sugar Industry in India", Daily Sakal, August 16, 2002 (Marathi)
6. Gavade P. N and Dr. Patil J. F. 'Problem and Prospects of Sugar Industry in 21st Century' Indian co-operative Review, Vol.XXXVIII No. 4 April 2001.
7. Govinda Pansare, "Basic Problems of Sugar', Daily Sakal, October 2002. (Marathi)
8. Puranik A. D., "Co-operative Sugar Factory as an Instrument of Economic Development', Maharashtra Sugar, Vol. I, Dec 1975.
9. Rane V.P., "Sugar co-operatives the Core of Development", Indian Express, November 27, 2002.
10. Singh L. P., "Co- operative processing in Rural Development" A case study of Sugar co-operatives, Kurukshtra, Nov. 2000.

APPENDIX-I

SOCIO-ECONOMIC IMPACT OF A PRIVATE SUGAR FACTORY

A CASE STUDY OF NATURAL SUGAR AND ALLIED INDUSTRIS LIMITED

Questionnaire I (Farmers)

1. Name of Farmer
2. Address
3. Educational Qualifications
4. Age
5. How many members are in your family?
6. How much land do you possess?
    a. Area under Well/Tube Irrigation
    b. Area under Surface Irrigation
    c. Total Irrigated Area
    d. Total Un-irrigated Area
7. What agriculture equipment do you have?
    a. Iron plough
    b. Harrow
    c. Seed-driller
    d. Bullocks
    e. Electric Motor
    f. Oil Engine
    g. Submersible pump
    h. Tractor
    i. Truck
    j. Other equipment
8. Do you cultivate sugarcane every year? Yes/No
9. How much land do you use for sugarcane cultivation?
10. What are the factor influenced you produce sugarcane?
    a. Irrigation
    b. Assured market due existence of the sugar factory

c. Income from sugarcane

d. Other reason

11. Do you use improved varieties of seeds for Jowar, Bajra and Sugarcane etc.?
12. Does your factory supply you the improved seeds? Yes/No
13. Do you chemical fertilizers? Yes/No
14. Does the factory supply you these chemical fertilities? Yes/No
15. Do you use compost fertilizer and press mud? Yes/No
16. Does the sugar factory supply you the above fertilizers? Yes/No
17. Do you Jute and Dhencha seeds as green manure uses to improve soil fertility? Yes/No
18. Does your factory supply you the above? Yes/No
19. Do you use tractor for farming operations? Yes/No
20. Do you take tractor, truck etc. on hire from big farmer for various farm operations? Yes/No
21. Do you give on hire tractor, truck etc. owned by you to other farmers? Yes/No
22. Do you employ agricultural laborers on daily wages for farm work? Yes/No
23. If 'No', specify the reason
24. Do you employ annual contract labourer or "Saldars"? Yes/No
25. Do you own cattle for daily occupation? Yes/No
26. If 'Yes', give number

    a. Cows b. Buffaloes
27. Do you own any business Yes/No

28. Information on Net Income

Source of Income	**1999**	**2007**
Land		
Job/Service		
Labour		
Business		
Dairy		
Agricultural Implements		
Total Income		

29. How do you make use of the income?

    a. Development of land

    b. Purchase of land

    c. Deposited in banks

    d. Purchase of cattle and construction of cattle shed

    e. House-construction

    f. Purchase of furniture

    g. Purchase of vehicle

    h. For marriage, Education and Festivals

30. Residential accommodation conditions

Type of Residential Building	**1999**	**2007**
Cement Concrete Building/bungalows		
Medium Houses		
Huts		

31. Details of house hold equipments

Name of Equipment	**1999**	**2007**
T.V. set		
CD Player		
Fuel Gas		
Refrigerators		
Air coolers		
Telephone		
Motor Cycle		
Jeep/ Car		

32. What benefits do you get from being the member of the factory?

a. Supply of credit for agriculture
b. Supply of Agriculture inputs
c. Incentive to increase sugarcane production
d. Irrigation Projects
e. Sugarcane seminars and farmers rallies
f. Bore well Projects
g. Scheme for deepening of wells
h. Financial assistance for electricity connection and payment of electricity of electricity bills due
i. Financial assistant for payment of irrigation charges Yes/No
j. Educational Facilities Yes/No
k. Medical Aid facilities Yes/No
l. Employment opportunities Yes/No
m. Opening of new business opportunities Yes/No
n. Provision of agricultural implements

APPENDIX-II

SOCIO-ECONOMIC IMPACT OF A PRIVATE SUGAR FACTORY

A CASE STUDY OF NATURAL SUGAR AND ALLIED INDUSTRIS LIMITED

Questionnaire II (Sugar Factory Workers)

1. Full name of the worker
2. Department
3. Name of Village
4. Educational Qualification
5. Age
6. How many members are there in your family?
7. What was your occupation before joining the factory?
8. Do you own any land?

