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**PERFORMANCE ANALYSIS
OF CO-OPERATIVE SUGAR FACTORIES
IN MAHARASHTRA, KARNATAKA AND GOA
- A COMPARATIVE STUDY OF SELECT UNITS**

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BY

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UNDER THE GUIDANCE OF

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DECLARATION

I, Gajanan Madiwal, hereby declare that this thesis for the Ph.D. Degree in Commerce titled '**PERFORMANCE ANALYSIS OF CO-OPERATIVE SUGAR FACTORIES IN MAHARASHTRA, KARNATAKA AND GOA - A COMPARATIVE STUDY OF SELECT UNITS**' is a bonafide record of the independent research work done by me under the guidance and supervision of **Dr. M. R. PATIL (Guide), Reader, DM'S COLLEGE OF ARTS, SCIENCE & COMMERCE, MAPUSA, GOA,** and **Dr. Y.V. REDDY (Co-Guide), Reader, DEPARTMENT OF COMMERCE, GOA UNIVERSITY, GOA.** I also declare that, this thesis or part thereof, has not previously formed the basis for award for any Degree or Diploma, Associateship, Fellowship or any other similar title.


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CERTIFICATE

This is to certify that, this thesis titled '**PERFORMANCE ANALYSIS OF CO-OPERATIVE SUGAR FACTORIES IN MAHARASHTRA, KARNATAKA AND GOA - A COMPARATIVE STUDY OF SELECT UNITS**' is a bonafide record of the independent research work done by Mr. GAJANAN MADIWAL, Research scholar, Goa University, under our guidance and supervision. The results of this thesis or part thereof, has not previously formed the basis for award for any Degree or Diploma, Associateship, Fellowship or any other similar title.


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ABBREVIATIONS

BEP - Break Even Point.

BSIEC - Bhargava Sugar Industry Enquiry Commission.

CV - Co-efficient of Variation.

EBDIT - Earning Before Depreciation, Interest and Tax.

ESCOS - Energy Service Companies.

GDP - Gross Domestic Product.

MT - Metric Tonne.

NFCES - National Federation of Co-operative Sugar Factories.

PACS - Primary Agricultural Co-Operative Societies.

RTA - Return on Total Assets.

RTS - Return on Total Sales.

SAP - State Advised Price.

SD - Standard Deviation.

SMP - Statutory Minimum Price.

SSK - Sahakari Sakhar Karkhana.

WTO - World Trade Organisation.

CHAPTER I
INTRODUCTION

CHAPTER I

INTRODUCTION

1.1 Background to Research Problem

Sugar is the first processed article of the diet that every child enjoys after milk. We need sugar right from morning in bed tea to till at night in sugarcoated tablets. Sugar plays a significant role as a source of energy in our diet. A few of us know about the cultivation of sugarcane (basic raw material), processes of sugar manufacturing and its by products. After textile industry, sugar industry is the second largest organized agro based industry in India. Reference of sugar and its products occurs in Vedas and epics indicated that the sugar was known to Hindus earlier than to any other race.

Origin of Sugarcane and Sugar Products

Sugarcane was first demonstrated¹ in New Guinea around 8000 B.C. later it was carried to India around 6000 B.C. *Ikshu* the term of sugarcane was found in *Atharva Veda*, which shows that the *Aryans* knew the sugar plant. Greek visitors to India have explained about the cultivation of sugarcane to the Indians. It was used to make honey (without the agency of bees), but it was nothing but *jaggery*. Megasthenes explained the process of sweet juice extraction from reeds. In the *Jatakas*, there is a reference about sugarcane processing machine known as *Mahayantra* or *Kolluka*. The *Arthashastra* written by *Kautilya* also provides information about the technique and process of manufacturing of sugar from cane juice. In olden days, by evaporating the juice of sugarcane down to a quarter, a third or half of the original volume, the raw *jaggery* (*Ksudra Guda*) was produced in and the first product was called as

guda, which was further refined and called as ***Matsyandika***, ***Khanda*** and ***Sarkara*** (sugar). They were used in medicinal compound. In ***Manusmriti*** there is a reference of two rivers viz., ***Iksuda*** and ***Ikumati***, where sugarcane (***Iksu***) was grown on the banks of the river, denoting the Indian's knowledge about the best-suited soil for the cultivation of sugarcane. The early Buddhist literature (1800 BC) gives reference of development of sugar manufacturing in Aryan India. They acquired the knowledge of raw *jaggery* / *guda* production only after reaching Bengal. The term *guda* might have derived from ***Gouda Desh*** present Bengal region and the Bengal region was famous for extensive production of sugarcane, *guda* and sugar, especially during British period. '***Phanila***' was one of the varieties of sugar made from cane juice. According to medical texts ***Khanda*** (another variety of sugar) is superior variety of sugar and has cooler in effect. ***Sarkara*** (crystallized sugar) is purest of all preparations form of cane juice. In ***Harashacharita***, one can find explanations of two kinds of sugar; the first kind is called as red sugar (***patala sarkara***) and the second one as white sugar (***karkasurkara***). The white sugar was prepared by boiling the *khanda* to remove its impurities.

The Chinese Buddhist pilgrim Fa-Hien, who entered India (from East of Indus) during 399 AD, written in his record as "*As you go forward from the mountain; the plant and trees are different from those in my land except the bamboo, the sugarcane and the pomegranate*"². Hiuen-Tsang who travelled during 629 AD also observed the use of sugar in various food items. The Chinese ambassador, Ch-u-ts-ai (1213 AD) reported to Jenghiz Khan that the farmers cultivate sugarcane and produce sugar and wine from cane juice. Marco polo (1290 AD), written in his journey record mentioned that the people of Bengal were trading sugar and many precious spices. Vasco-da-Gama

(1548) also witnessed sugarcane cultivation and sugar production at Calicut. Durate Barbosa who sailed with Magellan during 1513 AD was doing sugar trade from Bengal to Ceylon and Arabia.

There were two distinct methods for crushing sugarcane used in India. The first method was similar to oil-press mill, which consists of mortar-and-pestle mill. In the second method, the press mill had two vertically mounted wooden rollers, one of which was rotated by oxen driven around it. Being thrust between the rollers, the canes get crushed.

Scientific name of sugarcane is *saccharum officinarum*, a plant of grass family. In our country several races of sugarcane are cultivated. Based on their agricultural characteristics the races of the cane are classified traditionally³ in three main divisions, viz., UKH, Ganna and Paunda

Traditional Classification of Sugarcane

(i) The UKH races: The most extensively cultivated and specially used for production of sugar rather than chewing. There are many varieties in UKH race. Majority of these races have fairly hard pith and a hard skin, with small and narrow leaves. They grow at medium height and less susceptible to disease. The cane growers further classify them into white or green and red canes (they differ in shades of green and yellow also).

Various types of White or Green cane Ukh races: The Dhaur Cane - white colour appearance, need sufficient irrigation and manner, yields high quality crystal sugar. Dhaur Cane has high demand in the market. Farmers call it as queen of canes. Other sub varieties of dhaur cane are Ohamli, Machna, Momcha, Kewahi, Manga, Hara, Kinara, Pila ganna, Rakhri, Bori, Arba and Karra. **The Matna Canes** - the basic physical feature of the matna cane

varieties are, short and thin yellowish in colour, brittle at the joints, red spots on stem and skin adhered firmly to the pith. The juice is little acidic and yields a large amount of sugar. Other types of matnā cane are Agauri, Bansi, Bhar, Kaghazi, Khajra, Pandaria Dhaur, Subia, Badwa and Arkahara. **The Kuswar Canes** - the physical features of the Kuswar canes are thicker, stronger, more erect and more brittle than any other canes, used to produce gur and the raw sugar. The Kuswar canes are further classified as Mango, Bharanga, Reora, Dhaurwa, Hemga, Ledarwa, Charkahia, Karwa and Lakhra. **The Red Ukh Canes** - the red ukh races are poor in juice but yielding sugar of rich quality. The buds are very prominent and no brittle at joints. All are quick growing varieties; other varieties of red ukh are Jondaria, Akhri, Buraa, Saretha and Gholru.

(ii) The Ganna Races: These races are generally cultivated for chewing purpose. These are better and thicker quality than ukh races. The skin is so soft, which could be detached with a knife, rich in sugar crystals, because of this feature they are largely attacked by animals, other varieties are Methi, Dickaham, Pansahi, Kala ganna and Ghor Ara.

(iii) The Paunda Races: Imported race from other country grown for chewing purpose. They are tall and very thick plant with hard skin. The other varieties of the paunda races are Madrasi, Bambai, Lalarkala ganna, Banarasi and Burmi.

Modern Classification of Sugarcane

Right from 1918 the sugarcane Breeding Institute Coimbatore, Tamil Nadu has been sending cane varieties to various State Research Stations (SRS) for testing their suitability for different agro-climatic conditions. Indian cane

growers cultivated hybrid canes during 1923-24, looking at its performance and income, the farmers expended the area from 24,400 hectares to 68,800 hectares just in two years. In 1936, 1.381 million hectares were brought under hybrid technology. In 1923-24 the hybrid canes were grown in 1.96 percent of total cane cultivated area, which increased to 98 percent in 1943-44.

Earliest Varieties⁴ - The indigenous canes were replaced by the earliest varieties viz., co.205, co.210, co.213 and co.214. Further these varieties also replaced by improved canes viz., co.313, co.331, co.419, co.421, co.453, co.527, co.740 and co.997. **Improved Cloned Varieties** - At present major

improved clones grown in various states are co.86032, co.97009, co.G93076, co.si95071 co. 88025, co 92020, co.89012, co.91010, co.m92121, co.C90063, co.c671, co.89010, co.89012, co.89014, co.85004, co.m92122, co.88121, co.89249, co.86249, co.s98247, co.se96436, co.Bin94063 and co.N95132.

Early Maturing Clones - co.775, co.997, co.62174, co.6806, co.7201, co.7204, co.7304, co.7508, co.7704, co.7712, co.J64, co.c671 and co.A7601.

Late Maturing Clones - co.419, co.617, co.678, co.740, co.853, co.975, co.1148, co.62101, co.62175, co.62399, co.6304, co.7717, B37172, CP44-101, H50-7209, Nco310 and PaJ2878.

All these varieties are grown in India but production of sugarcane depends on many factors like (i) **climate** (temperature, frost, rainfall and sunshine, humidity); (ii) **variety** (early, late); (iii) occurrence of **disease** (red rot, smart, ratoon stunting diseases) and **pests** (borers, whitefly); (iv) **micro-organisms**; (v) **soils** and **fertility**; (vi) **irrigation** (drip, canal); (vii) **region** (altitude and latitude); (viii) **fertilizers** (time dose and method of application); (ix) **organic manures**; (x) **planting** (time, system); and (xi) **drainage, flood logging and drought**.

Indian agriculture activities are largely dependent upon rainfall. Indian 'Rainfall' has four-year cycle and hence, naturally agricultural production varies with this cycle. This trend is clearly visible in sugar industry also. Indian sugar sector is affected by either by rainfall or price (fair price for sugarcane) to the sugarcane growers.

Methods of Cultivation of Sugarcane

The methods of cultivation were the same as used today. Sugarcane was planted commercially as stem cutting consisting of two or more nodes, each of which bore bud and several root initials. **In the first step**, the field is dug up one feet deep with spades before planting with a view to attaining the necessary depth of the seed bed and destroying white ants and other insects harmful to the crop. **In the second step**, early maturing varieties sown earlier than late maturing clones to adjust the requirements of the sugar mills. **In the third step**, seeds sets of cane were planted on the flat on the levelled field. **In the fourth step**, nurturing and watering will be initiated.

Sugar Chemistry

Sugar, which we use, has the formula⁵ $C_6H_{12}O_6$, they are joined at different parts generally in the form of hexagonal ring structure. Different connections yield different types of sugar, sugar contents cane be extracted from any plant source most of the sugar extracted from cane, beet and sorghum. Carbohydrates that contain only one sugar unit (monosaccharides) or two sugar units (disaccharides) are known as simple sugars. Two most common monosaccharides are glucose and fructose. Glucose is the primary form of sugar stored in human body. Fructose is the main sugar found in most

fruits, but both glucose and fructose have the same chemical formula like sugar.

Types of Sugar

Following are the types of sugar⁶ and its related sweeteners:

Brown sugar: Refined sugar crystals covered with a fine coat of molasses hence appear as golden or dark brown sugar. The other types of brown sugars are Demerara sugar, Coarse golden brown sugar and Muscovado (more dark and strong flavour) sugar.

Caramelised sugar: It is prepared at home itself by caramelising or cooking at high temperature. It is also called burnt sugar.

Confectioner's sugar: It is granulated sugar, white in colour very large crystal size, other name is coarse sugar used for decorative purpose.

Demerara sugar: It is very high moist granulated sugar having a heavy syrup coating.

White granulated sugar: The most common sugar manufactured in all sugar mills. The basic raw material used to obtain granulated sugar is either sugarcane or beet that contains 99.8% pure sucrose, which can be stored many years in cool condition. It is available in various crystals sizes. (a) Table sugar- most commonly used purpose crystals. (b) Fruit / Berry sugar- fine crystals that dissolve easily in cold beverages. (c) Icing sugar- very finely ground crystals with a touch of starch to prevent lumps. (d) Coarse sugar-used for candies, large crystals. (e) Decorative, pearl or sanding sugar- medium size used for decorative purpose.

Tar binado sugar: Sugar with heavy molasses coating and mild caramel taste known as raw sugar.

Table molasses / fancy molasses: It is light in colour mostly used in animal food preparation.

Table syrups: The sucrose flavour and colour are added to water at different quantity to prepare this syrup, also known as liquid syrups.

Liquid invert sugar: The liquid contains pure sucrose and other two sugar components- glucose and fructose used by soft drink industry.

Maple syrup and sugar: The syrup is obtained from sap of maple tree. The maple sugar is obtained by crystallizing the syrup.

Corn syrup: It is prepared by converting cornstarch into a mixture of non-crystallized sugars.

By-products of Sugar Industry

The By-products⁷ of the sugar industry are Bagasses (30%-35%), Molasses (4%-5%), Press mud (2%-4%), Leaves and Tops (25%-35%) and Boiler ash (0.3%). The cost of sugar continues to be high due to the neglect of the profitable utilization of the By-products. If the By-products are used the cost of production of the sugar may go down by about 20%. The development of sugar cane By-products industries and their ancillaries may push up the profitability of the sugar industry. The countries like Australia, Brazil, Cuba, Philippines, South Africa and Taiwan have developed numerous industries utilizing the By-products. Some of these countries produce alcohol as main product and sugar as By-product.

In India, only the factories having 3500 MT capacity converting their molasses into spirit since it is commercially viable to invest in spirit production plants. The bagasses are used to produce electricity. About 50% of units produce electricity to fulfil mills' requirement when they are in operation. In

Australia bagasses are used to produce fine quality paper and readymade cattle food. Additional investment in new plant certainly will fetch a large amount of revenue. The industries can compensate man and machine hours lost in the sugar production unit in off-season. There is need to establish sugar complexes not just sugar factories in future. Filter mud and boiler ash generally goes in to the farmers' fields. So far nobody thought of extracting wax out of press mud at lowest cost.

History has shown ample evidences of colonial rulers who had put their maximum efforts to acquire and control the production and distribution of sweeteners. The first milestone was put with the establishment of 'The East India Company' on 31st December 1600. The Charter, issued by the king authorised the Governor and the company merchants of London to take up free trade of merchandise by sea. The East India Company started its venture by setting up of sugar factories at *Surat*, *Arangaon* and *Machlipatanam* in 1640. In India, the Civilian Crofts at *Sooksagar* established the first privately owned European Sugar Factory in 1784. The company could not meet growing demand for sugar in the Europe. Its capitalists started to give special attention towards cultivation of sugarcane and production of sugar in North India.

The East India Company appointed Mr. Richard Canadian⁸ (who was a sugar cultivation and manufacturing expert in those days) to observe the practice of sugarcane cultivation in various parts of the country. The observation report revealed that the methods used by the Indian cane growers and manufacturers were worse than those used in the West Indies.

Till 1858, Indian Sugar Industries were agglomerated in United Provinces, Bihar and Some districts of Bengal. Export of Indian sugar was hampered by a higher import duty on East Indian Sugar and at the same time

growth of the beet sugar industry in west. All these causes resulted into shrinking of sugarcane cultivation area in Basti and Gorakhpur districts, which was 1,42,122 acres in 1848 reduced to 74,617 acres in 1870. In 1906 there were 8 sugar mills with a total manpower of 1205 labourers. The statistics also revealed that there were 7 *gur* refineries in 1916. In 1921, the number of sugar mills increased to 16 and given employment opportunities to 3348 workers. Five more mills were established at the end of 1924.

After the First World War, in 1919, the Indian Sugar Producers Association approached the Govt. of India with an appeal to appoint sugar committee to study and advise on all aspects of the Industry. The committee reported that there were 22 factories in India, of which 18 were working and the sugar out put was 23,100 MT. The committee came up with a recommendation to set up Sugar Board with five official and six non-official members and a sugar research Institute with three division viz., agricultural, chemical and engineering. The policy of fixing prices for sugarcane started during those days.

The British rulers made one more remarkable achievement in 1922 by appointing the Sugar Commission to observe sugarcane cultivation in India. The sugar scientist revealed that the Indian canes were unfit for white sugar production. The Coimbatore Breeding Station developed a new variety and made possible the growth of sugar industry not only in India but also several other countries, India became self-sufficient and capable to export sugar to other countries instead of importing sugar from other countries.

In 1930 the Govt. of India appointed a Tariff Board⁸ to examine the position of the sugar industry in India and based on the Board's report, passed the sugar Industry Protection Act, 1932. The Tariff Board recognized the

importance of sugarcane for the agriculture economy like India. In 1932, the Tariff Board recommended tariff protector for the sugar industry for 15 years and inserted a clause in the preamble to the Indian Sugar Bill of 1932, stating that the protection would continue until 31st March 1946. Indian sugar sector got relief of duty for few years. During 1934-35 sugar industry confronted with a host of new problems like reduction in the cost of cane; sugarcane quality improvement; marketing of sugar; undue competition among the sugar producers; and utilization of by products.

Mysore was the first state in India to establish a large factory at *Mandya* in 1933, with a crushing capacity of 2,000 MT per day. The total capital investment was Rs.20 lakh. Indian sugar sector associates felt the need of sugar syndicate and was formed in June 1937. During 1935-36 there were 137 sugar factories in India. The syndicate successfully maintained the price of the sugar in Indian market. In 1938 the Bihar Government appointed a Labour Enquire Committee for investigating labour problem in the sugar sector.

The transportation of produced sugar was another problem. Bad conditions of roads prevented the factories from drawing cane from long distances. British Govt. prepared a coordinated road plan with a total expenditure of Rs.3,697 crore in five years in 1945. During 1945-46 there were 172 working sugar mills in India.

The cane growers also reported water problem to the British Government. Irrigation plays a significant role in the cultivation of sugarcane. It is a tropical cash crop where rain provides water for four to five months. The British Government was getting substantial revenue return from sugar industry and hence, the Government took up the canal construction work in *Deccan* regions, particularly *Godawari* and *Pravara* areas in 1911 and 1920

respectively. In *Ahemadnagar* district (1914-15) the Government canal irrigation covered 11,989 acres of sugar field. The sugar industry in India temporarily slackened during the non-co-operation movement (1919-22) due to boycott programmes and once again, during great depression period. The industry saw a set back but the British Govt. gave protection to many industries including cotton textile and sugar in those slack periods.

Global Sugar Scenario

Sugarcane is cultivated in 127 countries in the world. Most of them are situated in between 35°S and 35°N of the Equator with altitudes ranging from sea level above 700 metres and with varying climatic conditions and soils. About one third of the world's sugar production is contributed by the five countries viz., Cuba, Puerto Rico, Dominican Republic, Jamaica and Trinidad. Columbus introduced sugarcane to American⁷ in his second voyage led to the rapid development of sugar manufacturing in tropical America. The other settlers, Spanish, Portuguese and Dutch spread sugar manufacturing rapidly into many parts of America. During the 13th century, sugar cultivation started in all the countries in the Mediterranean. After that Mediterranean became the sources of supply of sugar cane to Europe and Africa.

The major sugar producers are Brazil, Argentina, Peru and Mexico. In USA, the principal sugar cane States are Hawaiian Islands, Louisiana and Florida. At the lowest cost of production, the USA sugar producers have been maintaining the highest environmental and labour standard and the USA is also a major sugar importer. Here sugar cane harvesting season normally extends 22 to 24 months. Some times, it extends even 30 to 34 months. The highest sugar recovery recorded in Australia. The Republic of South Africa, Egypt and

the islands of Mauritius are the three major sugar producers in African continents. In Asia, the major sugar cane producing countries are India, Indonesia, Philippine and China. In India, sugar cane is cultivated in 40.76 lakh hectares of land. India ranks first with regard to the area followed by Brazil and 13 lakh hectares in Cuba. During 1994 to 2003 the world sugar production increased by 25 percent. Some of the western countries produce beet sugar. The ratio between cane sugar and beet sugar is 76:24. Sugar was used as medicine rather than a sweetener in Europe till the 16th century. Only rich people used this as a food item during 18th century. In the 19th century sugar became a necessity for everyone. In the course of time beet sugar entered in the western market.

Till early 20th century the Caribbean remained the single important source of English sugar. British rulers fought, conquered and imported the slaves to its colonies for plantation of sugarcane. When Brazil started sugar production and exported to European countries during middle of the 16th century it affected European sugar production. From Brazil, the Dutch, the French and the British carried the sugar plant and slavery into Caribbean, where it flourished.

The International Sugar Organization established under the International Sugar Agreement 1968. After two decades, International Sugar Agreement was adopted by the United Nations' Conference on Trade and Development in 1992. India casts 38 votes out of 2000 votes on any proposals put for discussion in International Sugar Council⁷.

The world scenario of sugar production and consumption in the past few years in general and the ten important sugar producing countries in particular can be viewed at a glance from Table 1.1 and Table 1.2 respectively.