   If 'Yes' how much land do you own?

   Who cultivate that land?
9. What are your monthly wages?
10. Is your employment Permanent/ Seasonal/Temporary?
11. How many hours do you have to work?
12. How many of your family are the share holder of the sugar factory?
13. Are you a member of any trade union? Yes/No

    Which trade union?
14. How many problems of yours have been solved by the trade union?
15. Details of Household equipment

Name of Equipment	**1999**	**2007**
T.V. set		
CD Player		
Fuel Gas		
Refrigerators		
Air coolers		
Telephone		
Motor Cycle		
Jeep/ Car		

16. For what other purpose do you make use of your income apart from the daily family expenditure?
    a. Land development
    b. Purchase of land
    c. Deposited in Banks
    d. Purchase of cattle and construction of cattle shed
    e. House construction
    f. Purchase of vehicle
    g. For marriage, education and festivals
17. What benefits have you obtained since the establishment of the sugar factory?

a.	Bonus	Yes/No
b.	Overtime	Yes/No
c.	Medical Aid	Yes/No
d.	Educational Facilities	Yes/No
e.	Credit Facilities	Yes/No
f.	Accommodation	Yes/No
g.	Canteen	Yes/No
h.	Public Library	Yes/No
i.	Rest Room	Yes/No
j.	Sports and Recreational Facilities	Yes/No
k.	Cultural Activities	Yes/No

APPENDIX-III

SOCIO-ECONOMIC IMPACT OF A PRIVATE SUGAR FACTORY

A CASE STUDY OF NATURAL SUGAR AND ALLIED INDUSTRIS LIMITED

Questionnaire III (Agricultural Labours)

1. Full Name of the Agricultural Labourer
2. Name of the Village
3. Educational Qualifications
4. Age
5. How many members are there in your family?
6. What was your occupation before establishment of the factory?
7. Do you own any land? Yes/No

   If 'Yes', how much land do you own?
8. What is the daily wage rate at present?
9. What is your monthly wages?
10. Which is other sources of Income of the family
    a. Land Yes/No
    b. Job Yes/No
    c. Dairy Yes/No
    d. Business Yes/No
    e. Other sources Yes/No
11. Is your employment permanent/Seasonal/temporary
12. How many of your family are the shareholder of the Sugar Factory?
13. What benefits have you received since the establishment of the Sugar Factory?
    a. Educational facilities
    b. Availability of jobs
    c. Medical Aid
    d. Other benefits

14. Details of house hold equipment

Name of Equipment	**1999**	**2007**
T.V. set		
CD Player		
Fuel Gas		
Refrigerators		
Air coolers		
Telephone		
Motor Cycle		
Jeep/ Car		

15. For what other purpose do you make use of your income apart from the daily family expenditure?

    a. Land Development
    b. Purchase of land
    c. Deposited in Banks
    d. Purchase of cattle
    e. House construction
    f. Purchase of furniture
    g. Expenditure on marriage and education

APPENDIX-IV

SOCIO-ECONOMIC IMPACT OF A PRIVATE SUGAR FACTORY

A CASE STUDY OF NATURAL SUGAR AND ALLIED INDUSTRIS LIMITED

Questionnaire IV (Business Men)

1. Full Name of the Businessmen
2. Name of the village
3. Educational Qualification
4. Age
5. How many members are there in your family?
6. Type of Business

a. Joint family

b. Proprietary

c. Partnership

7. Do you own your land?

   If yes, how much land do you own?

8. Is anyone from your family employed?

   If yes, where?

9. Reason for coming into contact with the factory
10. Distance of the business place from the factory premises
11. Nature of Business

    a. Permanen b. Seasonal

12. Has your income increased owing to the establishment of the sugar factory?
13. Details of Residential Buildings

    a. Cement concrete's houses

    b. Medium houses

    c. Huts

    d. Hired houses

14. Details of house hold equipment

Name of Equipment	**1999**	**2007**
T.V. set		
CD Player		
Fuel Gas		
Refrigerators		
Air coolers		
Telephone		
Motor Cycle		
Jeep/ Car		

15. Impact of the sugar factory on Business

    a. Impressive b. Moderate

    c. Adverse d. No-Impact

16. What benefit have you received since the establishment of the sugar factory?

    a. Availability of loan Yes/No

    b. Increase in business attitude Yes/No

    c. Increase in trade and commerce Yes/No

    d. Availability of jobs Yes/No

    e. Availability of educational facility Yes/No

    f. Medical Aids Yes/No

APPENDIX-V

SOCIO-ECONOMIC IMPACT OF A PRIVATE SUGAR FACTORY

A CASE STUDY OF NATURAL SUGAR AND ALLIED INDUSTRIS LIMITED

Questionnaire V (Sugar Factory)

1. Name of the Sugar Factory
2. Date of registration
3. Which is the first crushing season of sugar factory?
4. Please give information about area of operation of the sugar factory
5. Information about the growth in membership of the sugar factory

Year	**Producer Member**	**Ordinary members (C0-op.Societes)**	**Nominal Members**	**Govt. of Maharashtra**
1999				
2000				
2001				
2002				
2003				
2004				
2005				
2006				
2007				
2008				
2009				
2010				
2011				
2012				

6. Information about Expansion of crushing capacity of the sugar factory

Year	
1999	
2000	
2001	
2002	
2003	
2004	
2005	
2006	
2007	
2008	
2009	
2010	
2011	
2012	

7. Information about the sugarcane crushed and sugar production

Year	**Sugarcane Crushed (MT)**	**Sugar Production (Qut.)**
1999		
2000		
2001		
2002		
2003		
2004		
2005		
2006		
2007		
2008		
2009		
2010		
2011		
2012		

8. Information about duration of the crushing season of the sugar factory

Year	**Date of Starting seasons**	**Date of closing seasons**	**No of working days**	**Average cane crushed (MT)**
1999				
2000				
2001				
2002				
2003				
2004				
2005				
2006				
2007				
2008				
2009				
2010				
2011				
2012				

9. Information about the cane price paid by the sugar factory

Year	**Cane price paid by sugar factory (Rs. Per tone)**
1999	
2000	
2001	
2002	
2003	
2004	
2005	
2006	
2007	
2008	
2009	
2010	
2011	
2012	

10. What type of facilities were provided by sugar factory to the producer members for improving the sugarcane production?
11. Which irrigation projects are undertaken by the sugar factory in its area of operation?
12. What projects out of the following the factory is implementing at present?

Name of Project	**Starting year of the project**
Distillery Plant	
Co-generation project	
Compost fertilizer plant	
Ethanol project	
Other	

13. Which co-operative societies were established as result of promotion and support by the sugar factory?

Name of the co-operative society	**Starting year of the project**

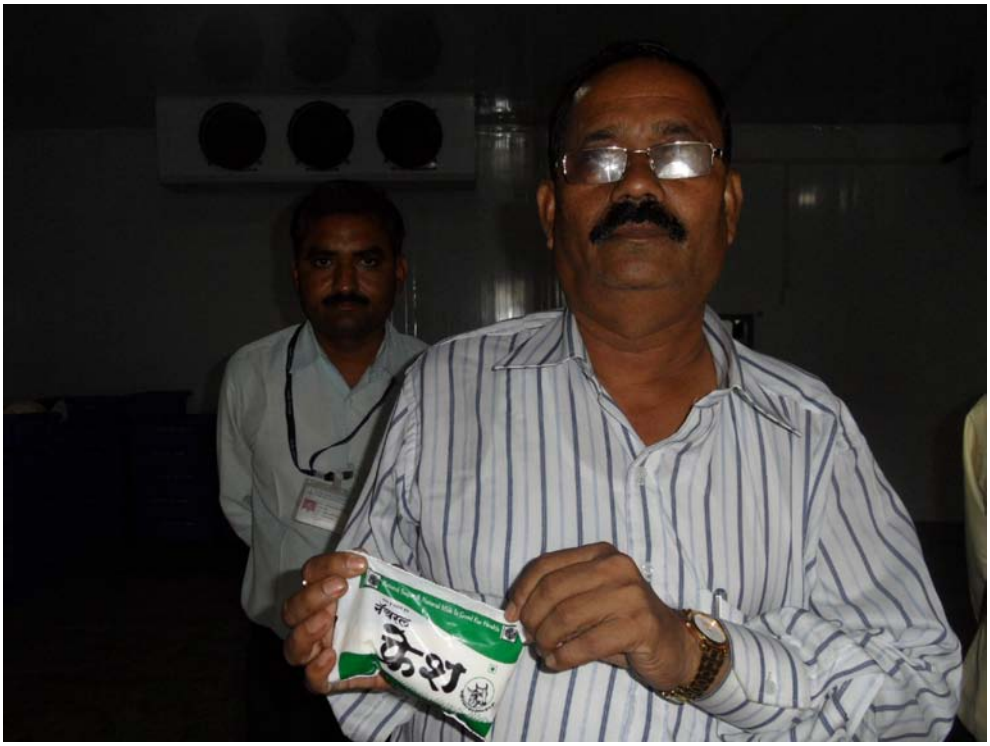
14. Information regarding the infrastructure Development undertaken by the sugar factory in its area of operation

Sr. No.	**Name of scheme**

15. What are the social welfare activities undertaken by the sugar factory for its shareholders and workers?

ANNEXURE

NSAI Dairy Section (Natural Milk)



Natural Fresh Milk of Dairy Section (NSAI)

Sugarcane crushing section of NSAI.

Boiler Section of NSAI.

Mechanical Section of NSAI.

Fire and Safety section of NSAI.

Factory Site of NSAI.

Natural Sugar Plant.