Table No. 1.1

**World Sugar Production, Consumption, Exports, Imports,
Ending Stocks During 1994-95 to 2003-04**

(Figures in thousand MT)

Year	Beginning Stocks	Production	Imports	Total Supply	Export	Domestic Consumption	Ending Stocks
1994-95	19288	115920	31317	167553	30289	113716	22520
1995-96	22520	122229	32182	174894	34219	116275	26437
1996-97	26437	122546	32772	178711	35816	119476	26463
1997-98	26463	124939	32653	181282	35426	122778	25851
1998-99	26901	130880	36032	193813	37357	124193	32263
1999-00	32338	136603	36123	204964	41471	127422	36071
2000-01	36071	130432	38683	205186	37674	130285	37227
2001-02	37227	134662	37817	209706	40748	134920	34038
2002-03	34038	143275	38048	215361	46578	136550	32233
2003-04	37045	144635	37237	218917	45107	139311	34499

Source: www.ussugar.com USDA, November, 2003

Table No. 1.2

Sugar Scenario of Ten Important Sugar-Producing Countries in the World

(In '000' MT)

Country	Year							
	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
Australia								
Production	5659	5567	4997	5448	4162	4610	5350	5114
Imports	2	2	4	5	5	5	5	5
Total Supply	5762	5797	5254	5636	4685	5249	6012	5582
Exports	4564	4554	4076	4123	3056	3607	4219	3893
Domestic Consumption	970	990	995	995	995	1020	1050	1200
Ending Stocks	228	253	183	518	634	622	743	489
Brazil								
Production	14650	15700	18300	20100	17100	20400	23760	24780
Imports	0	0	0	0	0	0	0	0
Total Supply	15160	16560	18860	21110	17810	21260	23970	25050
Export	5800	7200	8750	11300	7700	11600	14230	14250
Domestic Consumption	8500	8800	9100	9100	9250	9450	9640	10050
Ending Stocks	860	560	1010	710	860	210	100	750
China								
Production	7789	8631	8969	7525	6849	7872	9488	10070
Imports	1014	420	543	687	1083	1392	540	585
Total Supply	11487	11835	12027	10760	9783	10268	11170	12725
Export	435	308	572	433	129	647	510	115

Domestic Consumption	8268	9012	8907	8476	8650	8698	9122	10263
Ending Stocks	2784	2515	2548	1851	1004	923	1538	2347
Cuba								
Production	4200	3200	3760	4060	3500	3610	2200	2000
Imports	0	0	0	0	0	0	0	0
Total Supply	4600	3500	4328	4548	3838	3848	2328	2078
Export	3600	2500	3120	3400	2980	3000	1550	1250
Domestic Consumption	700	690	720	710	720	740	700	700
Ending Stocks	300	290	488	438	238	108	78	128
European Union								
Production	18221	19305	17818	19498	18520	16230	18664	17132
Imports	1808	1829	1867	1786	1839	2018	2100	1900
Total Supply	22095	23669	22686	24391	24089	21668	22695	22613
Export	5228	6361	5329	6138	6607	4200	5403	4900
Domestic Consumption	14332	14307	14250	14523	14420	14190	14529	14358
Ending Stocks	2535	3001	3107	3730	3062	3278	2763	3355
India								
Production	14616	14592	17436	20219	20480	20340	20100	19880
Imports	27	1000	1075	438	0	30	20	0
Total Supply	23098	22571	24361	28031	31190	31365	31790	30970
Export	422	21	10	25	1360	900	1700	1300
Domestic Consumption	15697	16700	16977	17296	17845	18455	20750	21500
Ending Stocks	6979	5850	7374	10710	11985	13000	9340	8170
Mexico								
Production	4835	5490	4982	4979	5220	5166	5038	5464
Imports	75	10	41	37	43	54	100	103
Total Supply	5624	6134	6014	5957	6326	6768	6424	6760
Exports	750	1224	524	318	155	403	100	66
Domestic Consumption	4240	4240	4549	4576	4623	5065	5266	5345
Ending Stocks	634	670	941	1063	1548	1300	1058	1349
Pakistan								
Production	2560	3805	3791	2595	2648	3453	3670	4037
Imports	771	21	8	280	1100	32	0	0
Total Supply	3555	4331	4302	3427	3875	3910	4130	4834
Export	0	628	540	0	0	0	300	324
Domestic Consumption	3050	3200	3210	3300	3450	3450	3500	3550
Ending Stocks	505	503	552	127	425	460	330	960
Thailand								
Production	6013	4245	5386	5721	5107	6355	6813	7690
Imports	0	0	0	0	0	0	0	0
Total Supply	6645	5045	5836	6405	5715	6926	7792	8972
Exports	4191	2839	3352	4147	3394	4300	5100	5800
Domestic Consumption	1651	1756	1800	1650	1750	1850	1900	1990
Ending Stocks	800	450	684	608	571	776	792	1182
United States								
Production	6536	7276	7597	8203	7956	7172	7620	8070
Imports	2517	1962	1655	1484	1143	1396	1510	1437

Total Supply	10407	10588	10775	11174	11412	10565	10292	10691
Export	191	162	209	112	128	98	141	145
Domestic Demand	8866	8903	9079	9049	9287	9292	8699	8778
Ending Stocks	1350	1523	1487	2013	1997	1175	1452	1768
Source: www.ussugar.com USDA, November, 2003								

Sugar Scenario in India

India is the second largest sugar producer in the world, having a share of over 15 percent of the world's sugar production and so far as the area under sugarcane cultivation is concerned, India stands first.

Normally, the crushing season in India begins from October to May. The Southwest monsoon affecting areas start their crushing in October whereas Northeast monsoon affecting regions start their season during late November. Tamil Nadu and some parts of Karnataka get a chance to start their crushing season from June to September and also run their mills about 190 to 200 days above the normal period 120 to 150 days. During October, the highest recovery rate is observed. India produces about 15.53 million MT (more than 15% of world's production) of sugar every year. The state of Maharashtra contributes 5.34 million MT followed by U.P. 3.73 million MT. Today, India is not only self-sufficient but also capable to export to the tune of 0.81 million MT p.a. to more than 38 countries. The countries like Pakistan, Bangladesh and Sri Lanka are our bulk buyers.

There are 553 registered sugar mills in the country⁹ (but many of them already lost their entity) with a production capacity of 180 lakh MT of sugar. The number of working sugar factories in India during 1994-95 to 2003-04 and state-wise total number of sugar factories in India (as on 30th September 2003) can be viewed at a glance from Table 1.3 and Table 1.4 respectively.

Table No. 1.3
Number of Working Sugar Factories in India
During 1994-95 to 2003-04

Year	Sector		Total
	Co-operative	Private and Public	
1994-95	231	177	408
1995-96	232	184	416
1996-97	229	183	412
1997-98	222	178	400
1998-99	249	178	427
1999-00	251	172	423
2000-01	259	177	436
2001-02	250	184	434
2002-03	269	184	453
2003-04	235	187	422

Source: Co-operative Sugar, November 2005.Vol.37.No.3. and August 2007 Vol. 38. No.12.

Table No. 1.4
State-Wise Total Number of Sugar Factories in India
as on 30th September 2003

State	Sector			Total
	Public	Private	Co-operative	
Punjab	-	7	15	22
Haryana	-	3	12	15
Rajasthan	1	1	1	3
Uttar Pradesh	22	54	27	103
Uttaranchal	2	4	4	10
Madya Pradesh	1	3	5	9
Chattisgrah	-	-	1	1
Gujarat	-	-	19	19
Maharashtra	-	16	156	172
Bihar	-	11	-	11
Assam	-	1	1	2
Orissa	-	3	4	7
West Bengal	1	1	-	2
Andra Pradesh	1	24	11	36
Karnataka	3	18	21	42
Tmil Nadu	3	19	16	38
Pondicherry	-	1	1	2
Kerala	-	1	1	1
Goa	-	-	1	1
All India Total	34	166	296	496

Source: Sugar India Year Book 2005

Table 1.4 indicates that about 35 percent of the sugar mills were in the state of Maharashtra, 21 percent mills in the state of Uttar Pradesh and 8 percent of mills were in Karnataka. So far as sector-wise classification is concerned, a large number (59.7%) of factories were in the hands of the co-operative sector followed by the private sector (33.5%) and public sector (6.8%). More than 50 percent of the sugar mills were in the hands of private people in Uttar Pradesh.

Maharashtra State and Agriculture Scenario

Maharashtra¹⁰ is the 3rd largest State in the Indian union with an area of 3,07,713 sq. km. In the south, Mumbai (formerly Bombay) is the State capital, the commercial capital and the head quarter of the Reserve Bank of India, also known as Holly Wood of India. Though the most industrialized State in India, still 70% of the people are dependent on agriculture. The population of Maharashtra is 9,67,52,247 (2001) and the population of Kolhapur district (area 7692 sq. km) is 35,23,162 (2001). Maharashtra State ranks first amongst major states in terms of State Domestic Products and accounts for 15 percent of the national income. Bombay Stock Exchange is the largest stock exchange in the country with over 5,969 companies listed (70% stocks transacted) on the exchange.

More than 215 Industrial Estates, 19,009 factories, 38,982 Credit Societies, 20,222 Primary Agriculture Credit Societies are in the State. Agriculture plays an important role in the economy of Maharashtra. The area available for cultivation is 3,07,58,000 hectares and the total area under

irrigation is 29,72,000 hectares. The area under cultivation, agriculture production and yield of ten major food crops grown in the State can be viewed at a glance from Table 1.5.

Table No. 1.5
Area, Production and Yield of Ten Major Food Crops
Grown in Maharashtra State During 1999-2000

S. No.	Crops	Area (Million Hectors)	Production (Million MT)	Yield (Kg. Per Hector)
1	Rice	1.51	2.54	1682
2	Cereals	7.41	6.45	870
3	Jowar	5.14	4.66	906
4	Bajra	1.74	1.13	653
5	Tur	1.04	0.87	834
6	Soyabean	1.16	1.62	1392
7	Sugarcane	0.59	53.14	90,053
8	Onion	112.60	1392.60	12,368
9	Coconut	0.002	2.27	11,350
10	Groundnut	0.52	0.55	1049

Source: Agriculture statistics at a glance (1999-2000), Ministry of Agriculture Govt. of India.

Karnataka State and Agriculture Scenario

Karnataka¹¹ is the 8th largest State in India with a total geographical area of 1,91,791 sq. km., Bangalore is the capital city of the State. The total population of the State is 5,27,33,958 (2001). There are more than 6,952 factories, 2,624 joint stock public companies and 25,013 private companies in the State. The total area under agriculture cultivation is about 1,20,97,000 hectare out of which 18,39,000 hectare sown more than once. The area under cultivation, agriculture production and yield of ten major food crops grown in the State can be viewed at a glance from Table 1.6.

Table No. 1.6

**Area, Production and Yield of Ten important Crops
Grown in Karnataka State During 1999-2000**

S.No.	Crops	Area (Million Hectors)	Production (Million MT)	Yield (Kg. Per Hector)
1	Sugar Cane	0.36	36.51	1,01,122
2	Potato	52.30	460.00	14,241
3	Coconut	0.32	16.70	5,219
4	Onion	125.70	594.70	4,731
5	Maize	0.61	1.69	2,776
6	Rice	1.45	3.64	2,512
7	Jowar	2.02	1.85	912
8	Soybean	0.06	0.06	891
9	Groundnut	1.97	1.24	633
10	Oil seeds	1.11	0.79	715

Source Agriculture statistics at a Glance (1999-2000), Ministry of Agriculture Government of India.

Goa State and Agriculture Scenario

Goa¹² is the smallest (total area is 3702 sq. km.) State. The total population of the State is 13,43,998 (2001). Formerly Goa, Daman and Diu were union territory. Goa was under the control of Portuguese till 19th December 1961. On 30th May 1987 Goa was elevated to statehood and Daman and Diu were made separate Union Territory. Its ancient name was Gomantaka. Panaji (Panjim) is the capital city of the State. The tourist traffic to Goa registered 14.48 lakh in 2004 of which foreigners' account for 3.63 lakh. Income from tourism was Rs.750 crore in 2004-05. Approximately 25% of the population earns their livelihood from tourism. The area under cultivation, agriculture production and yield of ten major food crops grown in the State can be viewed at a glance from Table 1.7.

Table No. 1.7
Area, Production and Yield of Ten important Crops
Grown in Goa State During 2005-06

S.No.	Crops	Area (‘000’ Hectors)	Production (‘000’ MT)	Yield (Kg. Per Hector)
1	Rice	52.8	170.7	3,232
2	Areca nut	1.6	2.6	1,656
3	Groundnut	3.3	5.7	1,732
4	Sugarcane	1.2	57.6	47,609
5	Coconut*	25.1	122.2 *	4,868*
6	Cashew nut	54.7	23.2	425
7	Ragi	0.4	0.4	897
8	Total pulses	9.8	9.1	935
9	Vegetables	7.8	72.3	9,034
10	Oil palm	0.8	1.8	2.302

Source: Towards knowledge farmer (2007), Directorate of Agriculture, Govt. of Goa.

* In case of coconut units is in million nuts and average yield is in numbers.

There are 477 factories, 2,557 joint stock companies out of which 2,265 are in private sector, 5,488 small-scale industries in the State. Total area available for agriculture is 1,71,356 hectare out of which 30,155 hectare is sown more than once. Agriculture is one of the important economic activities in the State. Rice along with fish (fish curry rice) is the staple diet of the goan people. Paddy is the principal crop of the State. There are two paddy seasons viz., monsoon crop Kharif (*sorod*) and the Rabi winter crop (*vaigan*).

1.2 Significance of Co-operative Sugar Sector in the Economy

On 25th March 1904, a few peers thought of mutual-help movement concept and that led to foundation stone to emerge Co-operative movement in India. The Indian co-operative movement is more than a century old. The co-operative sector in India has achieved a significant role in economic activities in different sectors. Today the movement emerged as one of the largest

movement in the world. In India, there are 0.5 million Co-operative Societies out of which more than 1.5 lakh co-operatives are Primary Agricultural Co-operatives Societies (PACS) with a membership of more than 230 million. On an average the movement, embraced 23% of population. One or the other way the self-help group covered cent percent of villages in our county. The sector generated more than 15.50 million employment in India.

The real spirit of co-operative movement sprouted in India with enactment of the Co-operatives Societies Act 1904. The Act has given definite direction by defining co-operative as, **'A co-operative is an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly-owned and democratically controlled enterprise'** ¹³. In the year of 1996, the basic principles were redefined, viz., Voluntary and Open Membership; Democratic Member Control; Member Economic Participation; Autonomy and Independence; Education, Training and Information; Co-operation among Co-operatives; and Concern for Community. The first three principles essentially address the internal dynamics of any co-operative and the last four affect both the internal operation and external relationship of co-operatives. The main aim of the movement was to substitute greedy moneylenders during the pre-independence period. In the first half of the century the movement could not reach the common man but 90 percent of the above said objectives were achieved within the last five decades.

In the First Five Year Plan (1951-56) India could not make any improvement in the co-operative sugar sector. The plan finished with only three co-operative sugar factories on the map of India's sugar industry. The country had to import 0.73 million MT of sugar. Tenfold improvement was

achieved by the co-operative sector by the end of 1960-61. During this period there were 174 sugar mills, out of which 30 factories were in co-operative sector. The total output of sugar was 3.02 million MT and the share of the co-operative was 0.45 millions MT. One can see a remarkable achievements of the co-operative sector 1960-61 onwards; in 1970-71 there were 73 mills; in 1980-81, 149 co-operative sugar factories; in 1990-91 the number shot up to 220 and at the end of the century it was 259 out of 436 sugar mills in India. In India, there are 252 working co-operative mills out of 453 working mills. Notwithstanding a significant contribution of sugar factories to the Indian economy, these factories including co-operative sugar mills are faced with several problems.

In India, altogether, there are 506 sugar mills installed (as on 30th September 2005), unfortunately 453 mills are functioning. The Co-operative sugar sector looking after 252 *Karkhans*, 134 mills are in the hands of private people and the rest 67 factories are in the public sector. There are 143 mills in India's sugar bowl, Maharashtra followed by Uttar Pradesh, 129 mills. The sugar sector generated employment for 4 crore farmers in the fields of 40.76 lakh hectares and 5 lakh in 506 in factories. The Indian farmers are capable to produce 30 crore MT of sugar cane in a year. In India, early varieties mature in 10 to 11 months and late varieties stand on the field for 12 to 14 month. The *Adsali* crop stands on the field for 14 to 18 month, which is grown in Maharashtra and some parts of Andhra Pradesh.

Sugar industry provides key input to many industries such as ice cream, chocolate, pharmaceutical, sweet making, sugar based chemicals, etc. More

than 60 percent of sugar production is utilised by these industries in India. The By-products are utilised by the alcohol distilleries, power generating units, organic fertilizer producers, liquid fuel producers, paper manufacturers, duplex and particle board manufactures, etc. In the light of the above, the sugar manufacturing enterprises in general and co-operative sugar sector in particular have assumed a vital role in the process of nation's economic development and growth.

1.3 Statement of Research Problem

Agriculture has continued to be the backbone of Indian economy and it contributes about 29% to GDP. Sugar industry is the second largest agro based industry in India and India is the second largest sugar producer in the world. The co-operative sugar sector has accounted a lion's share in terms of the total number of sugar factories as well as in the quantum of sugar production in India. The co-operative sector generated '**surety and security**' for its members. The sector provides a definite market for the members' sugarcane as well as infrastructure development funds at a low rate of interest. The co-operative sugar factories that are promoted by the members, of the members and for the members, operating on the basis of an accepted co-operative principles and values play a pivotal role in catering to the sugar requirement of people in India in particular and to people across the world in general.

The annual sugar cane price paid to the cultivators by the Sugar mills amounts to Rs.12,500 crore per year. The amount yet to be paid is Rs.2,000 crore out of which Rs.600 crore released by the Central Government. The

annual turnover of the Sugar Sector amounts to Rs.20,000 Crore. The Central Excise Department gets an income of Rs.1,400 Crore and the State Governments receive Rs. 800 Crore in the form of various cess. Looking at the importance of the Sugar sector the Government of India has established 56 Sugar Cane Research Stations all over the country.

Nevertheless, a considerable amount of economic significance of sugar industry, the sugar sector has been encountering with several problems⁷ that have hindered its growth and progress.

Some of them *interalia* are: **(i) low sugar cane productivity** across the country, which varies widely in the range of 40 to 134.2 MT per hectore. Tamil Nadu and Karnataka stand first and second by producing 134.2 and 91.2 MT per hectore respectively. Leading states like Madhya Pradesh and Bihar have the lowest yield in the range of 39.3 to 48.5 MT per hectore. Maharashtra 89 and Goa 60.6 MT per hectore. **(ii) Most of the machineries in sugar mills are out dated.** For the last 40-50 years none of the major repairs or replacements has been made in most of the mills. Low profits often do not allow a substantial depreciation without which the rehabilitation cannot be done. **(iii)** The average per capita consumption of sugar in India is only about 17.75 kg per annum and *gur* and *khandsari* 8.62 kg per annum (total 26.37kg); one of the **lowest per capita consumption of sugar** in the world. It is 55 kg in Australia, 52 kg in U.K and 50 kg in USA. The high sugar price and substitutes availability in the form of *gur* in the country is often responsible for low consumption. *Jagarry* tea is common in Indian villages. Competition with an unorganised sector (*gur* and *khandsari* producers) is another face of this problem. **(iv) Imposition of high**

excise duty and control on sugar stock, sugar price and cane price have resulted, a decrease in the profit margin of the sugar mills and therefore, they are neither in a position to offer high price of cane to the farmers nor in a position to make payment in time. **(v) Low rate of import duty** leading to the dumping of sugar from other countries. **(vi) Lack of professionals on the management.** **(vii) High cost of production and low profitability.** **(viii) Weak financial health** and poor attention towards the farmers' problems.

The sugar factories in Maharashtra, Karnataka and Goa (neighbouring States) are no exception to these problems. The sugarcane growers in Maharashtra and Karnataka are complaining about low price for their sugarcane and delay in cane bill payment. But the mills' managements are not happy with price and fiscal policies of the Government. So far as the sugarcane growers in Goa are concerned, they do not have these problems but the sugar factory is not getting required amount of sugarcane to crush. Against this background, it is clear that the real problem that has emerged before the policy makers and the co-operators is, how to improve the working and performance of co-operative sugar factories in India in general and poor performing States (like Goa) in particular. No micro level attempt has been made in the past three decades to analyse and understand the performance of the co-operative sugar factories in these three states. Hence, a need is felt to study the performance of the sugar unit in Goa in particular and the chosen units in Maharashtra and Karnataka in general so as to compare the performance of these units with the performance of the unit in Goa.

1.4 Objectives of the Study

- 1. To examine the supply trend of sugarcane and sugar production.**
- 2. To examine the total cost of sugar production.**
- 3. To study the operational viability and the financial feasibility of select co-operative sugar factories.**
- 4. To make comparative performance analysis of select co-operative sugar factories.**
- 5. To study the profile and problems of the sugarcane growers of select co-operative sugar factories.**

1.5 Hypotheses

- 1. Existence of correlation between sugarcane supply and sugarcane price in select units.**
- 2. Sugarcane procurement cost component dominates highly in the total cost of sugar production of select units.**
- 3. Low price for sugarcane, high cultivation cost and insufficient water supply are assumed to be the major problems of farmers.**

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CHAPTER II

REVIEW OF LITERATURE,

RESEARCH DESIGN AND METHODOLOGY

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REVIEW OF LITERATURE, RESEARCH DESIGN AND METHODOLOGY

2.1 Introduction

Review of literature is concerned to the study of previous research work in the field of chosen research problem. This is one of the most important components in the research process, which introduce the researcher to research gaps as well as to the research process. In order to get familiarity with the research process and to understand the research gaps in the chosen research problems about 100 research articles, 12 Ph. D thesis and 5 M. Phil dissertations were reviewed and the reviewed literature is presented under the following heads, viz., sugar industry in India and abroad, co-operative sugar sector in India, cost and operational analysis of sugar factories, financial analysis of sugar factories, human resources in sugar factories and in sugarcane fields, sugarcane and sugarcane cultivation.

2.1.1 Sugar Industry in India and Abroad

S. Pruthi¹ (1995) studied the history of sugar industry in India. The study focused on history of sugar, sugar making in ancient and medieval India, during British period and after independence till 1992. The consolidated chronological write up backed by secondary data, which was collected from the Government records and books. The study concluded with remarkable findings that the English trader brought sugarcane at Agra and Luknow to meet the growing sugar needs of the British Empire; the manufacturing of sugar was intensified by the

East India Company; dominance of small size units in the initial phase of the growth of the sugar industry and the existence of major regional difference in the size of sugar mills in India; and after the independence the growth of sugar industry was adversely affected by a variety of factors such as control, cane price, quota, duty and sugar politics.

D.K Grover ² and S.S Grewal (1991) examined the problems of sugar industry in India with special reference to four selected sugar mills and 72 sugarcane growers during the period 1960-61 to 1989-90. The main objectives were to study cane suppliers, the related changes in production and price, and to identify the various price and non-price factors responsible for fluctuations. The techniques used for analysis were Growth Rate Analysis with help of simple statistical tools such as ratios and averages, the compound growth rates for the important parameters were estimated by fitting the following equation $Y_t = Y_0 b^t$ where Y_t is the value of the dependent variable in current year, T is trend variables, Y_0 and b are constants, 't' statistics was used to estimate significance of the growth and Regression Analysis to identify the various price and non-price factors responsible for fluctuations in the area under sugarcane. The Nerolovian adjustment lag model was used to obtain the response function as $A_t = \Sigma 0$. The findings of the study were the major sugar growing states showed the similarities in their growth; the compound growth rates showed increasing trend; and the coefficient of variable showed that all the variables were subject to a wide fluctuations.

Ram Vichar Sinha³ (1998) studied the agricultural economics of sugarcane, problems of cane marketing and transport, technical performance, utilization of By-products, labour relations and policies on sugar economy. Simple tabulation method is used to analyse the data for the period from 1979-80 to 1983-84. The study revealed that the sugarcane development activities were not efficient, effective plant modernization and effective infrastructure developments were not under taken, utilization of By-products yet to introduce in the sugar mills and the work force yet to get proper wage.

D.K. Pant⁴ et al (2005) examined various process and economics of refined sugar production followed by the Indian sugar industry and also made an attempt to explain the efficient manner By-products utilization. The concluding remark was if the By-products of the industry were utilized properly the sugar production cost could be reduced.

C. Ramaswamy⁵ et al (2006), the researchers used secondary data to analyse the effective utilization of By-products. Indian sugar industry produces By-products in the forms of Bagasse (45 Million MT), Press mud (5 Million MT) and Molasses (7.5 Million MT) per year. There were 285 distilleries produced 2.7 billion liters of ethanol by utilizing 7.5 million MT of molasses during 2005-06. The authors gave a concluding remark that the large quantity production and higher amount of sugar export on regular basis may provide incidental added value to the sugar sector and enable setting up of large sugar complexes that can produce clean energy in the form of ethanol and power besides sugar.

M. Sivaraman⁶ (2005), the author made an attempt to describe the various sections in the Act and Amendments of Intellectual Property right effecting Indian agriculture. The Agriculture related issues in WTO Treaty; Indian Patent Law and Agriculture; Biological Diversity Act and Agriculture; Plant Varieties Protection Act and the provisions of these Acts affecting traditional knowledge of Indian farmers have been discussed. The analyses concluded with some suggestions to modify the said Acts.

P.J. Monohar Rao⁷ (2005) has compared the performance of seven countries viz., Brazil, India, Thailand, Mexico, Australia, South Africa and Argentina during the year 2002-04. The study revealed that India was the world's largest producer of all the sweetening agents (sugar, *Gur*, *Khandsari*) and has the largest number of sugar mills.

Dietmar Achilles⁸ (2005) critically evaluated the German position on EU reform proposal for sugar market regime. The German government generally supports the EU reform proposal for the EU sugar market regime but warns that the proposed quota reduction might not be sufficient to meet the reduction requirement resulting from the on going WTO negotiations and the WTO panel decisions on EU sugar exports. Farmers and the industry requested full compensation for income losses resulting from price and quota reductions. The author studied the cause and effect of EU reform proposal on sugar producing countries.

2.1.2 Co-operative Sugar Sector in India

S.S. Sirohi⁹ (2005) studied the status of co-operative sugar industry in India - past, present and future. This research article describes the status of co-operative sugar industry in India during 1936 to 1950, 1951 to 1985 and 1986 to 2005. In these periods sugar co-operatives under went major changes. The author has given sixteen recommendations for improving the health of sugar industry.

V.M. Hilage¹⁰ (1989) studied the growth of sugar industries in India in general and co-operative sugar sector in Maharashtra in particular. The main objective of the study was to take review of methods of performance analysis and determents of performance to evaluate the performance of two selected units situated in southern Maharashtra and to study the top management style and climate of the organization for the period 1976 to 1986. The study revealed that the Co-operative Act 1904 played a significant role till 1947 in sugar sector. But the co-operative sugar sector suffered from financial weaknesses, lack of professionalism, under developed marketing system and the low production of sugar. It is a case study of two units; the stratified random sampling was used for selection of farmers and members from 50 villages from the study area. The opinions of the middle level management were obtained by personnel interview.

S.S. Chandrasekharmath¹¹ (2005) has compared the two phrases of corporate concept - '**Co-operative Society**' and '**Corporate Society**' phonetically proximate but genetically too far. An in-depth understanding of the two concepts

was discussed with the opinions of co-operative and corporate scholars. The author compared the concept with business ethics, traditions and present situation and concluded that the executives of both the societies had to think in the same direction for overall development of the society.

Ghanshyambhai H. Amin¹² (2005) explored the progress and development of co-operative movement in Gujarat. It is a consolidated report of co-operative movement in Gujarat state right from 1889 to 2005. More stress was given on milk co-operatives with a special reference to 'Amul' followed by Bordoli sugar co-operative. There were 27 sugar co-operative mills in the state out of which 15 factories were in operation. The study revealed that co-operative movement in the state contributed tremendously under the able leadership and guidance of co-operative scholars.

Biradar Patil¹³ (1995) has examined the growth, problems of the co-operative sugar factories in Belgaum district of Karnataka State during 1985-88. The objectives of the study were to study the growth, problems, structure, working and socio-economic impact of co-operative sugar factories; role of sugar co-operatives in uplifting of small and marginal sugarcane growers; to compute the cost of sugarcane cultivation and net income of sugarcane growers. Both primary and secondary data were compiled; the primary data was gathered through structured questionnaire. The sugarcane growers were stratified into marginal (up to 5 acres of land), small (5 to 10 acres) and big (above 10 acres) farmers for the study. The study revealed that there was low yield of sugarcane in the region; instability in the sugarcane supply and price; high cost of production; delay in

payment of farmers' bills; and observed under utilization of By-products (bagasses, molasses and press mud) within the region.

Paramjit Sharma¹⁴ (2005) investigated 'why co-operatives are often coaxed for poor performance?' The writer of the research article made an attempt to evaluate the fundamental misconceptions in the minds of the people throughout the world regarding co-operative sector. The author observed that in the era of corporate scandals, most co-operatives are practicing a high degree of ethics and exhibited less greed.

P. Sivaprakasham¹⁵ (2005) examined the need of professionalisation of management in co-operatives to meet the challenges and proposed the strategies. The author made an attempt to convince the co-operative managers about the present need of Human Resources Development (HRD) in co-operatives referring to the area of planning, executing, educating, training, motivating and ensuring adequate skilled manpower in development programmes both for the societies and for the co-operatives and concluded with a remark 'professionalisation in co-operatives is the need of the hour'.

2.1.3 Cost and Operational Analysis of Sugar Factories

Vinay Kumar¹⁶ (2005), Managing Director of N.F.C.S.F. examined the sugar technology - prospects and challenges with reference to the technical area of the sugar industry and the efficiency norms applicable to the industry and concluded with a remark that the productivity can be improved by developing sugar complexes with the help of professional management.

Pitam Singh¹⁷ et al (2005) studied tuning of mill for optimum primary extraction. The optimum value of primary extraction can only be achieved by matching the values of the parameters, which can be matched by knowing their quantitative or qualitative effect on juice extraction. Preparatory Indexes (PI) and Fibre Loading (FL) are the governing factors. The Factorial Design Analysis (FDA) states that 16 sets of observations required to decide the quantitative effect of these parameters. The study revealed that one could tune the mill for its optimum primary extraction at site by adopting the procedure started in the FDA method.

Ramchari S. Nikam¹⁸ (1995) analysed the composition of various cost elements and their magnitude in total cost of sugar production, and also cost and productivity trend in co-operative sugar factories in *Solhapur* district of Maharashtra State for the period of 1987 to 1993. The study revealed that the rapid growth was observed in co-operative sugar industry. Post-independent period was dominated by co-operative sugar sector. The sector's total sugar production and average crushing capacity increased from 800 TCD to 5000 TCD; capacity utilization gone up from 94% to 131%; and average sugar recovery increased from 9% to 12% during the study period. The booms in the said industry fetch an attractive return to the cane growers. A notable suggestion is, over dependence on loan and deposits may hamper the sugar sector in future and cost consciousness is yet to be popularised among these mills. With the help of structured questionnaire primary data was computed. The secondary data was obtained from seven sugar mills in co-operative sector from *Solhapur* area comes under 'drought area', out of seven, only three expanded their capacity.

The duration of crushing ranges from 100 to 128 days and the average recovery rate was 10.68 percent.

A.K. Nanda¹⁹ (2005) made an attempt to analyse the energy consumption and water management at various stages of sugar processing and suggested certain techniques, which would reduce the energy consumption and promote better water management.

A. Krishna²⁰ (2005) proposed the future sugarcane complex with an example of 2500 TCD mill. The study concluded with a notable remark that the distillery attached to a sugar mill will fetch five times more income than that of a sugar mill without distillery.

V.B. Kakade²¹ (1995) studied the capacity utilization of co-operative sugar factories in Maharashtra State. The research was based on published data during the period from 1981 to 1990. The main objectives were to find out the degree of capacity utilization, BEP and variation and the cause for change in capacity utilization. The study revealed that the capacity utilization depends upon the supply of sugarcane.

M.G. Jadhav²² (2005) made an attempt to analyse the sugar loss at various stages with the help of a parameter developed for this study known as 'Reduced Total Loss Ratio Concept'. The loss of sugar contents at all stages from harvesting to final sugar in bag is a serious economic problem in sugar industry.

The study revealed that the reduced total loss ratio gives clear picture of losses at various stages, which could be studied and could be controlled.

A.S. Mahadik²³ (1991) analysed the economics of molasses based By-products of co-operative sugar factories in Kolhapur, Satara, Sangli and Solapur districts of Maharashtra State, during the period from 1975 to 1989. It was a micro level analysis. The main objectives were to analyse the cost, income and utilization of By-product and to examine employment generated by the selected units. The required data were gathered from the records of the factory, Excise Department and Government machinery. The study revealed that the bagasses and molasses constitute the main By-products of sugar industry and the utilization of the By-products affects the processing cost of the sugar. The study concluded with a suggestion that every sugar factory must utilize their By-products effectively to reduce the total cost of the sugar.

Klaus Niepoth²⁴ (2005) examined the developments in falling film plate evaporator technology right from 1992 to 2004 in Germany. The said technology could be further improved to reduce the primary energy consumption, high process stability and high thermal efficiency.

Sanjay Mohan Bhatnagar²⁵ (2005) summarised many research works done by various institutions on co-generation of electricity from the huge quantity of bagasses. The studies conducted by Tata Energy Research Institute (TERI), indicated that 5200 MW of power could be generated through the use of co-

generation in sugar factories in India. Hence, there was a need of modernization of Indian sugar industry.

Jahar Singh²⁶ et al (2005) collected sugar samples from ten different sugar factories in India, which followed Double Sulphitation Process (DSP) and found the presence and formation of colour in cane sugar crystals influenced by both macro and micro environmental factors and the sugar colours were acidic in nature.

B.L. Mittal²⁷ (2005) studied the evaporating crystalliser in sugar mills. The crystallization of sugar in a sugar mill was carried in three or four stages. The last stage is most important as the sugar lost in final molasses depends upon the efficiency of crystallization. The crystallization by cooling in air or in water has got its own limitations. To recover 100% sugar from final molasses was the main objective of the experiment. The researcher has designed an apparatus called the 'Continuous Evaporating Crystallisers' and says that the objective can be achieved if the process procedures are followed.

G.M. Jenekar²⁸ and **R.V. Gabadi** (2005) studied on kinetics of crystallization of sugar, effect of manganese and cobalt salts. The study deals with the role of manganese and cobalt salts on the rate of crystallization of sugar, which plays an important role in the economics of sugar industry. Many methods and procedures have been developed to get enhanced the rate of crystallization, of these manganese and cobalt salt were found to have beneficial role for pan boiling in sugar factories.

S. Thangavelly²⁹ (2005) explained twenty methods of estimating the presence of iron in sugarcane juice, *jaggery* and sugar. The analytical methods were collected from various sources right from 1970 to 2005. At the end, the author advised that the said methods might be tested and compared for their relative efficiency.

S. Thangavelly³⁰ (2005) has examined the various types of materials available for packing and wrapping of *jaggery* right from jute bags to galvanized iron drums. This analytical research work revealed that the alkthene lined Hessian bags are recommended by most of the researchers for the storage of *jaggery*.

Jasbir Singh³¹ (2005) examined the benefits of adopting co-generation system in sugar mills, trends of steam generation per MT cane and power consumption pattern in sugar factories. The study revealed that the appropriate standards to be adopted by the sugar mills as per their capacity so as to gain the highest benefits of energy consumption.

Raghavendra Kumar³² (2005) examined the role of Energy Service Companies (ESCOS) in saving energy and how it could be beneficial to the sugar Industry. The ESCOS at global levels and National levels have been discussed and concluded with a remark that the development of energy efficiency business in general and ESCOS business in particular has not yet taken place up to a desired level in our country for which collective action needs to be taken immediately.

2.1.4 Financial Analysis of Sugar Factories

G. Gaur³³ (2005), ex-financial advisor of National Federation of Co-operative Sugar Factories made an attempt to explain the financial norms and classification of fixed and variable costs applicable to the co-operative sugar mills. In his concluding remark said that any improvement in productivity both in the field and factory would provide level playing ground to the Indian Sugar Industry to face the competition in future.

Basavraj S. Benni³⁴ (2005) studied the physical and financial performance of twelve co-operative sugar factories during 2001-02 with the help of Ratio Analysis and Multivariate Econometric Technique Method. The study revealed that the physical and financial performance indicators influenced the total performance of sugar co-operative factories and concluded with a remark that in the total sugar production cost, cane conversion cost was greater than the cane cost.

Chandrakant Janardhana Joshi³⁵ (1991) analysed the finances of sugar factories (From 1960 to 1987) in Kolhapur District of Maharashtra. The objectives were to measure the liquidity, solvency, efficiency, working capacity, profitability and socio-economic developments. The study revealed that the financial performance depends on internal and external factors; internal factors are factory maintenance, employee behaviour, liquidity, solvency and profitability. The external factors were social, economic and political. The study concluded with remarks that the units should enhance their equity capital; introduce cane development programme, man power planning and plant modernization.

Mahadev G. Powar³⁶ (1997) analysed the raising and utilization of finance by co-operative sugar factories (From 1961 to 1993) of five co-operative sugar factories at the micro and the macro level. The objective was to interpret the data with the help of ratios - liquidity, solvency, efficiency and profitability. The findings of the research were, the use of chemical fertilizer made much harm to the soil; there was a need of innovation of modern technology and plant modernization; and there was a need of man power policy, accounting producers and inventory control.

Hanchinmani S.N.³⁷ (1996) has done the financial analysis of co-operative sugar factories in *Belgaum* district of Karnataka with a sample size of one unit. The annual reports and manufacturing reports from 1990-1994 were used as secondary data. The main objectives were to assess the financial position of co-operative sugar factory under study and to evaluate the financial operations and performances with the help of financial ratios. The parameters used in the study were, **Financial Structure** = Capital Structure + Current Liabilities; **Capital Structure** = Total Owned Fund + Term Loan; and **Assets Structure** = Fixed Assets + Current Assets. The study revealed that there were disproportionate relationship between different financial variables and standards; the co-operative sugar factory had a weak financial base, more dependent on bank loan; and the professional management yet to step in co-operative sugar factory.

Daxa Gohil³⁸ (2005) examined the transaction cost vis-à-vis financial performance of sugar industry in India. The study was based on secondary data of the private sugar mills working in India during the period from 2000-01 to 2002-03 with a sample size of 44 private sector sugar mills. The main objectives

behind the study were to examine the role of transformation vis-à-vis transaction cost in economic and financial performance (was tested based on regression model) of the Indian private sugar industry; and to bring out the policy implication of transaction cost approach for future development of sugar industry. In order to examine the relationship across the financial variables the parameters used were: (i) Return on Total Assets (RTA- Y_1) and Return on Total Sales (RTS- Y_2). The author's concluding remark was that the financial variables related to transformation costs and transaction costs (in advertising, marketing and bad debts) and transaction costs based on sugar production were statistically highly significant. Hence, the transaction costs influencing the financial performance at greater extent.

Shivajirao N. Borhade³⁹ (1991) studied the management of productivity in a co-operative sugar factory during the period 1981 to 1989 with the help of published data. The objectives were to measure productivity and to evaluate best approach of productivity. Time lost in percentage; labour lost in terms of revenues; machine efficiency in terms of per hour crushing; and the total productivity value of output, were the productivity parameters used in the study. The concluding remark was performance of the mill was moderate.

2.1.5 Human Resources in Sugar Factories and in Cane Fields

A.H. Dagde⁴⁰ (2001) has proposed a new concept of right sizing of manpower in sugar industry and advocated that without restructuring, right sizing, down sizing or optimising Indian sugar industry may be private or co-operative sector would not survive. Right sizing of manpower does not mean reduction in manpower but

does mean right person at right place at right time; avoiding duplication of work force; and reduction in salary and wage bills. The study proposed a model based on the manpower requirement stated by the various authorities/institutions based on the crushing capacity of sugar factories.

Maduri L. Bandasoda⁴¹ (1998) examined the employee services in Rajarampur Patil Sahakari Sakhar Karkhana Ltd. Rajarampur, Sangli District of Maharashtra for the year 1997. The objectives of the study were to study personnel services, legal aid, vocational guidance, send-off ceremony, employee convenience, canteen and restaurant facilities, existence of co-operative stores, housing facilities, transport, drinking water facility, uniform, etc. The study revealed that less than fifty percent of the employees were observed to have availed basic facilities.

V.A. Patil⁴² (2002) analysed the problem of seasonal workers working in selected sugar factories during the period 1997 to 2001. The main objectives of the study were to assess the degree of job satisfaction of the seasonal workers; to analyse the demographical statuses of the seasonal workers. The study revealed that the majority (66%) of the seasonal workers were young and were in between 20 years to 30 years; 32 percent were working in manufacturing section; 27 percent in engineering department; 17 percent in agriculture; 57 percent of them had more than 10 years experience; the degree of job satisfaction was 79 percent; and 81 percent told job was not boring.

Waman Nimbagi⁴³ (1990) analysed the socio-economic status of seasonal migrants in the co-operative sugar factories during the study period 1983 to 1989. The main objectives of the study were to analyse the demographic status of the seasonal migrants to list out problems of seasonal workers and socio-economic conditions of the seasonal migrants. Both primary and secondary data were used to arrive conclusions. The study revealed that the social and economical conditions of the seasonal migrants were not satisfactory.

K.D. Jadav⁴⁴ (1991) examined the socio-economic impact of the six sugar co-operatives factories in Satara District of Maharashtra during 1982 to 1989. The objectives of the study were to study the growth of sugar industry during the period in Satara district; to examine the total fund raised as share capital; to estimate the employment generation; to examine the cost of production and price; and to examine the contribution to rural development. The research report revealed that the number of co-operative sugar factories increased in the region: the socio-economic growth has been taking place in *Sahyadri*; the sugar industry generated employment; and the contributed considerably to the rural development.

Vandana S. Dandekar⁴⁵ (2000) made an economic analysis to find out rate of return to education due to inception of sugar co-operative factories in Sangli District of Maharashtra State during the period of 1987 to 1997. The required primary data was gathered with the help of structured questionnaire. A random sample survey method was used. The main objectives were to measure the return to educational expenditure for the employees in sugar co-operatives; to

measure the social, private and marginal rate of return. The published reports of the sugar co-operatives and published Govt. records were used as secondary data. The study revealed that 99 percent of the employees had invested in Life Insurance Corporation and purchased gold; and primary education cost was Rs.5811, High school Rs.8644, and ITI Rs.13,240.

N.S. Patil⁴⁶ (2005) studied the unique and successful rehabilitation of Satpuda Tapi Parisar SSK Ltd. Purushottam Nagar, Maharashtra. The research paper based on case study and the true story of Tapi Parisar SSK Ltd. pioneered by Mr.P.K. Annu Patil in 1969. The step-by-step achievements of the mill explained till the season 2005-06. The study concluded with an advise to the low performing mills to follow the action plan so as to achieve the success.

2.1.6 Sugarcane

S. Thangavelu and D. Subhadra⁴⁷ (2005) explored the footsteps of sugarcane right from 1923 to 2003. The data was compiled from various sources and presented to give conclusion. The researcher says that sugarcane cultivation cannot be increased beyond a certain limit but the left out way before us was 'Better Variety' and 'Better Cultivation Practices'.

Balwant Kumar⁴⁸ et al (2006) examined the fifteen sugarcane clones of different maturity groups, which were grown under eight different environments, such as autumn and spring crops for two consecutive years during 1999-2000 to 2002-2003 at Pusa Farm, Bihar. It was found that the BO128 clone suitable for autumn crop whereas, BO110 and BO109 were suitable for spring crop.

B.R.Bhite⁴⁹ et al (2006) experimented different sugarcane varieties for post-harvest effect. Advancement in agro genetic management technique significantly increased yield of sugarcane. However, the sugar recovery rates till today have not shown any significant improvements. This study focused on post harvest inversion of sucrose in different ten varieties of sugarcane was conducted at Padegaion and Satara. Uniformly matured canes of ten varieties of sugarcane were harvested from the experimental plot during 2003-04. It was found that the two varieties viz. COM 7125 and CO92020 showed variable response to post harvest storage.

S.Tanguvelu⁵⁰ and **K.Chiranjivi Rao** (2006) conducted field experiments to asses reasons for reduction in sugar contents in top and bottom portions of sugarcane genetic stocks and its associations with other quality characters. In a replicated field trial 30 clones were planted to study the sugar content in juice at 9,10,11 and 12 month in top and bottom portions of the early maturing and late maturing clones. The study revealed that the variations of reducing sugar between clones, sugar and portions were noted; significant positive associations of reducing sugar in juice were found with fructose and glucose and the importance of reducing sugar in maturity trend of sugarcane clones and its clear associations with other quality parameters.

S. Thangavelu⁵¹ (2005) analysed the role of sugarcane varieties on *jaggery* research. Sugarcane varieties play a major role in *jaggery* quality and yield hence, the factors influencing quality of *jaggery* taken as parameter such as agro-climate, fertilization, soil, irrigation, boiling, storage. Ninety years research work performance sugarcane varieties were taken into consideration to conclude the

study. The researcher says that the clones with high *jaggery* quality and quantity were suitable for *jaggery* making and the chemical compositions of cane juice are important in *jaggery* making.

G.Manickam⁵² et al (2005) conducted field experiments to evaluate the performance of three early season sugarcane clones viz., C960696, Si96129 and G96736 along with five standards (Coc98061, Co86249, Co86032, Co8021 and Cosi95071) for their cane yield, juice, quality and sugar productivity during 2002 to 2004. The result revealed that the new clone C96696 significantly registered the highest mean cane yield of 160.49 MT and 154.67 MT that respectively in plant and ratoon crop. The same clone registered the highest commercial cane sugar percent of 12.62 in plant and 12.68 in ratoon crop.

Niranjan Murthy⁵³ et al (2005) conducted field experiments on a promising early maturing sugarcane variety for Bhadra command area of Karnataka. The clone co-94005 early maturity group was evaluated in comparison with coc.671 and co.7704 groups during 2003-04. The study revealed that the performance of co.94005 for sugar and cane yield was better (16% to 21%) as compared to others.

Radha Jain⁵⁴ et al (2006) examined the sugarcane germination. Germination in sugar cane refers to sprouting of buds and early growth of young shoots from it. The productivity of sugar cane is higher in tropics than subtropics. Termination of sets / buds is usually less than 40 percent in subtropical India as against that of 60 percent to 80 percent in tropical zone. The germination can take place from seed or from cane cuttings. The research consists of germination study made by

the different scholars from 1947 to 1998 and concluded with a few details of factors that influencing with germination in sugar cane.

Shree Ram Singh⁵⁵ et al (2005) examined the role of frontline demonstration in transfer of sugarcane production technology in U.P. The study was undertaken to ascertain the role of demonstrations in sugarcane production technology in increasing the yield. The researchers conducted frontline demonstrations on farmers' fields during the period from 1996-97 to 2002-03. In all 34 areas (crop management, seed, weed, insect, pest, etc.) were selected for demonstration. The study revealed that after the demonstration the productivity was better and low yield due to poor knowledge.

P.K. Singh⁵⁶ et al (2005) conducted a field experiment at Indian Institute of Sugarcane Research, Lucknow during 1999 and 2000 crop seasons to assess the impact of sub-optimal conditions on eleven elite sugarcane genotypes along with two standard varieties as compared to the normal conditions. The genotypes CoLk9704 recorded the highest yield followed by CoLk9705 and CoLk9702. The highest sucrose percentage (19%) was recorded in LoLk9804 followed by CoLk9703.

Chhaya P. Shinde⁵⁷ (2005) analysed the influence of sulphur application on sugarcane yield and quality. Field experiments were conducted during 2001 to 2004 to study the response of *suru* sugarcane to the graded levels and sources of sulphur. The present study indicated that, the application of 60 kg. Sulphur per hector was effective in increasing the cane yield and for better quality.

Pagire B.V.⁵⁸ and S.T. Sarje (2005) analysed the input use and output in *suru* and ratoon sugarcane. The study was under taken in *Solhapur* district of western Maharashtra. The farmers' data for the year 2001-02 were collected by survey method. The study revealed that the yield obtained by ratoon cane was 47 percent less than the expected yield. The production function analysis for *suru* and ratoon cane showed 34 percent and 57 percent respectively of the total variation in the output.

2.1.7 Sugarcane Cultivation

Pawar P.P.⁵⁹ et al (2005) examined the benefits in adopting improved production technology in sugarcane farms in Western Maharashtra. The investigators approached 270 sugarcane growers during 2002-03 to asses the degree of knowledge about improved production technology of sugarcane farms. The survey revealed that 25 percent of the farmers were not aware of the techniques

B. Sundara⁶⁰ (2005) has analysed his experiments and experience in drip irrigation for sugarcane at sugarcane Breeding Institute, Coimbatore, during 1990 to 1996. The surface and sub-surface drip systems were compared with the conventional furrow irrigation and also the water saving skip-furrow and alternate furrow irrigation techniques. The study concluded with a remark that around 40 percent of the water was observed to be saved by adopting drip system with an increase of cane yield in the range of 10 to 20 percent.

Tej Pratap⁶¹ et al (2006) studied the effect of row-spacing seed rate and fertilizer requirement levels on growth and yield of sugarcane for maximization of the

productivity of sugarcane. The experiment was carried out during the spring season of 1995-96 and 1996-97. The study concluded that the row spacing had significant effect on germination percentage because the crop planted at 90cm. row spacing exhibited significantly lower germination than spaced at 60cm.

C.S. Poswal⁶² et al (2005) examined the constraints in adopting of transfer technology on sugarcane production and also to know the influence of farmers' knowledge level in adoption of improved sugarcane technology. The farmers were selected on the basis of size of holding. The area selected for the study was Muzafarnagar, U.P during 2003-04. The main practices adopted by the farmers were evaluated. They were cane varieties, planting operations, fertilizers application, irrigation management, weed control, plant protection, binding and harvesting. The study revealed that the average knowledge level of the farmer was 49 percent, 60 percent and 58 percent in marginal, small and other farmer respectively.

S.S. Wadkar⁶³ (1990) examined the changing pattern and trends in agriculture in Radhanagari Taluka of Kolhapur District In Maharashtra during 1961 to 1987. The main objectives were to assess the agricultural change in the taluka such as land used pattern, cropping pattern, technique of production; to examine the construction of Radhanagari Dam and its effect on crop pattern; and to assess the impact of new form of technology. The indicators adopted were pattern of land used; cropping pattern; techniques of production and the capital accumulation of agriculture section. Published and unpublished data from different administration wings were compiled. Land holding has been divided into three categories viz.,

small, medium, and large. The study revealed that the change in geographical area amounts to 10 to 15 percent; the crop pattern controlled by agro-climatic conditions; farmer prefer to grow Ragi and Groundnut in drought area; technology impact in seed and fertilizer; 80 percent of the land holders had less than 2 hectors of land; number of carts increased from 2431 (1960) to 2746 (1987); increase in irrigation area (8.5%) and employment (8%). The study concluded that a modern method, which can balance between the forest and the agriculture land.

Subhash J. Bargir⁶⁴ (1990) studied the measures adopted for increasing sugarcane production at Rajarampur Patil S.S.K. Ltd. during 1982 to 1989. The main objectives of the study were to find out what are the measures adopted by the mill to improve cane production and the impact of measures on sugarcane production. The primary data was obtained from the agriculture department of the mill during the study period. The mill had taken the several measures to improve the sugarcane production *viz.*, distribution of quality seed; trail of new varieties; lectures, seminars and conference for farmers; development of selected farms; water supply scheme like irrigation, new pipe lines, bore wells, sprinkler, drip irrigation and water management; infrastructure fertilizers like road soil testing and mobile labs; protection measures to members such as supply of fertilizer, press mud, transfer facilities, subsidy to small holders and demonstration of new method.

A.D. Shinde⁶⁵ (1991) examined the management and economics of selected lift irrigation schemes of Shetkari S.S.K. Ltd. situated at Sangli in Maharashtra,

during 1981 to 1989. The objective of the study was to analyse the lift irrigation scheme includes well, bore well, water ponds etc. The efforts put by the farmers and the sugar mills in consultations with bank and irrigation departments have been put together to arrive conclusions. The study concluded with remarks that the study area has achieved its targeted plans; lift irrigation helped both sugarcane cultivation and other crops and the joint venture of farmers and other agencies led to the economics development of the Sangli farmers. A pre-tested structured questionnaire was used to collect primary data and the secondary data was gathered from irrigation and agriculture departments.

R.R. Hasure⁶⁶ et al (2005) examined the planting geometry and inter crops on yield contribution character, cane yield, quality and economics of seasonal sugarcane (Co.86032). The study was based on field experiments conducted for three years during the 2001-02, 2002-03 and 2003-04 on medium black clay-loam soils. The study disclosed that the process of skipping one row after every two rows planting of sugarcane with inter crop of watermelon recorded significantly the highest yield of cane.

T.N.Tiwari⁶⁷ et al (2005) examined the adverse effects of heavy rainfall and water logging during grand growth period of sugarcane. In the year 1998-99 relatively higher rainfall followed by water logging not only affected the growth of the cane crop, but also affected the recovery rate. In the present study the rainfall data between the periods of June to December of two consecutive years (1997-98 and 1998-99) and the dry matter production per plant of ten sugarcane varieties have been examined. The researcher came with the conclusion that the

after monsoon period the varieties showed appreciable increase in dry matter production to recover themselves. The delayed growth of crop resulted in delayed sugar accumulation in experimental varieties.

Virendra Kumar Gupta⁶⁸ et al (2006) conducted a field experiment to examine the economics of seed sugarcane production as influenced by N and K fertilization during 2003-04 at Sugarcane Research Institute, *Samastipur*, Bihar, The researchers applied different doses of Nitrogen (N) and Potash (K) at different interval (T) and found that 150 kg N and 60 kg K 20 per hectare were suitable dose for higher seed cane yield.

A. Siddiqi⁶⁹ et al (2006) studied the effects of multi micronutrients and press mud compost application on yields and nutrient up take of sugarcane ratoons sequence. The study conducted to examine the effect of micronutrients and sulphur applied in combinations with press mud compost on yield and uptake of sugarcane ratoons sequence. Field experiments were conducted on sugarcane (CV.Cos97016) at Mundia, Uttanranchal. It was found that the application of 25kg. $ZnSO_4$ + 215 kg Gypsum per hector gives an extra yield of 120.4+ MT/ha.

Rajendran B.⁷⁰ (2006) analysed the benefits of Integrated Pest Management (IPM) practices for sugarcane. IPM is a widely accepted concept in plant protection for crops. An ideal strategy evolved to combat pests, with least interference to eco-system and assures environmental safety. The IPM focuses on the management of pests through cultural techniques, experimented at *Cuddalore*, Tamil Nadu during the seasons from 2002 to 2005. The study

revealed that an effective IPM practice increased the cane production to the extent of 36 percent with an additional cost of Rs. 6150 / ha.

K. Kannapan⁷¹ (2006) examined the effects of Sulphur application on sugarcane yield and quality. Sulphur is an essential plant nutrient in crop production. Sulphur difference in soil and in crops is a worldwide phenomenon. The study was made to know the effects of Sulphur on the yield and quality of sugarcane during 2003-2004 and revealed that only the Sulphur content could not cause significant improvement in growth but with Ammonium Phosphate gave a maximum cane and sugar contents in cane.

V.P. Bhalerao⁷² et al (2005) studied the effects of different organics fertilizers on soil properties, nutrient uptake, yield and quality of sugarcane. A field experiment was undertaken at Central Sugarcane Research Station, Padegaon on medium black soil, and was observed for three years from 1999 to 2002. The research revealed that about 40 percent of chemical fertilizers could be substituted using either by 9 MT Press Mud Cake (PMC) + 2 MT Spent Wash Ash (SWA)+ Urea Blending with *Neem* Cake (UB NC) + Bio-fertilizers.

Dheer Singh⁷³ and **P.K.Tomar** (2005) examined the critical period of weed removal in sugarcane ratoon. Sugarcane ratoon is an integral part of sugarcane cultivation. It occupies almost 50 percent of the total sugarcane average. However, the productivity of ratoon is only 45 percent that against the sugarcane 70-80 percent. Negligent attitude of farmers towards ratoon in general and its heavy infestation with weeds in particular is the main reason for poor productivity

of ratoon in India. Reduction in cane yield was observed up to 30-45 percent. A field experiment was conducted during 2002-03 and 2003-04 at Crop Research Center, Patnagar Uttarakhal to see the effect of duration of weed crop competition. A significant corresponding reduction was observed in cane yield where weeds were allowed to compete with the crop beyond initial 30 days. The study concluded with a notable finding that in ratoon crop critical period of weed removal was in between 30-60 days after planting.

V.P. Bhalaerao⁷⁴ et al (2005) analysed the effect of distillery's biomethanated effluent on yield, quality of *adsali* sugarcane and soil properties. Two-field experiments were conducted during 2002-04 in Pune. The soil chosen was medium black and calcareous in nature. The main purpose of the study was to find out the effect of pre-sowing application and fertilisation of secondary biomethanated effluent of spent wash on growth, yield, quality parameters and nutrient uptake by *adsali* sugarcane. The continuous pre-sowing application to *adsali* sugarcane was found beneficial.

B.L. Sharma⁷⁵ et al (2005) analysed the effect of nitrogen inhibitors on sugarcane crop. The study was based on a field experiment, conducted at the research institute farm for consecutive three years from 2000-01 to 2003-04 by employing sugarcane (Cose95422) to evaluate the performance of *neem* cake, castor cake and *neem* oil blended with urea on cane growth and quality parameters. The study revealed that the application of Urea blended with 1.0 percent *neem* oil in cane crop would increase the germination, shoot population and yield.

G. Kathiresan⁷⁶ and **G. Ramdas** (2005) examined the choice of intercrop for sustaining the ratoon sugarcane yield, quality and soil fertility under clay soil. The research work based on field experiments, conducted to study the effect of different levels of Nitrogen on sugarcane ratoon during early seasons of 2002 to 2004. The test ratoon crop was cosi-95671. The inter crop tested under ratoon crop was diancha (local variety) and Black Gram (vamban3). The pooled results revealed that in-situ incorporation of daincha significantly produced 124 MT/ ha of cane yield, which was 9 percent higher.

B.L. Sharma⁷⁷ et al (2005) conducted the field experiments and compared performance of Bio-compost for three years during 2001 to 2004 by employing to the sugarcane variety Cuse-95422 in the ratio of 1:1 to the inorganic fertilizer. The Bio-compost mixture not only increased the cane yield but also improved soil organic matter, soil texture and water holding capacity.

S.R. Misra⁷⁸ and **Manish K. Dubey** (2005) examined the effect of moist hot air treatment on germination of sugarcane buds. The researchers conducted field experiments during 2004-05, the planting material of BO91 and COSE92423 were subjected to moist hot air treatment at 50⁰c for 2 hours and planted in a field during spring and autumn seasons respectively. The study revealed that the moist hot air treated material not only gave quicker and better germination than the untreated material but also almost all the buds on the whole and cut canes sprouted simultaneously.

A.M. Charai⁷⁹ et al (2005) conducted a study in Pune district of Maharashtra, during 2004-05 in order to assess the knowledge and adoption of recommended practice for control of white woolly aphid in sugarcane crop by the sugarcane growers in the region. In all 124 sugarcane-growing farmers from two co-operative sugar factories were selected. The researchers found that most of the farmers had not adopted the practices for control of white woolly aphids like use of drip irrigation, removal and destruction of affected sugarcane leaves.

Rajala Chandran⁸⁰ et al (2005) examined the moisture stress management practices, adoption pattern and constraints involved. The study sought information from 150 respondents of sugarcane growers. The knowledge level of the respondents was assessed through a knowledge index developed for the purpose during 2000 at Chingleput, Tamil Nadu. The formula used was: $KI = K/P \times 100$ where KI =Knowledge Index, K =Knowledge score obtained by the respondent P = Possible maximum score. The study revealed that the overall knowledge level of sugarcane growers about the recommended technology was low. It was observed a wide gap between the recommended practices and their actual level of adoption. In order to bridge this gap public extension system should be made effective.

C. Shankaraiah⁸¹ and **K.N. Kalyan Murthy** (2005) examined some agro-techniques for sustenance of soil health and sugarcane production for Cauvery command area of Karnataka. The investigators analysed the field experiments conducted over a decade from 1990 to 2000. The study revealed that neither the mineral fertilizers nor the organic sources exclusively could sustain sugarcane

productivity. A judicious combination of both the components was the potential tool for sustaining the productivity of soil and crop.

R. Durai⁸² (2005) conducted field experiments during the seasons 2001-02 and 2002-03 in order to find out suitable nutrient chemical / growth regulator to induce drought tolerance. The pooled data of two years plant and one year ratoon collected from the experiments were tabulated. The study revealed that among the treatments, toiler spray of salicylic acid on sugarcane crop under water stress conditions favour for faster growth and there by recorded higher cane yield of 25 to 30 percent as compared to unsprayed.

2.1.8 Critical Evaluation of Reviewed Literature

The reviewed literatures revealed the following broad conclusions:

1. Some of the studies were emphasised on *history of sugar industry in India* (S. Pruthi, 1995) or only on *sugar industry in India* (Ram Vichar Sinha, 1998) or on the *problems of sugar industry in India* (D.K Grover and S.S Grewal 1991). There was hardly an attempt made to analyse in detail the problems of co-operative sugar sector.

2. Some of the studies were noticed to have under taken on performance of sugar co-operatives by selecting one or two areas (cost, operational, financial, manpower or sugarcane growers) affecting the performance of the sugar factory. Daxa Gohil (2005) had studied *comparative analysis of transaction cost vis-à-vis financial performance of sugar industry of India*; Hanchinmani S.N. (1996) studied on *financial analysis of co-operative sugar factories in Belgaum district of Karnataka*; V.B. Kakade (1995) studied *the capacity utilization of co-operative*

sugar factories in Maharashtra State; Mahadev G. Powar (1997) investigated the raising and utilization of finance by co-operative sugar factories in Satara District of Maharashtra; A.D. Shinde (1991) studied the management and economics of selected lift irrigation schemes of Shetkari Sahakari Sakar Karkhana Ltd. Sangli, Maharashtra; and Ramchari S. Nikam (1995) analysed the composition of various cost elements and their magnitude in total cost of sugar production. None of the studies was under taken to study major key factors together that affect the performance of sugar co-operative factories.

3. A few studies were noticed to have emphasized the socio-economic impact of sugar mills by giving more stress on problems or benefits derived by the society and less importance to the sugar factories. V.A. Patil (2002) investigated *the problems of seasonal workers working in selected sugar factories; K.D. Jadav (1991) analysed the socio-economic impact of sugar co-operatives in Satara District of Maharashtra. Waman Nimbagi (1990) also studied the socio-economic status of seasonal migrants in the co-operative sugar factories with special reference to Kolhapur District of Maharashtra State. Vandana S. Dandekar (2000) analysed an economic analysis to find out rate of returns to education due to the inception of sugar co-operative factories in Sangli District of Maharashtra.*

4. The analytical tools and techniques were not made use abundantly in some of the studies. The tool like traditional method of ratio analysis was used to analyse the financial performance of the sugar mills instead of modern and universally accepted hybrid ratios.

5. The comparative studies were under taken on one or two key areas with limited parameters.

6. Majority of the research works carried out on sugarcane varieties, sugarcane growth pattern and application of fertilizer as sugarcane is the major factor of production in the sugar industry. Other dominating factors such as cost of production, financial requirements and interest burden on temporary borrowings, managerial factors, farmers' perceptions, etc., were not given much more importance. This may be one of the reasons for poor performance of Indian sugar industry.

7. A few researchers have under taken studies on performance analysis and comparative studies but concentrated either on cost variables or on financial factors. None of the researchers has made an attempt to consider four dominating areas together (Costing, Operational, Financial and Sugarcane Growers) to arrive a concrete conclusion to say a particular unit is performing well or poor. Performance of business units cannot be judged by looking from one or two angles. It is good to analyse the problems at micro and macro levels and that too from all dimensions, which are affecting the business environment of every production unit.

8. Most of the suggestions made by the researchers can be implemented and adopted by the sugar mills for the farmer members. But mindset of the cane growers is already fixed due to unfavourable price policy adopted by the Government and payment policy of the mills' management. Hence, there is a need to develop policy suggestions to melt the deep-rooted prejudices among

sugarcane growers, which would have taken care of in the above said research work.

9. Most of the field research on sugarcane was under taken under the controlled situation in the field with created environment that may not yield the same results under uncontrolled situation in the actual fields. Hence, there is need to establish trusted relationship between the farmers and the factory, which was not stressed by the researchers.

It is observed that all these studies emphasized either a particular problem of a sugar mill or comparative study within the State. So far no research was undertaken to make a comparative study of key parameters such as financial, cost components, operational efficiency and problems of sugarcane growers of three different sugar factories situated in different States. Keeping in view the shortcomings of the earlier studies, all the key performance parameters were studied, analysed and compared in this research work.

2.2 RESEARCH DESIGN AND METHODOLOGY

The research design and methodology is presented under the following heads:

2.2.1 Description of the Study Area and Select Units

The core geographical area and the selected units for the study and their scenario are given as under:

(a) *Sugar Industry in the State of Maharashtra*

The state of Maharashtra has emerged one of the leading states in the sugar production. At present there are 143 sugar factories in Maharashtra. The

area under sugar cane cultivation is 5,30,000 hectares, the state produces 4,71,51,000 MT of sugarcane and 5.34 million MT of sugar. On the basis of recovery rate, the state has been divided into three zones viz. high, medium and low recovery zones and the Kolhapur district comes under high recovery rate zone.

Chatrapati Shahu Sahakari Sakhar Karkhana Limited, situated in Kagal Taluka of Kolhapur district, one of the best performing units in Asia, established in the year 1977. The unit crushes 3,500 MT per day with the help of 929 employees and produces more than 5.25 lakh quintals of sugar by maintaining a recovery rate at 12.6 percent.

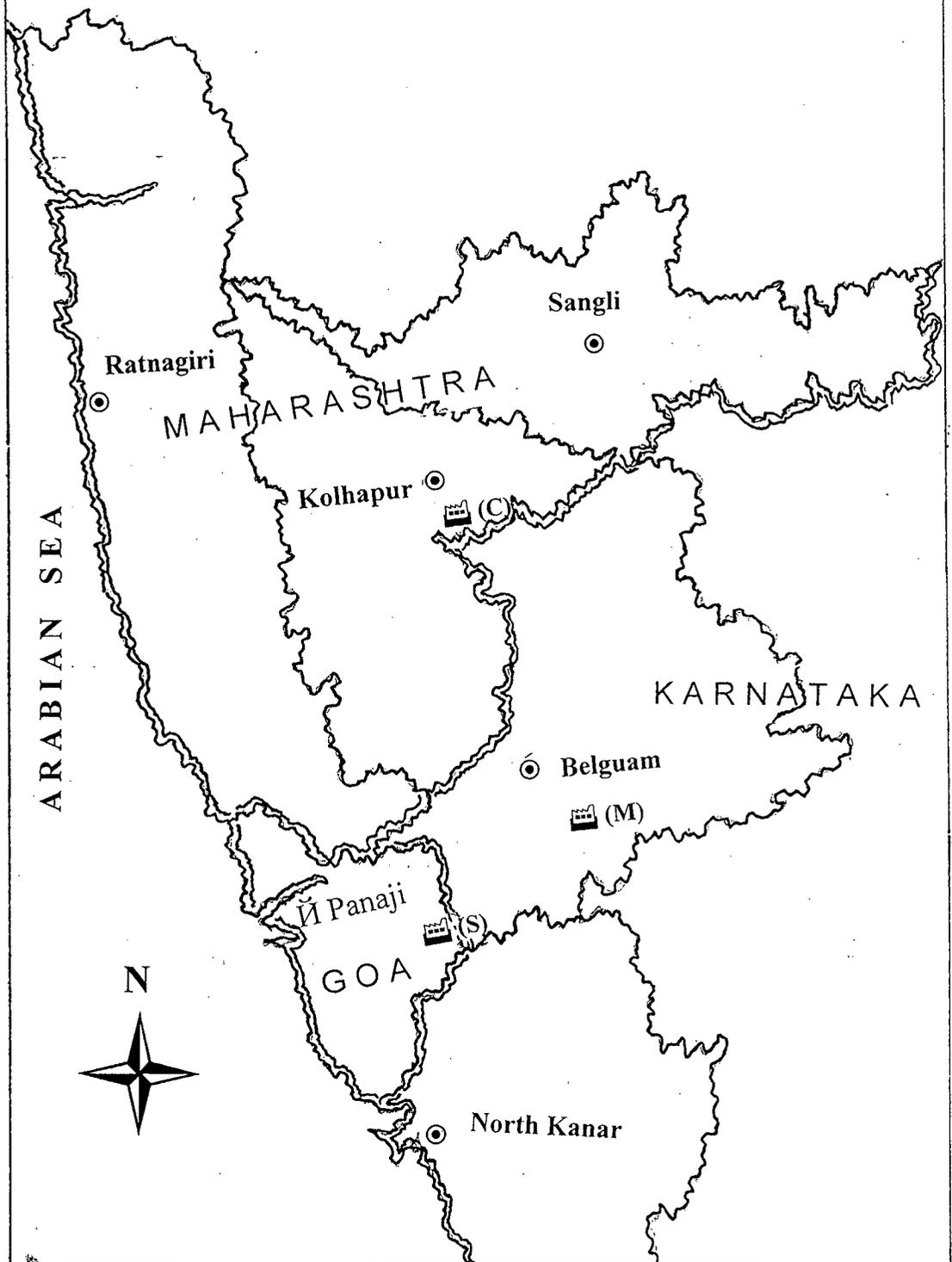
(b) Sugar Industry in the State of Karnataka

There are 38 sugar factories in Karnataka State. The area under sugarcane cultivation is 3,12,000 hectares. The state produces 2,84,54,000 MT of sugarcane and 13,70,000 MT of sugar. A high recovery rate is observed in Kaverki belt and in Belgaum District. In the recent past, the Govt. of Karnataka has withdrawn various taxes on sugar factories, which were hampering the growth of sugar factories in Karnataka.

The unit selected for the study is ***Shri Malaprabha Sakkare Karkhane Niyamit***, situated at M.K. Hubli, in Belgaum, one of the good performing units in the district. Shri Malaprabha Sakkare Karkhane Niyamit, was established in 1971 with a crushing capacity of 1250 MT per day. After a decade, looking at an increasing trend of sugarcane supply from 585 villages, the crushing capacity was increased to 3,500 MT per day in the year of 1982-83. The recovery rate of the unit was always above 10 percent because of the hard work of 1,200

MAP No. 2.1

LOCATION OF THE SELECTED CO-OPERATIVE SUGAR FACTORIES



⌘ State Capital ● District Head Quarter ≈≈ State Boundary ~ ~ District Boundary

🏭 (C) Chatt. Shahu S.S.K.L. 🏭 (M) Malaprabha S.S.K.L. 🏭 (S) Sanjivani S.S.K.L.

employees of the unit and the sugarcane suppliers of the region. The unit produces more than 5.35 lakh quintals of sugar and has its own distillery unit.

(c) Sugar Industry in the State of Goa

The *Sanjivani Sahakari Sakhar Karkhana Maryadit*, is the only sugar factory in Goa, that was established in 1972 with a capacity of 1,250 TCD. The initial capacity remained the same for last 30 years but the land under sugarcane cultivation took a slight change from 1,200 hectares to 1,350 hectares in three decades and the total sugarcane cultivation from 40,000 MT to 80,000 MT. The unit purely depends upon gate-cane (60%), which comes from Karnataka. There are 447 employees in the unit. The recovery rate is less than 9 percent. The output of the factory is 1.2 lakh quintals of sugar. Sanjivani Sahakari Sakhar Karkhana could not make any significant gain for the last 30 years. The cumulative effect of accumulated losses did not allow the mill's management to go for modernization. The factory neither experienced any major repairs since its inception nor bumper profits in its entire life span.

2.2.2 Justification for Selection of Units

After doing a preliminary survey, it was observed that the Kolhapur, Belgaum and South Goa districts are adjacent to one another; the age and initial capacity (1,250 MT per day) of the factories are almost the same. In spite of these conditions only the first two units are performing well but not the unit in Goa. The reasons for low performance of the Sanjivani S.S.K.L. and better performance of other two units are the focalised point of triangular comparative study. No research has been under taken in the past to analyse the actual

causes for the low performance of the sole unit in Goa. The measures that are adopted by the other profit making sugar factories in Maharashtra and Karnataka will be modified and suggestions can be made according to the length and breadth of the problems of Sanjivani Sahakari Sakhar Karkhana for its better performance.

2.2.3 Scope of the Study

Geographically, the proposed study is confined itself to the three co-operative sugar factories *viz.*, **Chatt. Shahu Sahakari Sakhar Karkhana Ltd.**, situated in Kagal Taluka of Kolhapur district of Maharashtra; **Shri Malaprabha Sahakari Sakkare Karkhane Niyamit**, situated at M.K. Hubli, in Belguam district of Karnataka and the **Sanjivani Sahakari Sakhar Karkhana**, situated at Darbandar in South Goa district of Goa. **Hereafter the selected units are called as Chatt. Shahu S.S.K.L., Malaprabha S.S.K.L. and Sanjivani S.S.K.L.** The study intends to assess the working and performance of the three selected co-operative sugar factories.

2.2.4 Period of the Study

Present study encompasses the performance of ten financial years of selected units from 1994-95 to 2003-04.

2.2.5 Nature and Source of Data

The study is based on both primary and secondary data. In order to achieve objective of the study, the necessary primary data are obtained from sugarcane growers of three units.

The required secondary data were gathered from the published Annual Reports, Manufacturing Reports and Agriculture Reports (from 1994 to 2004) from Chatt. Shahu S.S.K.L., Malaprabha S.S.K.L. and Sanjivani S.S.K.L.

Besides this, the required additional data also was collected from the departments like National Federation of Co-operative Sugar Factories of India, Indian Sugar Mills Association of India, National Cooperative Development Corporation of India, Training and Research Institutions for Co-operatives in Maharashtra, Karnataka and Goa, Directorate of Agriculture, Goa, University libraries viz., Goa University, Karnataka University, Dharwad and Shivaji University, Kolhapur, and sugar web sites.

2.2.6 Sampling Procedure

In order to elicit opinion from the sugarcane growers of selected co-operative sugar units, 30 sugarcane growers and members (comprising of large, medium and small) from each unit are randomly chosen for the study.

2.2.7 Parameters Used to Evaluate Performance

More than 47 parameters (this number does not include supporting parameters) have been used and a few of them are:

Cost performance indicators: Sugarcane procurement cost; manufacturing cost; administrative cost; salary and wage bills; depreciation and interest on key loan in total cost of production of the selected mills.

Operational performance parameters: Area under sugarcane cultivation; yield per hectare; sugarcane price; sugarcane supply; production of white crystallised sugar; duration of crushing season; rate of recovery; man and machine

efficiency; capacity utilisation and total number of hours crushed and hours lost of selected units.

Financial performance parameters: Equity Capital, Net Sales, Net Profits, Total Assets, Total Debts, Working Capital and Earning Before Depreciation, Interest and Tax (EBDIT) of the selected units.

Sugarcane growers' personal profile: Age; educational qualification; and family size.

Sugarcane growers' agricultural profile: Farmers' income; family members' participation in agricultural activities; total area of land holding; area irrigated; area under sugarcane cultivation; types of crops grown; cattle population; tools and machines used in cultivation; and types of fertiliser used.

Sugarcane growers' problems: marketing problems; cultivation problems, procurement of finance; degree of co-operation received from different related agencies, cane transportation; adoption of new technology; waiting in queue; and cane bill payment.

2.2.8 Tool Used to Collect Data

Pre-tested structured questionnaires containing open-ended, close-ended and ranking questions were given to the sugarcane growers for eliciting their personal profile, agriculture profile and problems. Opinions of the farmers also extracted during the personal interviews and in the farmers' meetings organised by the mills' management. The appropriate parameters emphasizing the performance of sugar units are identified and included in the questionnaire.

2.2.9 Analytical Tools Employed

In order to accomplish the objectives of the study, the collected primary and secondary data were analysed with the help of following tools:

So as to ascertain the degree of financial health of the selected units, **Edward Altman's Z-Score Model**⁸³ ($Z\text{-Score} = 1.2 x_1 + 1.4 x_2 + 3.3 x_3 + 0.6 x_4 + 0.999 x_5$) is used. The financial consistency of the selected units is evaluated with the help of '**Mean**', '**Standard Deviation**' and '**Coefficient of Variation**'.

$$(I) \text{ Mean } (\bar{x}) = \frac{\sum x}{N}$$

$$(II) \text{ Standard Deviation (S.D.) } \sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{N}} \quad \text{Where } X = Z\text{-score.}$$

Standard Deviation is an absolute means of variation and therefore it cannot be used to compare the variation present within two or more sets of data. For such a comparison, it is customary to use the corresponding relative measure of variation known as coefficient of variation (CV)

$$(III) \text{ Co-efficient of Variation (CV) } = \frac{\text{S.D.}}{\text{Mean}} \times 100$$

In order to find out the trend relationship between price and sugarcane supply (local and gate cane), **Karl Pearson's product movement** co-efficient of correlation between X and Y (statistical tool) is found suitable and hence, used to find out the trend relationship of two variables⁸⁴.

$$\text{The formula used is: } = r_{x, y} = \frac{\text{cov. (x, y)}}{\sigma_x \cdot \sigma_y}$$

$$\text{Where; (i) Covariance between x and y } = \text{cov. (x, y) } = \frac{\sum xy}{n} - (\bar{x}) \cdot (\bar{y})$$

(ii) Standard Deviation of 'x' $\sigma_x = \sqrt{\frac{\sum x^2}{n} - \bar{x}^2}$

(iii) Standard Deviation of 'y' $\sigma_y = \sqrt{\frac{\sum y^2}{n} - \bar{y}^2}$

The value of co-efficient of correlation is interpretable as:

- (i) Perfect positive correlation if value = +1;
- (ii) Perfect negative correlation if value = -1;
- (iii) No correlation if value = 0;
- (iv) Strong positive correlation if value is in between 0.7 and 1;
- (v) Strong negative correlation if value is in between -1 and -0.7;
- (vi) Weak positive correlation if value is in between '0' and 0.7; and
- (vii) Weak negative correlation if value is in between -0.7 and 0.

Besides these tools, other statistical tools such as ranking, average, percentage, ratios are also used to evaluate the cost and operational performance and to analyse the farmers' profiles and problems.

2.2.10 Limitations of the Study

- As the study has covered sugar factories of three different States, the existence of differences with regard to language, culture, attitude and aptitude towards agriculture and factory was observed during the course of survey and hence, the conclusions of the study cannot be generalised.
- The method of data recording and publishing adopted by the selected units in the three different States has undergone a lot of modifications during the

study period and therefore, the conclusions of the study cannot be generalised.

2.2.11 Chapterisation

This research work is presented under the following six chapters:

Chapter I : Introduction

This chapter provides an introduction to history of sugar; origin of sugarcane and sugar products; classification of sugarcane and sugar; sugar scenario of world and India; colonial rulers and sugar industry in India; growth of sugar industry in co-operative and other sectors; sugar industry By-products; agriculture scenario of Maharashtra, Karnataka, Goa; objectives and hypotheses.

Chapter II : Review of Literature, Research Design and Methodology

Brief summaries of referred thesis and research articles pertaining to sugar industry in India and abroad; co-operative sector in India; cost and operational analysis of sugar factories; financial analysis of sugar factories; human resource in sugar mills; sugarcane; sugarcane cultivation, etc., are given in the first part of this chapter.

The second part of this chapter has covered the scope and relevance of the study; methodology employed; analytical tools like Edward Altman's Z-Score model, Karl Pearson's product movement co-efficient of correlation, other statistical tools like Mean, S.D. C.V.; and limitations of the study.

Chapter III : Cost and Operational Performance Analysis of Select Units

The first part of the chapter has included major cost components *viz.*, sugarcane procurement cost, manufacturing cost, administrative cost, salary and wage bills, depreciation and interest on key loan in total cost of production of the selected mills. All these six major cost components have been analysed and compared in terms of their share in total cost, cost per bag (or per quintal) and in terms of percentage within the same unit and with other selected units. In order to arrive concrete results of key cost drivers, a comparative cost performance analysis of the selected units is prepared and presented with concluding remarks.

The second part deals with the operational performance of the selected sugar mills that are evaluated on the basis of ten effective parameters *viz.*, (i) Area under sugarcane cultivation; (ii) Yield per hectare; (iii) Sugarcane price; (iv) Sugarcane supply trend; (v) Production of white crystallised sugar; (vi) Duration of crushing season; (vii) Rate of recovery; (viii) Man and machine efficiency; (ix) Capacity utilisation; and (x) Total number of hours crushed and hours lost in selected units.

Chapter IV : Financial Performance of Select Units

In this chapter, an attempt has been made to analyse and compute the consolidated effect of various ratios so as to ascertain the degree of financial health and to predict the corporate failures with the help of a universally accepted hybrid ratio, which is suggested by **Edward Altman**. The major components of annual reports such as Equity Capital, Net Sales, Net Profits, Total Assets, Total Debts, Working Capital and Earning Before Depreciation, Interest and Tax

(EBDIT) of the selected units have been tabulated. Based on those tabulated variables, the value of x in Z-score, Z-scores of each unit and comparative Z-score analysis of selected units have been tabulated. **Mean Values, Standard Deviations and Co-efficient of Variations of Z-Scores** of the selected units have been tabulated and the conclusions drawn are presented under the caption '**Consistency in Financial Health**'.

Chapter V: Profile and Problems of Sugarcane Growers

This chapter highlights the indicators relating to the **farmer's personal profile, agricultural profile and problems**. The **personal profile** consists of name, age, educational qualification and family size etc. The **agricultural profile** contains farmer's income, family members' participation in agricultural activities, total area of land holding, area irrigated and area under sugarcane cultivation, types of crops grown, cattle population, types of fertiliser used, etc. The multi dimensional **farmers' problems** have been discussed under various heads like marketing problems, cultivation problems, problems relating to the procurement of finance, degree of co-operation received from different related agencies, etc. Based on the consolidated **survey report**, suitable conclusions are drawn.

Chapter VI: Summary of Findings, Conclusions and Suggestions

This chapter summarises the findings; conclusions drawn and suitable suggestions made to improve the efficiencies of various segments like cane procurement, cane development, marketing, production, flow of finance and the degree of relation with the sugarcane growers, etc.

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CHAPTER III

COST AND OPERATIONAL

PERFORMANCE ANALYSIS OF

SELCT UNITS

CHAPTER III

COST AND OPERATIONAL PERFORMANCE ANALYSIS OF SELECT UNITS

3. Introduction

Generally the degree of performance of a business unit is measured in terms of profit earned and retained by the unit. This age-old concept lost its significance in the world of competition. The modern philosophy, which emerged in the world of competition, liberalization, privatisation and globalisation, says '**produce a lot but spend a bit**'. Hence, an attempt is made in this chapter to analyse the cost and operational performance of the selected units.

3.1 Cost Performance Analysis of Selected Units

The sugar industry is the only industry in the world produces main product, by-products; required amount of energy in the form of steam and electricity and water for its own consumption. In spite of all these capabilities by birth, the Indian sugar industry could not succeed as it could have been achieved. In view of this, an attempt is made to analyse the role of six major cost elements in white crystal sugar production and operational efficiency of the selected units.

3.1.1 Major Cost Components

In order to study cost structure the total cost of sugar mills has been split into six major cost elements. The categorized six groups are:

Sugarcane Cost and Allied Expenses - The entire sugar sector in the world pays a huge basic material (sugarcane or beet) bill. The bill exceeds 60 percent of the total cost of production. In India, the cost of sugarcane and allied expenses is more than 65 percent that includes not only sugarcane price (farmers' bill) but also includes allied expenses like sugarcane harvesting and transport, cane purchase tax, cane-feeding expenses and other cane related expenses. All these expenses are also called as cane procurement cost.

Manufacturing Expenses - The factory expenditure consists of expenses of engineering department, manufacturing department, repairs and maintenance of machinery, electricity, press mud and ash transports, bagasse lifting and shifting, excise duty, water supply expenses and other miscellaneous expenses of manufacturing.

Administrative Expenses - The office expenditure consists of office stationary, TA and DA to staff and managing committee, guesthouse, advertisement, labour welfare, uniform and other miscellaneous expenses of the office.

Salary and Wage Bill - The salary and wage bill consists of both manufacturing and administrative staff. It also includes the salary and wage paid to permanent employees, seasonal employees and temporary staff.

Depreciation - The depreciation includes both depreciation of the production section and the office of the factory. This is one of the major elements of cost since every sugar mill has to erect huge plants and machineries and maintain godown, office and a fleet of transport. The significance of depreciation reduces only when a sugar factory refrain from modification, modernization and automation which is not possible.

Interest on Key Loan - The interest on key loan includes the interest on short-term and long-term loans. Every sugar mill has to borrow temporary loan to make the payment of huge sugarcane bills. No sugar factory is allowed to sell its sugar stock soon after the production due to government restriction. The sugar stock is sold as per the monthly quota granted by the Central Government. The sugar mills receive their sales proceeds part by part. Hence, a large amount of working capital gets blocked in sugar stock. The sugar factories borrow loan from co-operative banks in millions of rupees and pays interest also in millions rupees.

Table 3.1 gives clear-cut picture of the major cost components, total cost, cost per bag (per quintal) and the share in percent of each component. The cost of sugarcane and allied expenses were found to have dominated in total cost component.

Table No. 3.1

Major Cost Components, Total Cost, Cost Per Bag (or per quintal) and the Share in Percent of Each Component of Chatt. Shahu S.S.K.L.

During 1994-95 to 2003-04

Year	Sugarcane Cost and Allied Expenses		Manufacturing Expenses.		Administrative Expenses.		Salary and Wage Bill		Depreciation		Interest on Key Loan		Total Cost per Bag in Rs.
	Total Cost in Lakh Rs.	Cost per Bag in Rs.	Total Cost in Lakh Rs.	Cost per Bag in Rs.	Total Cost in Lakh Rs.	Cost per Bag in Rs.	Total Cost in Lakh Rs.	Cost per Bag in Rs.	Total Cost in Lakh Rs.	Cost per Bag in Rs.	Total Cost in Lakh Rs.	Cost per Bag in Rs.	
1994-95	3952.29	731 (74%)	295.51	55 (5%)	92.69	17 (2%)	389.29	71 (7%)	210.68	39 (4%)	402.89	74 (8%)	987 (100%)
1995-96	3713.46	593 (69%)	360.44	57 (7%)	97.57	16 (2%)	452.99	72 (8%)	202.44	32 (4%)	546.63	87 (10%)	857 (100%)
1996-97	6326.85	936 (76%)	510.78	75 (6%)	101.70	15 (1%)	544.76	81 (7%)	188.59	28 (2%)	667.49	99 (8%)	1234 (100%)
1997-98	4951.13	874 (71%)	513.82	91 (7%)	128.89	23 (2%)	541.12	95 (8%)	178.27	31 (3%)	635.47	112 (9%)	1226 (100%)
1998-99	5228.79	865 (70%)	581.91	96 (8%)	129.45	21 (2%)	634.21	105 (9%)	172.33	37 (3%)	603.36	100 (8%)	1224 (100%)
1999-00	5716.45	757 (70%)	634.83	84 (8%)	184.41	19 (1%)	727.40	96 (9%)	204.11	27 (2%)	704.43	98 (10%)	1081 (100%)
2000-01	6859.68	814 (70%)	615.97	73 (6%)	194.42	23 (2%)	852.96	101 (9%)	266.04	31 (3%)	978.39	116 (10%)	1158 (100%)
2001-02	7723.92	930 (72%)	732.45	79 (6%)	215.74	26 (2%)	878.88	106 (8%)	280.41	34 (3%)	1000.35	121 (9%)	1296 (100%)
2002-03	7230.01	823 (73%)	837.81	95 (8%)	173.61	20 (2%)	632.39	72 (6%)	378.23	43 (4%)	722.69	82 (7%)	1135 (100%)
2003-04	6418.21	1072 (71%)	737.69	123 (8%)	210.26	35 (2%)	767.52	128 (9%)	429.16	72 (5%)	458.37	77 (5%)	1507 (100%)
Average Cost and Percentage		839.5 (71.6%)		82.8 (6.9%)		21.5 (1.8%)		92.7 (8.0%)		37.4 (3.3%)		96.6 (8.4%)	

Source: Annual Reports of Chatt. Shahu S.S.K.L.

On an average, the cost of sugarcane and allied expenses was Rs. 839.5 (71.6%) during the study period. This cost varied in between 69 to 74 percent and Rs.593 to Rs.1072 per bag. The procurement cost of sugarcane depends upon other variables like cane price paid to the local and gate cane suppliers, the quantum of cane supplied by the local and gate cane suppliers, percentage of sugar content in sugarcane supplied to the mill and actual quantum of white crystal sugar produced by the mill, which is again dependent upon technical efficiency of the mill.

During 1995-96 the cane procurement cost was below 70%, which was due to low sugarcane bill paid during that year and the recovery rate also very low as compared to rest of the years. More over, the quantum of cane received was 5,27,909 MT and the production was 6,26,580 bags, which was more than previous years. During 1996-97 the cane bill shot up from Rs.593 to Rs.936, which was due to increase in recovery rate (12.69%) and increased in SMP. During the year 50,000 additional bags were produced with an additional supply of 23,000 MT of cane as compared to previous year. Hence, the total cane procurement cost increased from Rs.3713.46 lakh to Rs.6326.85 lakh. The upward and downward trends in recovery rate, supply and production were visible during the study period.

The reduction in cane price form 1998-99 to 2003-04 has not affected much more on cost structure due to increase in recovery rate, cane supply and increase in technical efficiency. The share of cane cost in total cost varied in

between 71 to 73 percent from 1997-98 to 2003-04 which was near to the average (71.6) percentage.

The average share of manufacturing expenses was Rs. 82.80 that was about 6.9 percent, which varied from 5 to 8 percent and Rs.55 to Rs.123 per bag. The cost of manufacturing was dependent mainly upon duration of the crushing season, production capacity of the sugar mill and quantum of sugarcane crushed. Even though the number of working employees was a major factor under manufacturing expenses category, salary and wages of manufacturing staff treated as a separate dominating cost component, which was clubbed with the salary and wages of administrative staff.

During 1995-96 and 1998-99, the crushing season stretched to 233 and 209 days. The average was 176 days. The impact of increase in capacity in 2001-02 led to increase in the total manufacturing cost from 2001-02 to 2003-04. Rest of the years the increase in manufacturing cost was slow and steady with the increase in quantum of sugar production.

The Administrative Expenses was the third major cost component in the total cost. During the study period, the share of the administrative expenses varied in between 1 to 2 percent (average 1.8%) of total cost and the per bag cost varied in between Rs.15 to Rs.35. The salary bill of administrative staff was not included in this cost head. The administrative cost increased from 2001-02 to 2003-04 due to increase in production capacity of the mill.

Chatt. Shahu S.S.K.L.'s salary and wage bills varied in between 6 to 9 percent and the average amount paid during the study period was 8 percent of the total cost. The actual amount paid per bag varied in between Rs.71 to Rs.128. The salary and wage bills consist of the salary and wage bill of all the departments and all the types of work force. This bill inflated during 2000-01 and 2001-02 because of payment of bonus and increase in wage and salary scales. The factors like number of permanent, seasonal and temporary employees (including daily wages) in the factory; age group of employees, increment, bonus, and other monetary benefits given to them; duration of crushing season; production capacity of the unit and the degree of automation, modernization and computerization adopted by the sugar mill play a major role in influencing the size of salary and wage bill.

The depreciation was also one of the dominating factors in the total cost. The percentage of depreciation in total cost of production varied from 2 to 5 percent and the mean value was 3.3 percent. The amount kept aside as depreciation by the mill varied from Rs.172.33 lakh to Rs.429.16 lakh and Rs. 27 to Rs. 72 per bag. During 2002-03 and 2003-04, the depreciation account showed Rs.378.23 lakh and Rs.429.16 lakh as compared to Rs.280.41 lakh in 2001-02. It is because of the mill erected additional plants to increase crushing capacity from 2500 MT to 3500 MT per day. Generally the amount of depreciation varies with the changes in the following relative variables like plants and machineries purchased or sold by the factory and other assets such as

vehicles, miscellaneous assets purchased or sold by the mill during the financial period.

The interest paid on key loan was the second highest factor in total cost of production. In India, the entire sugar sector suffering from interest burden of key loans. This is an unnecessary burden imposed by the government of India in the name of quota selling. Every sugar factory must borrow a huge amount of key loan from co-operative banks to hold the sugar stock throughout the year. Sugar mills do not get the sales proceeds unless they sell their stock but they cannot sell the sugar stock because of the government's restrictions but the mill must pay to the sugarcane suppliers in time. Any delay in payment creates doubt in sugarcane growers' mind. The cane suppliers may discontinue the sugarcane production and may switch on to other profitable cash crops.

The share of interest on key loan varied from 5 to 10 percent during the study period and the mean value was 8.4 percent. The amount paid by the Chatt. Shahu S.S.K.L. in the form of interest on key loan varied from Rs.402.89 lakh to Rs.1000.35 lakh and the per bag burden varied in between Rs.74 to Rs.121. During 2003-04, the mill utilized its internal source of finance to pay off the sugarcane bills and brought down the interest burden from Rs.1000.35 lakh (2001-02) to Rs.458.37 lakh. The need for key loans was also reduced due to the reduction in the production and reduction in cane price during 2003-04.

Table No 3.2.
Major Cost Components, Total Cost, Cost Per Bag (or per quintal) and
the Share in Percent of Each Component of Malaprabha S.S.K.L.

During 1994-95 to 2003-04

Year	Sugarcane Cost and Allied Expenses		Manu- facturing Expenses.		Admini- strative Expenses.		Salary and Wage Bill		Depreciation		Interest on Key Loan		Total Cost per Bag in Rs.
	Total Cost in Lakh Rs.	Cost per Bag in Rs.	Total Cost in Lakh Rs.	Cost per Bag in Rs.	Total Cost in Lakh Rs.	Cost per Bag in Rs.	Total Cost in Lakh Rs.	Cost per Bag in Rs.	Total Cost in Lakh Rs.	Cost per Bag in Rs.	Total Cost in Lakh Rs.	Cost per Bag in Rs.	
1994-95	5691.86	844 (78%)	438.81	65 (6%)	249.13	40 (4%)	589.07	87 (8%)	80.97	12 (1%)	214.53	32 (3%)	1080 (100%)
1995-96	5943.41	769 (74%)	551.60	71 (7%)	254.27	33 (3%)	686.44	89 (8%)	80.00	10 (1%)	531.49	69 (7%)	1041 (100%)
1996-97	6851.48	887 (74%)	673.75	87 (7%)	259.34	34 (3%)	760.78	99 (8%)	121.65	16 (1%)	623.00	81 (7%)	1204 (100%)
1997-98	5055.69	939 (69%)	509.68	95 (7%)	250.94	47 (3%)	766.92	143 (11%)	159.04	30 (2%)	554.76	103 (8%)	1357 (100%)
1998-99	5503.98	850 (69%)	556.68	86 (7%)	254.23	39 (3%)	1011.98	156 (13%)	168.38	26 (2%)	448.22	69 (6%)	1226 (100%)
1999-00	6517.31	1017 (68%)	630.35	98 (6%)	246.48	38 (3%)	1285.37	201 (14%)	162.08	25 (2%)	649.70	101 (7%)	1480 (100%)
2000-01	5755.96	870 (67%)	572.63	87 (7%)	210.17	31 (2%)	1197.56	181 (14%)	123.10	19 (1%)	745.69	113 (9%)	1301 (100%)
2001-02	4658.26	1056 (63%)	456.72	103 (6%)	194.23	44 (3%)	1112.51	252 (15%)	136.48	30 (2%)	855.85	194 (11%)	1679 (100%)
2002-03	3740.48	662 (59%)	411.35	72 (6%)	264.54	47 (4%)	854.95	151 (14%)	141.28	25 (2%)	876.50	155 (15%)	1112 (100%)
2003-04	2320.28	921 (54%)	296.82	118 (7%)	251.55	100 (6%)	797.74	317 (19%)	142.67	57 (3%)	497.92	198 (11%)	1711 (100%)
Average Cost and Percentage		881.6 (67.5%)		88.2 (6.6%)		45.3 (3.4%)		167.6 (12.4%)		25 (1.7%)		111.5 (8.4%)	

Source: Annual Reports of Malaprabha S.S.K.L.

Like any other sugar mills the sugarcane procurement cost (Table 3.2) of Malaprabha S.S.K.L is also above 70 percent. The largest portion on the total cost was observed to be eaten up by the cost of the sugarcane and allied expenditure. The arithmetic mean was 67.5 percent. Downward trends were observed in cane procurement cost during the study period. It began with 78 percent in 1994-95 and ended with 54 percent in 2003-04 because of the disproportionate increase in the salary and wage bills.

So far as per bag cost is concerned it varied in between Rs.662 to Rs.1056. During 2001-02, Malaprabha S.S.K.L. has paid higher price for cane, crushed less than 5 lakh MT of sugarcane and the recovery rate was also less during the year as compared to the rest of the years. All these three negative factors attributed towards increasing the cost per bag but reduced the share in terms of percentage due to increase in the share of salary bills and key loans.

The mean value of manufacturing expenses was about 6.6 percent. It varied in between 6 to 7 percent. It has shown direct and proportionate movement with the quantum of production and cane crushed during the study period. The cost per bag of manufacturing expenses recorded in between Rs. 65 (1994-95) to Rs.118 (2003-04). During 2001-02 and 2003-04 the factory overheads were Rs.103 and Rs.118 respectively. It is a little more as compared to the rest of the years due to the reduction in the quantum of cane crushed. Both years Malaprabha S.S.K.L. crushed 4.41 lakh MT and 2.51 lakh MT of sugarcane, which was lower performance as compared to rest of the years.

The cost of administration varied from Rs.31 to Rs.100 per bag and the share in percentage varied in between 2 to 6 percent and the mean value was 3.4 percent. During 2003-04, the administrative cost per bag was almost doubled as compared to rest of the years because in that year the mill crushed less quantity (just 2.51 lakh MT) of sugarcane and the low recovery rate, which was just 9.84 percent. On an average the factory has crushed more than 6.75 lakh MT during the study period.

The salary and wage bill of workforce varied in between 8 to 19 percent and the mean value was 12.4 percent. Per bag cost varied in between Rs.87 to Rs.317. During 2003-04 Malaprabha S.S.K.L. paid Rs.797 lakh, lower amount as compared to the previous five years but the per bag average was Rs.317 which was the highest because of the drastic reduction in sugarcane supply and production. The sugarcane supply reduced to 45 percent as compared to the average sugarcane supply during the study period.

The depreciation account of Malaprabha S.S.K.L. influenced just 1 to 3 percent in total cost structure and the average was 1.7 percent. From every sugar bag the value of depreciation recovered in between Rs.12 to Rs.57. The highest amount of depreciation (Rs.57 on per bag) was recovered during 2003-04 due to reduction in the quantum production.

The interest paid on key loan has shown an upward trend year after year. It was just 3 percent during 1994-95. The need for the key loan multiplied four

Table No. 3.3

Major Cost Components, Total Cost, Cost Per Bag (or per quintal) and the Share in Percent of Each Component of Sanjivani S.S.K.L.

During 1994-95 to 2003-04

Year	Sugarcane Cost and Allied Expenses		Manufacturing Expenses.		Administrative Expenses.		Salary and Wage Bill		Depreciation		Interest on Key Loan		Total Cost per Bag in Rs
	Total Cost in Lakh Rs.	Cost per Bag in Rs.	Total Cost in Lakh Rs.	Cost per Bag In Rs.	Total Cost in Lakh Rs.	Cost per Bag in Rs.	Total Cost in Lakh Rs.	Cost per Bag in Rs.	Total Cost in Lakh Rs.	Cost per Bag in Rs.	Total Cost in Lakh Rs.	Cost per Bag in Rs.	
1994-95	1282.29	811 (78%)	127.00	80 (8%)	20.10	13 (1%)	175.24	110 (10%)	22.47	14 (1%)	29.71	18 (2%)	1046 (100%)
1995-96	1200.98	1088 (70%)	165.25	150 (10%)	57.62	52 (3%)	217.01	197 (13%)	25.96	24 (1%)	58.04	53 (3%)	1564 (100%)
1996-97	1329.06	918 (65%)	243.96	169 (12%)	37.21	26 (2%)	264.79	183 (13%)	31.28	22 (2%)	127.94	88 (6%)	1406 (100%)
1997-98	1155.03	1122 (65%)	161.43	157 (9%)	44.49	43 (2%)	243.66	237 (14%)	37.37	36 (2%)	140.22	136 (8%)	1731 (100%)
1998-99	1611.04	796 (70%)	239.87	118 (10%)	41.98	21 (2%)	276.82	137 (12%)	41.67	20 (2%)	101.45	50 (4%)	1142 (100%)
1999-00	1570.56	1058 (64%)	263.83	178 (11%)	57.06	38 (2%)	337.17	227 (14%)	41.33	29 (2%)	163.07	110 (7%)	1640 (100%)
2000-01	1530.57	973 (65%)	232.36	148 (10%)	43.57	28 (2%)	343.02	218 (15%)	41.67	26 (2%)	159.42	101 (6%)	1494 (100%)
2001-02	781.00	1031 (51%)	153.74	203 (10%)	38.38	51 (2%)	322.91	426 (21%)	37.29	50 (2%)	217.93	288 (14%)	2049 (100%)
2002-03	1290.68	1008 (62%)	165.60	129 (8%)	35.42	28 (2%)	345.99	270 (16%)	33.41	26 (2%)	224.21	175 (10%)	1636 (100%)
2003-04	1092.97	1092 (57%)	202.82	203 (10%)	30.33	30 (2%)	357.50	357 (18%)	31.46	31 (2%)	213.92	214 (11%)	1927 (100%)
Average Cost and Percentage		989.7 (64.7%)		153.5 (9.8%)		33 (2.0%)		236.2 (14.6%)		27.8 (1.8%)		123.3 (7.1%)	

Source: Annual Reports of Sanjivani S.S.K.L.

fold during 2001-02 and 2002-03 because of increased cane cost hence the interest on key loan shot up to 11 and 15 percent respectively. The mean value shifted at 8.4 percent, which was far away from minimum value of 3 percent. The share of interest burden on each bag varied between Rs.32 to Rs.198. Even though the mill has taken temporary loan of Rs.497 lakh during 2003-04 (which was less amount as compared to other years), the cost per bag burden increased due to the operation at non-profitable level due to short supply of sugarcane.

So far as the cane procurement cost (Table 3.3) is concerned, Sanjivani S.S.K.L. was observed to have had deviation in share in total cost in terms of percentage. Sanjivani S.S.K.L. has never crushed more than 2 lakh MT of sugarcane during the study period, more over, it has paid higher price to the gate cane suppliers as compared to other units. The recovery rate never crossed 10.70 percent during the study period. In spite of all these a downward trend was observed in sugarcane cost and allied expenses in terms of percentage. The share of cane procurement cost in terms of percentage varied in between 51 to 78 percent and the mean value was 64.7 percent. The lowest and the highest costs per bag were Rs.811 (1994-95) and Rs.1122 (1997-98). The comparative statement of all the selected units revealed the secret of reduction in the cane procurement costs in terms of percentage because the manufacturing cost and increased wage bill absorbed the impact of lion share of sugarcane bill, which was generally more than 70 percent in every sugar factory. During 2001-02, the share of cane procurement cost reduced to 51 percent because the unit crushed just 84,810 MT of sugarcane within 60 days of crushing season. The share of

normal manufacturing cost, interest on key loan and salary bill increased tremendously.

The manufacturing expenses, the second cost component has shown a higher share in total cost in terms of percentage. It varied in between 8 to 11 percent and the mean value was 9.8 percent, which was very high as compared to other units. The main reason behind the abnormal cost structure of Sanjivani S.S.K.L. was insufficient amount of sugarcane supply. The sugarcane supply trend could not meet even its Break Even Point (BEP) demand so far. Thus, the fixed manufacturing overheads never get diluted properly with the cost per bag.

The administrative overhead varied in between 1 to 3 percent and the mean value was 2 percent. During 1994-95 it was 1 percent and very next year 1995-96 the administrative cost has gone up to 3 percent, remaining eight years the administrative cost remained constant at 2 percent, due to few modifications in office, the administrative overhead increased during 1995-96. The administrative cost per bag varied in between Rs.13 to Rs.52.

The share of salary and wage bills varied from Rs.110 (1994-95) to Rs.426 (2001-02) per bag and in terms of percentage it was 10 to 21 percent and the mean value was 14.6 percent. It was observed to be quite high as compared to other two units. As stated earlier Sanjivani could not achieve BEP level and hence could not recover one of the major cost in the form of the fixed overheads i.e. salary bill of production and administrative department. This resulted in higher amount of loading of salary bill on each bag of white crystal sugar.

Sanjivani S.S.K.L. could not accumulate excess revenue for modification or modernization because the mill has incurred losses since its inception.

No major modification or replacement has been done for the last 30 years. Thus the burden of depreciation also reduced to that extent. The depreciation in total cost was in between 1 to 2 percent and the mean value was 1.8 percent. In terms of money value, every sugar bag was loaded with depreciation charges in between Rs.14 (1994-95) to Rs.50 (2001-02) during the study period.

Like other two selected units, Sanjivani S.S.K.L. also borrowed temporary loan to hold the stock of sugar throughout the year. The share of interest burden on each bag varied from Rs.18 (1994-95) to Rs.288 (2001-02). In terms of percentage it was 2 to 14 percent during the study period. Fortunately the mean value was 7.1 percent, which was lower than the mean value of other two selected units.

3.1.2 Comparative Cost Performance Analysis of Selected Units

One can judge the best cost-conscious and the best performing unit through the comparative cost performance analysis of the selected units. The Table 3.4 revealed that the lion's share of total cost of Chatt. Shahu S.S.K.L. has gone towards cane bill and allied expenses. It was also true that the unit has paid higher price to the cane suppliers as compared to other two units. On an average, the price paid by Chatt. Shahu S.S.K.L. was Rs.906.40 per MT for local cane suppliers as well as gate cane suppliers. Malaprabha S.S.K.L. paid on an average of Rs.816 per MT for local and gate suppliers and Sanjivani S.S.K.L. paid on an average Rs. 663 per MT for locals and Rs.900.50 per MT for gate

cane suppliers. The price paid by the Sanjivani S.S.K.L. to the gate cane suppliers does not include transport and other allowances.

Table No 3.4
Comparative Mean Value in Percentage of Major Cost Components
of Selected Units During the Study Period.

Sr. No.	Major Cost Components	Chatt. Shahu S.S.K.L.		Malaprabha S.S.K.L.		Sanjivani S.S.K.L.	
		Cost Per bag in Rs.	Percentage (Rank)	Cost Per bag in Rs.	Percentage (Rank)	Cost Per bag in Rs.	Percentage (Rank)
1.	Sugarcane Cost and Allied Expenses.	839.50	71.6 (1)	881.60	67.5 (1)	989.70	64.7 (1)
2.	Manufacturing Expenses.	82.80	6.9 (4)	88.20	6.6 (4)	153.50	9.8 (3)
3.	Administrative Expenses.	21.50	1.8 (6)	45.30	3.4 (5)	33.00	2.0 (5)
4.	Salary and Wage Bill	92.70	8.0 (3)	167.60	12.4 (2)	236.20	14.6 (2)
5.	Depreciation	37.40	3.3 (5)	25.00	1.7 (6)	27.80	1.8 (6)
6.	Interest on Key Loan	96.60	8.4 (2)	111.50	8.4 (3)	123.30	7.1 (4)
Total		1170.50	100	1319.20	100	1563.50	100

Source: Computed.

So far as the manufacturing expenses were concerned, Sanjivani S.S.K.L. incurred 9.8 percent of the total cost of production, which was the highest percentage as compared to Chatt. Shahu S.S.K.L. (6.9%) and Malaprabha S.S.K.L. (6.6%). The amount spent on per quintal of sugar production by Sanjivani S.S.K.L. was Rs.153.50, Chatt. Shahu S.S.K.L. was Rs.82.80 and Malaprabha S.S.K.L. was Rs.88.20. A notable point here is, in terms of percentage Chatt. Shahu S.S.K.L.'s cost of manufacturing was more as

compared to Malaprabha S.S.K.L. but in terms of amount attributed on each bag was less by Rs.5.40.

The administrative expenditure incurred by Chatt. Shahu S.S.K.L. was 1.8 percent of the total cost. Sanjivani S.S.K.L. and Malaprabha S.S.K.L. have spent 2 percent and 3.4 percent respectively. The amount loaded on each bag by Chatt. Shahu S.S.K.L. was Rs.21.50, Sanjivani S.S.K.L. Rs.33 and Malaprabha S.S.K.L. Rs.45.30.

The salary and the wage bills were the second highest components in the total cost of Sanjivani S.S.K.L. (14.6%) and in Malaprabha S.S.K.L. (12.4%) after the cane and allied cost. Since the interest on key loan (8.4%) occupied the second place in the total cost, the wage bill slips down to the third major cost (8%) in case of Chatt. Shahu S.S.K.L. Sanjivani S.S.K.L. paid Rs.236.20; Malaprabha S.S.K.L. paid Rs.167.60 and Chatt. Shahu S.S.K.L. paid Rs.92.70 to their employees to produce one quintal of white crystal sugar.

Manpower Strategy in the Selected Units

The National Federation of Co-operative Sugar Factories (NFCSF), New Delhi, Commissioner of Sugar, Maharashtra State and *Shakhar Sangh*, Mumbai have suggested typical standard manpower strength¹ for various capacities of sugar plants.

Table No.3.5.
Crushing Capacity and Manpower Requirement Suggested by the
Commissioner of Sugar, NFCSF and Shakhar Sangh.

(Figures In Number of employees)

Crushing Capacity Per Day (In MT)	Man Power Requirement as per		
	Commissioner of Sugar	NFCSF	Shakhar Sangh
1250	708	585	643
2500	878	692	NA
3500	1299	NA	NA
5000	1617	NA	NA

Source: Co-operative sugar April 2005, Vol, 36, No8. * NA Not available

Present manpower strategy in the selected units:

- i. Chatt. Shahu S.S.K.L. has work force of 1220 employees for its 3500 capacity;
- ii. Malaprabha S.S.K.L. has 1750 employees for its 3500 capacity; and
- iii. Sanjivani S.S.K.L. has 625 employees for its 1250 capacity.

The present manpower strategy adopted by the selected units revealed that Chatt. Shahu S.S.K.L. runs its operation below the number specified by the commissioner of sugar at 3500 MT per day capacity. The ratio between actual manpower and the standard specified was 1220:1299. There are 79 less number of employees in the mill. A high degree of automation and modernization reduced the requirement of manpower.

A notable point is, a large amount of investment in automation and modernisation reduced the wage bill of the Chatt. Shahu S.S.K.L. and at the same time there was an increase in depreciation and interest burden on other side.

Number of employees employed in Malaprabha S.S.K.L. was observed to have more than the standard stated. The ratio between the actual workforce and the standard specified was 1750:1299 for 3500 MT capacities per day. There are 451 more employees. An additional burden should not be more than 10 percent (130 employees) of the standard manpower specified by the competent authorities.

Sanjivani S.S.K.L. has already less number of employees. The ratio between actual and standard was 625:878. Since the unit did not have distillery unit, the workforce works only during the crushing seasons. The seasonal employees did not have any work during off-season. The burden of the seasonal work force was an additional load on wage bill. Thus the wage bill of Sanjivani S.S.K.L. showed very high in terms of percentage as well as in terms of amount attributed on per bag. Had the unit utilised the work force during the off-seasons in allied services in the mill itself, the cost per bag burden would have been reduced considerably.

Sanjivani S.S.K.L.'s management already planned to announce VRS for 164 (of which 101 employees are seasonal) employees and also planning to adopt out sourcing strategy in coming years. This is a 'Right Step' at 'Right Time'

because most of its regular employees and seasonal employees are already above 55 years and eager to accept VRS. Moreover, the factory also can cut down its wage bill to the extent of not less than Rs.1.5 crore per year.

Every business institution accumulates an asset replacement fund in the name of depreciation. Sugar mills also create depreciation account by charging in its Profit and Loss Account. The amount of depreciation depends upon the quantum of assets already possessed, purchased and disposed off by the factory during a particular financial year.

The comparative figure has shown in the table revealed that the Chatt. Shahu S.S.K.L. charged Rs.37.4 (3.3%) per bag, Sanjivani S.S.K.L. Rs.27.80 (1.8%) and Malaprabha S.S.K.L. Rs.25 (1.7%) per bag. Chatt. Shahu S.S.K.L. charged higher amount due to the modernization and expansion of plant capacity and machinery during 2000-01. Malaprabha S.S.K.L. has done capacity expansion before the study period. Hence, the amount charged per quintal has shown at minimum as compared to other units. The total depreciation charged by the Sanjivani S.S.K.L. was very meagre, but the per bag share was very high because the number of bags produced were very less as compared to other selected units.

Chatt. Shahu S.S.K.L. charged higher amount of depreciation due to heavy investments in capacity expansion and modernization. There may be reduction in manufacturing cost, cost of administration and salary and wage bills,

but at the same time the burden of depreciation and interest on key loan increased, which has led to an increase in production cost. The total amount of depreciation charged by the Sanjivani S.S.K.L. was very less but the cost per bag was very high due to its low production and low recovery rate.

The interest on key loan, the sixth dominating cost component in the list of cost structure, stands second (in rank) dominating factor of costs after the cost of cane in case of Chatt. Shahu S.S.K.L. Both Chatt. Shahu S.S.K.L. and Malaprabha S.S.K.L. attributed 8.4 percent and Sanjivani S.S.K.L. paid 7.1 percent of its total cost. But the actual impact on per bag in terms of amount, Chatt. Shahu S.S.K.L. charged Rs.96.60, Malaprabha S.S.K.L Rs.111.50 and Sanjivani S.S.K.L. loaded Rs.123.30.

3.1.3 Total Average Cost Per Bag of Each Unit During the Study Period

- (i) Chatt. Shahu S.S.K.L. Rs.1170.50; Rank 1;
- (ii) Malaprabha S.S.K.L. Rs.1319.20; Rank 2; and
- (iii) Sanjivani S.S.K.L. Rs.1563.50; Rank 3.

If all these units were ranked based on the minimum cost per bag of production, they get their ranks as already they were. Malaprabha S.S.K.L. incurring extra cost of Rs.149 and Sanjivani S.S.K.L. Rs.393 per bag as compared to Chatt. Shahu S.S.K.L.

3.2 Operational Performance Of The Selected Units

The operational performance of sugar mills was evaluated on the basis of ten parameters, viz., (i) Area under sugarcane cultivation; (ii) Yield per hectare; (iii) Sugarcane price; (iv) Sugarcane supply trend; (v) Production of crystallised sugar; (vi) Duration of crushing season; (vii) Rate of recovery; (viii) Man and Machine efficiency; (ix) Capacity utilisation; and (x) Total number of hours crushed and hours lost.

3.2.1 Area Under Sugarcane Cultivation

Every sugar mill has its own agriculture department, which looks after the development of agriculture environment required for the sugarcane cultivation within the jurisdiction of factory. The progressive achievements in terms of sugarcane production and the area under sugarcane cultivation indicate the efficiency and effectiveness of the agriculture department. The statistics relating to the area under sugarcane cultivation of the selected mills are given below.

Table No 3.6
Actual Area Under Sugarcane Cultivation of Three Units
During 1994-95 to 2003-04

(Figures in Hectares)

Year	Chatt. Shahu S.S.K.L.	Malaprabha S.S.K.L.	Sanjivani S.S.K.L.
1994-95	6,828	16,337	1,412
1995-96	5,755	17,726	1,254
1996-97	5,398	16,229	1,136
1997-98	4,960	14,943	1,112
1998-99	6,469	15,054	1,130
1999-00	6,942	17,478	1,185
2000-01	5,981	15,014	1,194
2001-02	6,254	14,676	1,212
2002-03	6,444	15,012	1,187
2003-04	6,220	15,032	1,143
Average	6,125	15,750	1,197

Source: Annual reports of the selected units.

It is evident that the area under sugarcane cultivation (Table 3.6) in each of the selected unit has shown a fluctuated trend. Generally farmers prefer to grow a particular type of crop when it gives high yield and more margin of profit. To test this assumption, area under sugarcane cultivation trend and sugarcane price trend were put together and observed that the cane price did not influence much the sugarcane growers.

Chatt. Shahu S.S.K.L. paid sugarcane price Rs.755 per MT during 1995-96, which was lesser than the previous (1994-95 paid Rs.801) year. The area under cultivation reduced from 6,828 hectare to 5,755 hectare. During 1996-97 the sugarcane price went up (Rs.1035), but the fall in area under sugarcane cultivation continued. Chatt. Shahu S.S.K.L. announced new increased price of Rs.1,050 per MT during 1997-98, still fall in area the under sugarcane cultivation continued. The total reduction in the area from 1994-95 to 1997-98 was 1,868 hectare. The farmers complained about less amount of rainfall during those years and hence, farmers switched on to other crops, which need less amount of water. At the same time, it is observed that there was an improvement in the yield per hectare. Looking at the upward trend in sugarcane price and good monsoon, the farmers of *Kagal Taluka* went back to plant sugarcane again. But the mill announced low price (Rs.985 per MT) during 1998-99 season. Since the yield per hectare increased from 72 MT per hectare to 80 MT per hectare, these farmers got a handsome amount in total. The tendency of 'produce more and gain more' even at low price continued among the sugarcane growers of *Kagal Taluka* even though the cane price touched at bottom price at Rs.750 per MT during the 2003-04.

Belgaum district comes under high recovery zone in Karnataka. Malaprabha S.S.K.L. situated at M.K.Hubli a few miles away from Belgaum head quarter. Malaprabha S.S.K.L. has (average) 15,750 hectares of land under sugarcane cultivation. It was very vast area as compared to Chatt. Shahu S.S.K.L. (average 6,125 hectares) and Sanjivani S.S.K.L. (average 1,197 hectares). Malaprabha S.S.K.L. also experienced reduction in its area of sugarcane cultivation from 1995-96 to 1998-99. The impact of fall in price for sugarcane may be one of the causes. During 1994-95 the sugarcane price reduced to Rs.825 per MT and 1995-96 it was Rs.710 per MT. A sudden decrease of Rs.115 per MT led to the withdrawal of sugarcane crops from the fields by the farmers.

During 1996-97 the cane price shot up to Rs.875 per MT and Rs.950 in 1997-98. These improvements in cane prices visible in the subsequent years till 2000-01. During these three years (1998-99 to 2000-01) not only the total sugarcane cultivation area increased but also yield per hectare also has shown upward trend hence the cane growers received more revenues in total. From 2001-02 to 2003-04 the monsoon was not favourable in M.K. Hubli area, resulted into low yield per hectare. The yield per hectare was very low (48.1 MT per hectare) as compared to Chatt. Shahu S.S.K.L. (74.2 MT per hectare) and Sanjivani S.S.K.L. (52.6 MT per hectare). This was because of the agriculture department of Malaprabha S.S.K.L. maintained the record of entire area of sugarcane grown under its jurisdiction, but only about 55 percent of the area was actually registered in the mill and the sugarcane grown in these area was

supplied to the mill. That was the reason the yield per hectare has shown very low performance as compared to other two selected units.

About 60 percent of the sugarcane fields in M.K.Hubli area depended upon the rainfall and partial irrigation. Hence the cane supply trend was highly influenced by the monsoon. The crop duration of sugarcane is lengthy as compared to other crops hence the farmers cannot switch on to other crops immediately if monsoon fails because sugarcane is planted much before the monsoon encounters in the region.

Sanjivani S.S.K.L. started with a great intention that the farmers in Goa will cultivate more and more sugarcane in future to make Goa as a self-sufficient state so far as sugar production is concerned. The dream of founder members and political leaders did not turn into reality even after three decades of its venture. The farmers in Goa could not feed the factory to meet its minimum requirements of 2,00,000 MT sugarcane per season. The area under sugarcane cultivation never crossed 1,500 hectares since its inception. On an average it remained 1,196 hectares during the study period. All efforts made by the Government of Goa and the mill itself did not give any fruit full result due to unfavourable climatic condition for sugarcane cultivation prevailing in the region, unsuitable soil structure and negative attitude of the farmers.

During 1994-95 there were 1,412 hectares of land under sugarcane cultivation. The sugarcane price paid to the local sugarcane growers was Rs.530 per MT, where as Rs.900 per MT paid to the gate cane suppliers who come from

outside the Goa state. Outsiders were paid more because of the higher percentage of sugar contents in their canes. During 1995-96 Sanjivani S.S.K.L. paid Rs.600 per MT to the locals cane suppliers and the gate cane suppliers were paid Rs.750 per MT. Here a notable point is that the gate cane suppliers were not getting allowances and concessions as locals were getting as the farmer members. Further the cane price remained constant at Rs.700 per MT from 1997-98 to 2003-04 but the gate cane price varied in between Rs.800 to Rs.1,100 during the same period. During these seven years more or less the area under sugarcane cultivation remained less than 1,200 hectares.

3.2.2 Yield Per Hectore

Yield per hectare is one of the parameters widely used to assess the performance of farms, crops, seeds, fertilizers, pesticides, etc in agro-based industry, obviously sugar industry is an agro-based industry. The most outstanding feature of the industry is the vital link between the farmers and the factory whose interests and developments are inter-dependent. No other agro-based industry can be compared with sugar industry in terms of impact and close contact between the farmer suppliers and the factory management. Hence any increase in yield or increase in recovery rate definitely increases the production of the mill and income of the farmers.

In order to make a comparative analysis of the selected mills the data relating to the sugarcane yield per hectare of the study area were compared with the yield per hectare of Maharashtra, Karnataka, Goa and 'All India Average' during the study period.

Table No 3.7**Comparative Statement of Sugarcane Yield During the Study Period**

(Figures in MT Per Hectors)

Year	Maharashtra	Chatt. Shahu S.S.K.L.	Karnataka	Malaprabha S.S.K.L.	Goa	Sanjivani S.S.K.L.	All India
1994-95	86	69	96	46	47	47	71
1995-96	80	72	80	49	48	48	68
1996-97	81	63	83	48	50	50	67
1997-98	83	72	92	46	53	53	71
1998-99	89	80	103	52	54	54	71
1999-00	90	71	101	52	56	56	71
2000-01	83	79	103	54	59	59	69
2001-02	78	78	81	49	54	54	67
2002-03	74	89	85	45	53	53	63
2003-04	51	69	67	40	52	52	59
Average	79.5	74.2	89.1	48.1	52.6	52.6	67.7

Source: Co-operative Sugar Journal, Feb. 2006, Vol.37. No 6 and Annual reports of the selected units.

So far as the state wise average yield (Table 3.7) is concerned, Karnataka stood first (89.1 MT per hectare) followed by Maharashtra (79.5 MT per hectare) and Goa State stood third (52.6 MT per hectare) in the list. During three years from 1998-99 to 2000-01, Karnataka farmers reaped bumper crops, which was above 101 MT per hectare.

When the average yield of the selected units was compared with the all India average (67.1 MT per hectare) yield, Chatt. Shahu S.S.K.L. was (74.2 MT per hectare) above the average, Malaprabha S.S.K.L. (48.1 MT per hectare) and Sanjivani S.S.K.L. (52.6 MT per hectare) below the national average.

From 1994-95 to 1999-2000 the performance of the Maharashtra State shown upward trend and afterwards there was downward trend. The performance of Karnataka State also shown upward trend from 1994-95 to

2000-01 and there after, there was declining yield trend. Like in Maharashtra and in Karnataka States a similar trend was seen in Goa State. In 1994-95 on an average all the States and national level performance was good as compared to the 1995-96. But during 2003-04, throughout India, a very low yield performance was observed due to failure of monsoon.

The performance of the farmers in Goa was very poor. They could not cross even national average. There was a difference of about (67.1 MT-52.6 MT) 15 MT per hectare. In India, the yield of sugarcane largely depends upon the monsoon. An interesting point is that the sugar contents in gate cane (more than 12 percent) were more than the sugar contents in goan (less than 9 percent) canes.

The farmers in Goa must look for high yielding sugarcane with high sugar contents, which suits agro-climatic condition of Goa. Both quantity and quality improvement are the biggest challenges before the farmers in Goa and the factory. A suitable variety of sugarcane, which suits costal climate and soil, is to be developed by the Sanjivani S.S.K.L. in consultations with Cane Development Research Centre, Coimbatore.

3.2.3 Sugarcane Price

There are several factors, which play key roles and influence the sugarcane price. They can be classified into two main groups:

- (i) The factors effecting sugarcane price; and**
- (ii) The Price Strategy of the Selected Units.**

3.2.3.1 The factors affecting sugarcane price can be further classified into:

(a) Monsoon Factors:- The destiny of farmers and agro-based industries purely depends upon the mercy of monsoon in our country. The sugarcane crop depends upon timely and sufficient rainfall, required amount of moisture and absence of the pests and diseases. If other things remain as they are, any increase in supply of sugarcane (due to sufficient rainfall and high yield per hectare) leads to 'lower cane price strategy'. Many times cane price goes below the Statutory Minimum Price (SMP) fixed by the competent authority. If the situation goes reverse (short supply of sugarcane), the sugar factories will be compelled to offer higher price to attract the cane growers. Hence the monsoon factor is an important factor, which controls the cane price and supply trend.

(b) Price of Substitutes:- In India *Gur* and *Khandsari* units are still major source of sweeteners especially in rural India. About 60 to 65 percent of sugarcane produced in the country is utilised for sugar manufacturing, about 21 to 28 percent is utilized for the manufacturing of *Gur* and *Khandsari* and the balance of 11 to 12 percent goes to feeding, chewing, seeding and other uses. Though the recovery rate in *Gur* and *Khandsari* unit is less than 8 percent, Government of India did not put any restrictions on them.

(c) Statutory Minimum Price:- The Statutory Minimum Price (SMP) is the price fixed by the Central Government below that no sugar factory is allowed to buy sugarcane from the cane growers. Every year the Central Government announces SMP for sugarcane by notification in the month of September or

October, which is to be essentially paid to the sugarcane growers by the sugar mills. The SMP based on minimum 8.5 percent recovery rate with progressive bonus at the rate of 0.1 percent recovery rate but SMP does not include transport cost, harvesting charges and state government support price.

The Govt. of India also purchases certain percentage of sugar prorated to sugar production from each mill as levy sugar. From 1941 to 1967 the Govt. of India adopted controlled and decontrolled policy and in between 1950 to 1952 exercised partial control policy. Afterwards it was felt, there should be some degree of control on production and distribution of sugar in the country so that minimum requirement of (energy in the form of glucose) every citizen could be met. Hence, 1967 onwards the Govt. of India adopted partial control policy. The ratio between levy and free sale was 40:60 in 1941-42 and 60:40 in 1968 then several times the Govt. of India changed the ratio of levy and free sale from 70:30 to 10:90, which is at present.

At present the Govt. of India collects as levy sugar and distributes the same to the economically backward people through Public Distribution System (PDS). The price of levy sugar is fixed after considering the SMP for sugarcane, cost of production including interest on bank borrowing and Govt. subsidy, if any.

A part from SMP the many State Governments fix the **State Advised Price (SAP)** for sugarcane. It is purely based on a few relevant factors applicable to the State (status of farmers, climatic condition, etc.) and the political compulsions. Generally SAP is fixed higher than SMP. The co-operative and the

state owned sugar mills have no option but to pay as per the order. Since it is an additional burden imposed by the State Government, the mills' management approached the respective State Governments to pay the difference between SAP and SMP in the event of financial losses. So far no sugar factory received the difference in time from the respective State Governments, hence incurred additional expenditure in the form of interest on key loan.

The Govt. policy of SMP and SAP and lower realisation from sale (sales price also fixed by the Govt.) created an environment for sugar mills to fall sick. These are the core reasons that sugar industry in India could not perform well till today.

Table No 3.8
Free and Levy Sugar Ratio During the Study Period

(Figurers in Percentage)

Year Quota	1994 To 1995	1995 To 1996	1996 To 1997	1997 To 1998	1998 To 1999	1999 To 2000	2000 To 2001	2001 To 2002	2002 To 2003	2003 To 2004
(i) Free	60	60	60	60	60	70	85	85	90	90
(ii) Levy	40	40	40	40	40	30	15	15	10	10
Total	100	100	100	100	100	100	100	100	100	100

Source: The Co-operative Sugar Journal, August 2005, Vol. 36, No. 12.

During the study period the ratio between free and levy sugar (Table 3.8) was 60:40 at the beginning. The Govt. of India changed its quota policy in 1999-2000 by adopting minimum partial control policy by the end of 2002-03. The Central Govt. decided to reduce levy quota at 10 percent and left 90 percent for

free market. But the power of releasing monthly (sales) quota still remains in the hands of the Govt. of India.

3.2.3.2 Price Strategy of the Selected Units

The sugar mills in India can not make use of '**Selling Price Strategy**' for sugar since the supply force (one of the market forces) is in the hands of the Central Govt. Sugar price is not determined by the price drivers (demand and supply) of the market but by the supply controllers.

When one end is closed to operate the managements of sugar mills thought of to make use of '**Buying Price Strategy**'. In this area also the Central and respective State Governments play a key role by fixing a regulator in the name of SMP and SAP. In India, managements of all the sugar factories follow their own '**Pricing Strategy**' to attract the sugarcane growers towards sugar mills. Any unfavourable price strategy will be compelled the sugarcane growers march towards nearby *gur* producers and other sugar mills. The price policy of the selected units during the study period is tabulated in Table No. 3.9.

In Table 3.9 the prices paid to the local and gate cane suppliers by the selected units during the study period were compared with the prices (computed) to be paid as per the SMP and SAP. The price ranges (minimum and maximum) are shown in the last main column. The minimum price is given at 8.5 percent recovery, further it is to be enhanced by adding bonus (at the rate of 0.1 percent increase in recovery rate into bonus rate given in the last sub column) amount to be payable per MT.

Table No 3.9
Cane Price Paid By the Selected Units and the Statutory Minimum Price (SMP)
Declared by the Central Government During the Study Period

Year	Chatt. Shahu S.S.K.L.				Malaprabha S.S.K.L.				Sanjivani S.S.K.L.				All India SMP at 8.5% Recovery + Bonus @ 0.1% per MT	
	Recovery in percentage	SMP Per MT (Rs)	Price Paid To Locals in Rs.	Price Paid To Gate Cane in Rs.	Recovery in percentage	SMP Per MT (Rs)	Price Paid To Locals in Rs.	Price Paid To Gate Cane in Rs.	Recovery in percentage	SMP Per MT (Rs)	Price Paid To Locals in Rs.	Price Paid To Gate Cane in Rs.	Minimum and Maximum Price Range in Rs.	For Every 0.1% Increase Rate in Rs.
1994-95	12.32	594	801	801	10.96	508	825	825	9.51	431	530	900	391-664	4.00
1995-96	11.86	606	755	755	10.35	525	710	710	10.05	509	600	750	425-690	5.40
1996-97	12.69	698	1035	1035	11.05	604	875	875	10.07	548	600	750	459-729	5.70
1997-98	12.84	745	1050	1050	11.07	639	900	900	8.96	512	700	1100	485-790	6.00
1998-99	12.55	775	985	985	10.61	658	800	800	10.37	643	700	977	527-831	6.20
1999-00	13.04	861	965	965	10.64	708	800	800	10.11	757	700	900	561-858	6.60
2000-01	12.97	908	975	975	10.54	738	800	800	9.52	666	700	940	595-966	7.00
2001-02	13.03	951	888	888	10.37	757	825	825	8.96	654	700	940	620-1007	7.30
2002-03	13.45	1021 (SAP 1101)	860	860	10.80	804 (SAP 925)	600	600	9.25	677	700	948	615-1138	8.20
2003-04	12.58	1077	750	750	9.84	844	825	825	8.89	763	700	800	730-1189	8.50
Average	12.73	823.6	906.4	906.4	10.62	678.5	816	816	9.63	616	633	900.5	--	--
Percentage to SMP	100	100	110	110	---	100	120	120	--	100	103	146	--	--

Source: Annual Reports and Manufacturing Reports of the select units and Coop Sugar Journal. October. 2006, Vol.38. No.2.

From 2000-01 onwards both Maharashtra and Karnataka States started declaring SAP for the benefit of the sugarcane growers in their region. It is observed that the minimum prices of SAP were the same as SMP except during 2002-03.

Sanjivani S.S.K.L. paid lower price to the local cane growers and higher price to the gate cane suppliers because of the higher percentage of sugar contents in the gate cane. But the actual price paid to the gate cane suppliers was observed to be more than the SMP because the gate cane suppliers also demanded a part of allowances (not all the time) that were usually paid to the members. This difference in price policy led to some sort of dissatisfaction among the cane growers in Goa. Several meetings with the farmers in Goa were held and the factory management got success in convincing the importance of recovery rate and need of gate cane for the survival of the Sanjivani S.S.K.L. The local suppliers must realise the fact that the survival of the Sanjivani depends upon the gate cane otherwise goan farmers must provide minimum requirement of 2 lakh MT sugarcane per season. The farmers in Goa neither could increase the area of sugar cultivation nor production per hectare. The local supply trend remained more or less 25 percent of minimum requirement for the last three decades.

Chatt. Shahu S.S.K.L. paid the highest price during 1996-97 (Rs.1035 Per MT) and 1997-98 paid (Rs.1,050 per MT). Similarly, Malaprabha S.S.K.L. paid Rs.875 per MT and Rs.900 per MT; Sanjivani S.S.K.L. Rs.750 per MT (gate cane) Rs.1,100 per MT (gate cane) during the same period. It is because during 1995-96, 62 percent of sugarcane produce were utilised for production of white

crystal sugar and 26 percent for *gur* and *khandsari*. The share of sugarcane utilised for white sugar production reduced to 47 percent during 1996-97. The *gur* producers attracted the cane suppliers by adopting high price and an immediate payment policy. The sugarcane utilization percentage increased from 26 to 41. The fear of competitors and reduction in cane production compelled the sugar mills' management to fix a higher price than that of *gur* producers' price offer. The tag-of-war continued till 1998-99. During 1999-00 again the percentage of sugarcane utilization for white sugar production (60 %) and *gur* (29%) came down to normal.

Generally all the Sugar mills have to pay more or equal to the SMP. All the three selected units have made their payments of cane bills in similar fashion. Chatt. Shahu S.S.K.L. was observed to have paid lesser than the SMP during the last three (from 2001-02 to 2003-04) years during the study period. During 2002-03 the mill neither paid SMP nor SAP to sugarcane suppliers.

Chatt. Shahu S.S.K.L. paid, on an average Rs.906.40 to the locals as well as gate cane suppliers, which was higher than the average of SMP (Rs.823.60) during the study period. In terms of percentage it was 10 percent higher than the SMP.

Malaprabha S.S.K.L. also paid higher price than the SMP till 2001-02. During 2002-03 and 2003-04 the SMP were Rs.804 and Rs.844 PMT but the mill paid only Rs.600 and 825 respectively to the local as well to the gate cane

suppliers. During 2002-03, the Govt. of Karnataka announced SAP of Rs.925. On an average Malaprabha S.S.K.L. paid Rs.816 per MT, which was 20 percent higher than the average SMP of Rs.678.50 per MT.

Sanjivani S.S.K.L. was observed to have followed 'Dual Pricing Policy'. The locals were paid lower price than the gate cane suppliers because of the sugarcane grown in Goa was of very poor quality. The sugar content in them was less than 9 percent. They were also paid allowance of cane transport and harvesting expenses. Hence, the farmers in Goa have received additional benefits, which was not included in the price paid to the locals. During 2003-04 the mill paid Rs.700 per MT to locals and Rs.800 per MT to gate cane suppliers, but the SMP was Rs.763 per MT. On an average Sanjivani S.S.K.L. paid Rs.633 per MT (103%) and Rs.900.50 (146%), which is over and above the SMP of Rs.616 (100%).

3.2.4 Sugarcane Supply Trend

After the price factor analysis, it is better to analyse the sugarcane supply trend so that these two parameters can be put into a test of correlation so as to arrive a conclusion that the said parameters are influencing each other or not.

In order to penetrate deep into the supply behaviour of locals and gate cane suppliers, the data extracted from the annual reports of the selected units were put into three separate tables in an analytical form.

Table No. 3.10
Sugarcane Supply Trend in Chatt. Shahu S.S.K.L.
During the Study Period

Year	Local Sugarcane		Gate Sugarcane		Total	
	In MT	Percentage	In MT	Percentage	In MT	Percentage
1994-95	3,30,840	75	1,07,701	25	4,38,541	100
1995-96	1,82,109	34	3,45,800	66	5,27,909	100
1996-97	4,39,876	80	1,11,742	20	5,51,618	100
1997-98	3,54,040	80	87,251	20	4,41,291	100
1998-99	4,40,003	93	32,824	7	4,72,827	100
1999-00	4,78,520	82	1,04,150	18	5,82,670	100
2000-01	2,86,842	44	3,62,349	56	6,49,191	100
2001-02	3,00,043	47	3,36,004	53	6,36,047	100
2002-03	3,12,429	48	3,39,601	52	6,52,030	100
2003-04	2,26,271	48	2,48,693	52	4,74,964	100
Average	3,35,097	62	2,07,611	38	5,42,708	100

Source: Annual Reports of Chatt. Shahu S.S.K.L.

Chatt. Shahu S.S.K.L. was observed (Table 3.10) to have experienced drastic changing scenario in supply trend between local suppliers and gate cane suppliers. During 1994-95 the cane supply ratio between local and gate cane was 3:1 very next year locals withdrew the supply and the ratio reduced to 1:2. From 1976-77 to 1999-2000 the ratio was 4:1 (except 1998-99); indicated that the local suppliers have shown loyalty towards the mill. Further 2000-01 onwards gate cane suppliers rushed to the factory to encash 'Care for Farmers policy' adopted by the Chatt. Shahu S.S.K.L. (in time payment of farmers' cane bills and good will created by the mill) mesmerised the outsiders and compelled the farmers to march towards the factory. During 2000-01 the mill increased its

crushing capacity from 2,500 MT to 3,500 MT per day. This capacity expansion venture of the mill removed the feelings of uncertainty of getting entry and waiting in a long queue, which were in the minds of the gate cane suppliers.

Table No. 3.11
Sugarcane Supply Trend in Malaprabha S.S.K.L.
During the Study Period

Year	Local Sugarcane		Gate Sugarcane		Total	
	In MT	Percentage	In MT	Percentage	In MT	Percentage
1994-95	5,94,503	100	1,586	-	5,96,089	100
1995-96	6,94,791	100	262	-	6,95,053	100
1996-97	7,58,298	100	425	-	7,58,723	100
1997-98	4,12,860	84	76,776	16	4,89,636	100
1998-99	5,20,362	89	66,668	11	5,87,030	100
1999-00	6,68,338	96	29,440	4	6,97,778	100
2000-01	5,70,597	90	59,915	10	6,30,512	100
2001-02	4,32,835	88	59,914	12	4,92,749	100
2002-03	4,56,924	91	44,443	9	5,01,367	100
2003-04	1,96,656	81	48,031	19	2,44,687	100
Average	5,30,616	93	38,746	7	5,69,362	100

Source: Annual Reports of Malaprabha S.S.K.L.

Malaprabha S.S.K.L.'s sugarcane supply trend record (Table 3.11) has shown from 1994-95 to 1996-97, the factory received sufficient sugarcane (100%) supply from its loyal members. The gate cane share was negligible. During 1997-98, 16 percent cane came from outside and that was maximum percentage of gate cane received by Malaprabha S.S.K.L. during the study period. The monsoon failed during 2003-04 in the region. Due to sugar price

competition and bad monsoon, the mill crushed just 2.44 lakh MT out of which the gate cane suppliers supplied 48,031 MT of sugarcane. On an average Malaprabha S.S.K.L. crushed 93 percent of members' cane and the rest 7 percent gate cane during the study period.

Table No. 3.12
Sugarcane Supply Trend in Sanjivani S.S.K.L.
During the Study Period

Year	Local Sugarcane		Gate Sugarcane		Total	
	In MT	Percentage	In MT	Percentage	In MT	Percentage
1994-95	53,716	32	1,12,446	68	1,66,162	100
1995-96	55,062	29	1,35,216	71	1,90,278	100
1996-97	53,890	37	89,709	63	1,43,599	100
1997-98	54,237	47	60,758	53	1,14,995	100
1998-99	64,079	33	1,31,729	67	1,95,808	100
1999-00	58,334	39	88,844	61	1,47,178	100
2000-01	64,516	39	1,00,445	61	1,64,961	100
2001-02	65,744	78	19,066	22	84,810	100
2002-03	60,972	44	77,651	56	1,38,623	100
2003-04	55,520	49	56,873	51	1,12,393	100
Average	58,607	40	87,273	60	1,45,880	100

Source: Annual Reports of Sanjivani S.S.K.L.

The sugarcane supply trend (Table 3.12) of Sanjivani S.S.K.L. was quite opposite as compared to other two selected units. This unit was purely depended on gate cane suppliers. On an average, the mill received 60 percent of sugarcane from outside the state. The local suppliers could not provide more than 66,744 MT in the last 32 years. During 2001-02 the gate cane supplier did

not supply sugarcane in response to the adverse policy (regarding membership issue) adopted by the mill's management towards the gate cane suppliers even though the mill offered price was Rs.940 per MT for outsiders and Rs.700 per MT for locals. At the same time, gate cane suppliers from Karnataka state faced border-crossing problem. Ultimately Sanjivani S.S.K.L. could not get even 85,000 MT in that year.

In order to find out, (i) whether any increase in sugar price has motivated the sugarcane growers to grow and supply more cane to the factories; (ii) whether any increase in sugarcane price attracted the gate cane supplier; and (iii) are there any correlation between sugar cane prices and supply trends of sugar cane, the collected data were analysed by **universally accepted statistical tool², 'Karl Pearson's All purposes Product Moment Co-efficient of Correlation'** to draw a conclusion.

Chatt. Shahu S.S.K.L.'s local cane suppliers (Table 3.13) were observed to be more sensitive with hick in cane price and have shown a positive (+ 0.75) response in supplying additional quantity of sugarcane. It is observed that the increase in the cane price mesmerised the members to sell their entire sugarcane produce to the mill itself. Otherwise the same members used to sell their part of the cane produce to the *gur* producers and local cane juice sellers, if these two alternatives fetch them higher price and profit.

Table No 3.13**Sugarcane Price Paid and Sugarcane Supplied to Chatt. Shahu S.S.K.L.
During the Study Period**

Year	Local Cane		Gate Cane	
	Price In Rs.	Sugarcane Supply In '000' MT	Price In Rs.	Sugarcane Supply In '000' MT
1994-95	801	330	801	107
1995-96	755	182	755	345
1996-97	1035	439	1035	111
1997-98	1050	354	1050	87
1998-99	985	440	985	32
1999-00	965	478	965	104
2000-01	975	286	975	362
2001-02	888	300	888	336
2002-03	860	312	860	339
2003-04	750	226	750	248
Average	906.4	334.7	906.4	207.6
Variables	X	Y	X	Y

Source: Annual Reports of Chatt. Shahu S.S.K.L.

So far as the gate cane suppliers were concerned there was very weak negative correlation (-0.32) between price and supply trend. It indicated that whatever may be the price impact of fluctuation, it did not affect the gate cane suppliers but these gate cane suppliers influenced by other factors such as dealing with *gur* producers, local cane juice sellers, situation prevailing in nearby factories, etc.

Table No.3.14**Sugarcane Price Paid and Sugarcane Supplied to Malaprabha S.S.K.L.****During the Study Period**

Year	Local Cane		Gate Cane	
	Price In Rs.	Sugarcane Supply In '000' MT	Price In Rs.	Sugarcane Supply In '000' MT
1994-95	825	594	825	1
1995-96	710	694	710	1
1996-97	875	758	875	1
1997-98	900	412	900	76
1998-99	800	520	800	66
1999-00	800	668	800	29
2000-01	800	570	800	59
2001-02	825	432	825	59
2002-03	800	456	800	44
2003-04	825	196	825	48
Average	816	530.8	816	38.4
Variables	X	Y	X	Y

Source: Annual Reports of Malaprabha S.S.K.L.

The members of Malaprabha S.S.K.L. have shown (Table 3.14) negative (-0.10) response to the price fluctuation. The cane price comparative statement, which was already discussed, proved that the members have got more benefits as compared to the other selected units. As per the records of the factory the members observed to have shown loyalty. It is observed that mill received lesser amount of sugarcane from the members only when monsoon failed in the region. The other reason was that the members have bitter experience for supplying their sugarcane to other nearby factory in the past. On an average, there was no

significant correlation between the price trend and supply trend so far as local cane suppliers are concern.

The same situation (-0.11 correlation) was observed in case of gate cane suppliers. But the impact of the gate cane suppliers was negligible because the share of the gate cane suppliers was just 7 percent of the total supply.

Table No. 3.15
Sugarcane Price Paid and Sugarcane Supplied to Sanjivani S.S.K.L.
During the Study Period

Year	Local Cane		Gate Cane	
	Price In Rs.	Sugarcane Supply In '000' MT	Price In Rs.	Sugarcane Supply In '000' MT
1994-95	530	53	900	112
1995-96	600	55	750	135
1996-97	600	53	750	89
1997-98	700	54	1100	60
1998-99	700	64	977	131
1999-00	700	58	900	88
2000-01	700	64	940	100
2001-02	700	65	940	19
2002-03	700	60	948	77
2003-04	700	55	800	56
Average	663	58.1	900.5	86.7
Variables	X	Y	X	Y

Source: Annual Reports of Sanjivani S.S.K.L.

It is observed that 40 percent of the sugarcane suppliers of the Sanjivani S.S.K.L. were locals. The gate cane suppliers (60%) dominated the sugarcane supply trend of the factory. Unfortunately a negligible (+0.02) very weak positive correlation was observed (Table 3.15) between the price and quantum of cane

supply among the local cane suppliers. Almost all the members supply their sugarcane to the factory since they do not have any other buyers except a small market demand from the local juice vendors and religious functions like *Ganesh* festival, *Tulashi* marriage, etc.

So far as gate cane suppliers were concerned, the correlation result was observed to have '**weak negative correlation**' (-0.26), which indicated even though there were large differences in cane prices between the gate cane suppliers as compared to the locals and the favourable price policy for gate cane farmers adopted by the mill's management, did not yield any fruitful results.

3.2.5 Production of White Crystal Sugar

Every sugar mill proudly says its performance in terms of white crystallized sugar production. This parameter of performance is accepted universally, however, production performance of any sugar factory totally depends upon the other two variables *viz.*, quantum of sugarcane crushed and recovery rate.

It is mandatory on the part of the sugar factory to grade their sugar as per the Indian Sugar Standards. The bags shall be packed as per the Packing and Marketing Order 1970, issued by the Govt. of India. According to this order each bag shall contain 100 kg (now a days sugar factories are packing in convenient handling bags of 50 kg also) of sugar and on each bag shall give: (a) The quantitative content; (b) The quality of sugar therein; (c) The date of manufacturing; and (d) The process of manufacture (Sulphitation or Carbonation).

Sugar is graded on the basis of colour and grain-size. There are two grades for colour and five grades for grain-size.

(a) Colour grades: - 30 for the whitest and 29 for others.

(b) Grain size: - A, B, C, D and E size. 'A' is the boldest standard and 'E' is the finest. All together there are 10 grades viz., A -30, A -29, B -30, B -29, C -30, C-29, D -30, D -29, E -30 and E -29.

In order to analyse the white crystal sugar production performance of the selected units during the study period, the data relating to the sugar production is presented in Table 3.16.

Table No. 3.16
Comparative Statement of White Crystal Sugar Production
During the Study Period

(Figures in quintal)

Year	Chatt. Shahu S.S.K.L.	Malaprabha S.S.K.L.	Sanjivani S.S.K.L.
1994-95	5,40,915	6,74,000	1,58,022
1995-96	6,26,580	7,72,570	1,10,418
1996-97	6,75,920	7,72,055	1,44,693
1997-98	5,66,700	5,38,182	1,02,965
1998-99	6,04,650	6,47,379	2,02,489
1999-00	7,54,780	6,40,360	1,48,481
2000-01	8,42,540	6,61,180	1,57,298
2001-02	8,29,950	4,41,200	75,720
2002-03	8,78,290	5,65,015	1,28,067
2003-04	5,98,450	2,51,875	1,00,058
Average	6,91,877.5	5,96,381.6	1,32,821.1

Source: Annual Reports and Manufacturing Reports of the Selected Units.

The comparative sugar production performance (Table 3.16) indicates that Chatt. Shahu S.S.K.L. has shown upward trend of production except during 1997-98, 1998-99 and 2003-04, due to monsoon failure in those years in Kolhapur region. A tremendous increase in quantum of production has been achieved 2000-01 onwards. Chatt. Shahu S.S.K.L. has achieved double-dimensional progress, one in terms of increase in production capacity and the second one in terms of production. But during 2003-04 the mill did not get sufficient sugarcane to crush due to bad monsoon, which hit the sugarcane production.

Malaprabha S.S.K.L. has shown upward as well as downward production trends during the study period. During 1997-98 shortage of sugarcane supply reduced the quantum of sugar production. Malaprabha S.S.K.L. has also faced similar situation as encountered by Chatt. Shahu S.S.K.L. during 2001-02 to 2003-04, continuous failure of crop due to white woolly diseases and bad monsoon that reduced the production of white crystal sugar.

A wide fluctuation has been observed in the production profile of the Sanjivani S.S.K.L. This unit unfortunately neither received the sufficient quantity of sugarcane nor quality sugarcane, which were essential for the good performance in sugar production. Sanjivani S.S.K.L. received more than 1.35 lakh MT of sugarcane from outside the state during 1995-96, which was the highest during the study period but it could not cross 2 lakh quintals of sugar production as achieved during 1998-99 because of the low average recovery rate. During 2001-02, Sanjivani S.S.K.L. faced acute shortage of sugarcane because the gate cane suppliers did not respond in that season due to the various problems such as difficulty in getting inter state border pass for

sugarcane and incentive from the factory for gate cane suppliers were the major problems among them.

3.2.6 Duration of Crushing Season

The duration of crushing season is used as one of the parameters of performance. Every sugar mill keeps records of gross seasonal days and net seasonal days. Gross seasonal days consist of net seasonal days and days spent for cleaning and repairing purpose during the crushing season. If any unit maintains the difference between gross seasonal days and net seasonal days at minimum level, such unit is treated as highly efficient unit. The net seasonal days are calculated with the following formula.

$$\text{Net Seasonal Days} = \frac{\text{Total Hours Crushed}}{22 \text{ Hours}}$$

Each day consists of 22 effective working hours and 2 hours are kept for cleaning and maintenance. If any unit makes use of those two hours also, its net seasonal days may cross the gross seasonal days.

The length of the crushing season days depends upon the number of sugarcane suppliers come to the mill and the quantum of sugarcane bring with them; area under sugarcane cultivation; yield per hectare; number of cutting order issued by the Agriculture Department of the factory; monsoon and climatic condition; mood of the gate cane suppliers; crushing capacity of the factory and efficiency of engineering department of the sugar factory. If all of these factors are in favourable direction for a mill, such mill could achieve a high degree of efficiency in crushing seasons.

In order to ascertain the best performing unit in terms of number of days, the performance of the selected units, performance of the respective states and all India level were tabulated in Table No 3.17. The data relating to the study period were taken for comparison.

Table No. 3.17
Comparative Statement of Duration of Crushing Season
of the Selected Units During the Study Period

(Figures in Net Number of days)

Year	Maharashtra State	Chatt. Shahu S.S.K.L.	Karnataka State	Malaprabha S.S.K.L.	Goa State	Sanjivani S.S.K.L.	All India
1994-95	179	170	186	213	122	122	166
1995-96	198	233	201	231	144	144	192
1996-97	122	170	123	140	92	92	132
1997-98	138	172	115	114	73	73	127
1998-99	159	209	174	207	128	128	146
1999-00	175	194	171	158	101	101	155
2000-01	147	183	149	169	114	114	139
2001-02	126	178	123	115	60	60	131
2002-03	122	188	127	130	99	99	129
2003-04	75	125	83	65	85	85	88
Average	144.7	182.2	145.2	154.2	101.8	101.8	140.5
As Compared to National Average	103%	130%	103%	110%	73%	73%	100%

Source: Co-operative Sugar Journal, May 2005, Vol.36 No.9 and Manufacturing Reports of the Selected Units.

During 1995-96 all the three units have crushed (Table 3.17) for a maximum number of days during the study period. Chatt. Shahu S.S.K.L.'s records have shown that the longest duration of crushing season was 233 days but the highest sugar production recorded during 2002-03 and the duration was 188 days. It was due to the increase in capacity from 2500 to 3500 MT per day, which reduced the number of days but increased the quantum of production.

Another notable point was Chatt. Shahu S.S.K.L. has increased its crushing capacity during 2000-01. Up to the 1999-00 the unit was running with 2500 MT per day capacity. The factory record has shown crushing duration prolonged for 194 days and produced the highest amount of sugar as compared to 1995-96 (233 days). It indicated that there was no rush of sugarcane supply, hence reduction in crushing speed per day, which was much below the capacity, led to the increase in number of crushing days. But in reality the efficiency was observed during 1999-2000 and 2002-03 with capacity of 2500 MT per day and 3500 MT per day respectively. During 2003-04, Chatt. Shahu S.S.K.L. did not get sufficient sugarcane due to monsoon failure in the region, hence indicated less number of days.

The average number of days was 182.2 and the average performance in terms of percentage has shown the highest (130%) figure as compared to the national level (100%) average. The average ratio between gross and net crushing days was 176:182. Chatt. Shahu S.S.K.L. crushed on an average 38 more days as compared to the average of the Maharashtra State and 42 more days as compared to the national level average.

The Malaprabha S.S.K.L. also crushed 231 days during 1995-96, which was the highest number of days during the study period but 1995-96 the factory crushed lesser amount of sugarcane (6.95 lakh MT) as compared to 1996-97 (7.58 lakh MT) season. The reason for increase in number of days was during 1995-96 the factory lost more than 900 hours due to various reasons but not due to waiting for cane, which led to under utilization of capacity. The average

performance of Malaprabha S.S.K.L. was better (154.2days) as compared to the Karnataka average (145.2 days) and the national (140.5 days) average. It was 10 percent more than the national average. The average ratio between gross crushing days net crushing days was 159:154.

So far as Sanjivani S.S.K.L. was concerned the highest number (144 days) of crushing days recorded during 1995-96. There was no difference in Goa state average and Sanjivani S.S.K.L. records since only one sugar-manufacturing unit in the state. Sanjivani S.S.K.L. has received 1.90 lakh MT of sugarcane during 1995-96, which was lesser than the record of 1998-99 (1.95 MT). More over during 1995-96 production of sugar was lower (1.10 lakh quintals) as compared to 1998-99 (2.02 lakh quintals). The reasons behind the lowest performance during the lengthiest season were: low rate of recovery; the average amount of cane crushed was less (but more than the 1250 MT capacity) in that season; and as much as 833 hours were lost due to various reasons.

The average performance of Sanjivani S.S.K.L. was very low (101.8 days) as compared to the national average (140.5 days) and in terms of percentage it was just 73%. The average ratio between gross crushing days and net crushing days was 123:102.

3.2.7 Rate of Recovery

Rate of recovery is another important parameter indicates the degree of production performance. The rate of recovery is nothing but the percentage of

sugar content extracted from sugarcane. The sugar content in cane differs from region to region and from time to time. The sugar content in sugarcane does not have any correlation with the yield per hectare. High degree of sugar contents fetches a high rate of white crystal sugar return. The input of sugarcane and output of sugar production is measured in term of percentage.

The degree of sugar contents in sugarcane depends upon the quality of soil, sugarcane variety and seed, impact of monsoon, pesticides and fertilizers used and cropping pattern. The rate of recovery depends upon percentage of sugar content in cane and also depends upon the efficiency of men and machines in the factory.

In order to find out which of the selected units has shown the highest performance during the study period, the extracted data have been tabulated in Table No. 3.18. Further the data have been compared with the performance of the respective States and with all India level performance.

Chatt. Shahu S.S.K.L. has experienced a fluctuating trend (Table 3.18) in sugar recovery rate during the study period. The highest recovery rate (13.45%) was observed during 2002-03 because the factory got high quality sugarcane in that year, which was containing 15.19 percent sugar in it. The average rate of recovery achieved by the Chatt. Shahu S.S.K.L. was 12.72 percent, which was the highest among the selected units. It was also more as compared to the State average and national level average. Chatt. Shahu S.S.K.L. has shown 21 percent more efficiency in recovery as compared to the national recovery rate.

Table No 3.18
Comparative Statement of Average Recovery of Sugar Percent
in Sugarcane of the Selected Units During the Study Period

(Figures in percentage)

Year	Maharashtra State	Chatt. Shahu S.S.K.L.	Karnataka State	Malaprabha S.S.K.L.	Goa State	Sanjivani S.S.K.L.	All India
1994-95	10.93	12.32	10.20	10.96	9.51	9.51	10.30
1995-96	10.49	11.86	9.94	10.35	10.05	10.05	9.81
1996-97	11.11	12.69	10.80	11.05	10.07	10.07	10.27
1997-98	11.14	12.84	10.57	11.07	8.96	8.96	10.34
1998-99	11.15	12.55	10.67	10.61	10.37	10.37	10.35
1999-00	11.39	13.04	10.81	10.64	10.11	10.11	10.67
2000-01	11.63	12.97	10.88	10.54	9.52	9.52	10.91
2001-02	11.62	13.03	10.90	10.37	8.96	8.96	10.79
2002-03	11.66	13.45	10.99	10.80	9.25	9.25	10.86
2003-04	10.94	12.58	10.52	9.84	8.96	8.89	10.53
Average	11.21	12.73	10.63	10.62	9.63	9.63	10.48
As Compared to National Average	107%	121%	101%	101%	92%	92%	100%

Source: Co-operative Sugar Journal, May 2005, Vol.36 No.9 and Manufacturing Reports of the Selected Units.

Malaprabha S.S.K.L. has shown the highest recovery rate (11.07%) during 1997-98 and the sugar content in cane was 13.24 percent. But during 1996-97 the factory received sugarcane with 13.29 percent sugar content but the recovery rate dropped to 11.05 percent. It indicated some sort of inefficiency on the part of man and machine performance. Because of an additional difference of (13.29-13.24) 0.05 percent sugar content did not contribute additional bags of sugar. More over it was also observed that reduced rate of recovery (11.07-11.05) of 0.02 percent in production.

The performance of Sanjivani S.S.K.L. was very poor during the study period because the recovery rate was 9.63 percent, which was less than the national average record of 10.48 percent. Had the mill received the entire lot of sugarcane supply from the local farmers the average recovery rate would have dropped certainly to the bottom recovery rate of less than 9 percent for the year. It was evident if one observed the quantum of gate cane supply during 1997-98 to 2001-02 and 2003-04 and the recovery rate recorded in these three years. Hence, the mill's degree of higher recovery rate purely depended upon the quantum of gate cane supply.

3.2.8 Man and Machine Efficiency

No sugar factory can extract cent percent sugar content from sugarcane. A small amount of sugar content goes as normal process loss. After making numerous researches in the sugar extraction methods and processes, the researchers fixed up an allowable maximum normal losses. If any sugar unit maintains its normal losses within the allowable normal losses, such sugar mills are considered as highly efficient mills. The rate of normal loss indicates the degree of efficiency of men and machines in sugar mills.

It is noticed that there is a loss of sugar at all stages right from harvesting to final product, which is a serious economic problem of sugar industry. It is also observed that the over all loss of sugar contents from the point of pre-harvest to till the point of bagging is estimated between 5 percent to 35 percent. The quantum of loss depends upon the degree of geographical and technical factors

affecting the sugarcane cultivation, transportation and production processes. The **sugar losses³** in the sugarcane has been classified into:

- (I) **Known Losses or Determined Losses** consist of (a) Bagasse loss; (b) Filter cake loss; and (c) Molasses loss. These losses are determined by multiplying their weight measured using weighting scales.
- (II) **Unknown Losses or Undetermined Losses**, which cannot be determined directly but as ascertained from the difference between sugarcane and sugar accounted for. These losses arise during chemical process or in mechanical process such as juice heating, syrup tanks, crystallisers, centrifugals and at bagging point.

The Govt. of India in its order (dated 31/05/1988) has specified the maximum limit for total sugar loss as: (a) 2.2 percent for the plant set up as per 1973 standard; and (b) 2.0 percent for the plant set up as per 1987 standard specifications.

In addition to the above standard allowable losses, the Bhargava Sugar Industry Enquiry Commission (BSIEC) has given break up of losses in percentages:

(A) For known loss:

- (a) Bagasse - maximum loss allowed between 0.9 and 1.1 percent;
- (b) Filter cake - maximum loss allowed 0.1 percent; and
- (c) Molasses - maximum loss allowed 0.1 percent.

(B) For unknown maximum loss is 0.1 percent.

The total standard normal maximum loss allowable is 2.7 percent. If any unit keeps its losses to the extent of 2.3 percent, which is at minimum level, such unit is called as highly efficient unit.

In order to ascertain the men and machines efficiency in extracting sugar content from the sugarcane, the data relating to the selected units have been tabulated in the form of comparative statement in Table No. 3.19.

Chatt. Shahu S.S.K.L. has received very high quality (Table 3.19) of sugarcane with 15.19 percent sugar content in it during 2002-03. In the same year the mill made a record recovery rate of 13.45 percent, which means extraction of 89 percent of total sugar content. On an average, the Chatt. Shahu S.S.K.L. has received the sugarcane with 14.49 percent sugar content and the average recovery rate was 12.73 percent. The sugar extracting efficiency of men and machines was 88 percent. It is evident that the extracting efficiency of men and machines remained the same (88%) even after increase in capacity (2000-01) except during 2002-03 (89%).

Chatt. Shahu S.S.K.L., however, has shown a high degree of production efficiency. As per the Bhargava Sugar Industry Enquiry Commission (BSIEC) the production standard must be in between 81 percent and 84 percent and as per the specification (1987) fixed by the Govt. of India it is 86 percent. But the Chatt. Shahu S.S.K.L. has extracted 88 percent of the sugar content, which indicated a high degree performance of men and machines engaged in the process.

Table No 3.19

**Percentage of Sugar in Sugarcane and Sugar Recovery in Selected Units
During the Study Period**

(Figures in Percentage)

Year	Chatt. Shahu S.S.K.L.			Malaprabha S.S.K.L.			Sanjivani S.S.K.L.		
	Percentage of sugar in sugarcane	Percentage of sugar recovery	Difference in terms of percentage	Percentage of sugar in sugarcane	Percentage of sugar recovery	Difference in terms of percentage	Percentage of sugar in sugarcane	Percentage of sugar recovery	Difference in terms of Percentage
1994-95	14.10	12.32	87	13.02	10.96	84	12.31	9.51	77
1995-96	13.72	11.86	86	12.58	10.35	82	13.51	10.05	74
1996-97	14.45	12.69	88	13.29	11.05	83	12.63	10.07	80
1997-98	14.56	12.84	88	13.24	11.07	84	11.37	8.96	79
1998-99	14.26	12.55	88	12.85	10.61	83	13.08	10.37	79
1999-00	14.80	13.04	88	12.94	10.64	82	12.89	10.11	78
2000-01	14.72	12.97	88	12.93	10.54	82	12.32	9.52	77
2001-02	14.79	13.03	88	12.62	10.37	82	11.54	8.96	78
2002-03	15.19	13.45	89	12.96	10.80	83	11.92	9.25	78
2003-04	14.31	12.58	88	11.97	9.84	82	11.55	8.89	77
Average	14.49	12.73	--	12.84	10.62	--	12.31	9.63	--
Percent- age	--	--	88	--	--	83	--	--	78
After Deduction of Minimum Loss	--	12.19	84	--	10.54	82	--	10.01	81
After Deduction of Maximum Loss	--	11.79	81	--	10.14	80	--	9.61	78
Standard Loss Allowed by the Central Govt.	--	12.49	86	--	10.84	84	--	10.11	82

Source: Manufacturing Reports of the Selected Units.

Malaprabha S.S.K.L. has received quality sugarcane containing 12.84 percent sugar in it and the unit has shown the average extracting efficiency to the extent of 83 percent. As per the BSIEC production standard the Malaprabha S.S.K.L. has to extract 82 percent of sugar and as per the specification (1987) of the Govt. of India it is 84 percent. The factory has shown higher production efficiency as per the BSIEC standard but one percent less as per the plant set up standard specification of 1987 issued by the Govt. of India.

Sanjivani S.S.K.L. was observed to have received low quality sugarcane during the study period. More over, the factory has neither under gone capacity improvement nor any major modifications and replacements due to its inherent problem of accumulated losses. Apart from all these short falls, Sanjivani S.S.K.L. was able to maintain its extracting efficiency at 78 percent, which was equal to the minimum standard of BSIEC because as per the BSIEC production standard the factory has to extract sugar content in between 78 percent and 81 percent. But as per the plant set up standard (applicable at the rate of 2.2 percent as per 1973) it was 82 percent, where Sanjivani S.S.K.L. lagging behind by 4 percent.

3.2.9 Capacity Utilization

The capacity utilization is one more parameter available to decide the degree of production efficiency of every manufacturing unit. Some of the manufacturing units can make use of its cent percent capacity but most of the time they cannot exceed it. But industries like sugar, cement, etc., work beyond

their actual capacity as and when need arises. They work even during the stoppage time for cleaning, if cleaning is not needed.

Some time sugar mills receive a large amount of sugarcane within a short span of time. Since sugarcane is a perishable raw material, it must be crushed as early as possible preferably within six hours after detaching from its root to get maximum rate of recovery. Otherwise convertible sugar contents get converted into non-convertible sugar contents. Hence the sugar mills must take care of all these factors during crushing time.

Sugar mills can take benefits of over utilisation of production capacity during the crushing period. The over utilisation of capacity does not create any additional burden of fixed charges either in the form salary (permanent as well as seasonal) or in the form of other set-up expenditures. Any increase in number of breaks increases process cost. After all the sugar mills have to be remain closed for two third of its lifetime because of the material used for production is seasonal in nature. It is observed that the workers also show their interest to work hard, some times without break during crushing season. The engineering departments of the mills generally keep their plant and machinery ready well before the season to run without any major breakdowns.

The installed crushing capacity (Table 3.20) of the Chatt. Shahu S.S.K.L. was 2,500 MT per day till 1999-2000. The manufacturing report of the unit has shown 134 percent capacity utilization during 1999-2000, which was not allowed as per the sugar manufacturing guidelines.

Table No 3.20

**Installed Capacity, Average Amount of Sugarcane Crushed Per Day and the
Capacity Utilization of the Selected Units During the Study Period**

Year	Chatt. Shahu S.S.K.L.			Malaprabha S.S.K.L.			Sanjivani S.S.K.L.		
	Installed Capacity (in MT)	Sugarcane Crushed Excluding Stoppage Time (in MT)	Capacity Utilised in Percentage	Installed Capacity (in MT)	Sugarcane Crushed Excluding Stoppage Time (in MT)	Capacity Utilised in Percentage	Installed Capacity (In MT)	Sugarcane Crushed Excluding Stoppage Time (in MT)	Capacity Utilised in Percentage
1994-95	2500	2818	113	3500	3870	111	1250	1484	119
1995-96	2500	2470	99	3500	3828	109	1250	1442	115
1996-97	2500	2678	107	3500	3702	106	1250	1709	137
1997-98	2500	2866	115	3500	3968	113	1250	1718	137
1998-99	2500	2887	115	3500	4083	117	1250	1669	134
1999-00	2500	3349	134	3500	3989	114	1250	1583	127
2000-01	3500	3867	105	3500	3972	113	1250	1584	127
2001-02	3500	3902	112	3500	3861	110	1250	1549	124
2002-03	3500	3792	108	3500	4127	118	1250	1532	123
2003-04	3500	4131	118	3500	3995	114	1250	1437	115
Average	2900	3276	113	3500	3940	113	1250	1571	126

Source: Manufacturing Reports of the selected units.

Very next year the mill's management installed an additional crushing unit of 1,000 MT per day capacity and brought down the over loading. The unit also reaped the benefits of upward trend of sugarcane supply after the installation of additional unit. Chatt. Shahu S.S.K.L. was observed to have over utilised (on an average more than 13 percent) its normal crushing capacity during the study period. The average installed capacity was 2,900 MT per day and the average amount of sugarcane crushed was 3,276 MT per day during the same period.

Throughout the study period Malaprabha S.S.K.L. had crushing capacity of 3,500 MT per day and the unit crushed 3,940 MT per day during the same period. Malaprabha S.S.K.L. was also observed to have over utilized 13 percent more than the installed capacity.

Sanjivani S.S.K.L. established with 1,250 MT per day capacity and remained with the same capacity till the end of the study period. It is well known fact that the unit was not getting sufficient amount of sugarcane. It is evident that the factory had crushed over and above its installed capacity during the study period. Sanjivani S.S.K.L. was observed to have crushed 26 percent more than the normal capacity and the average was 1571 MT per day, indicated over utilization of crushing capacity.

3.2.10 Total Number of Hours Crushed and Hours Lost

The production efficiency of sugar manufacturing units cannot be judged only on the length of crushing season and the level of capacity utilisation. The efficiency of the various processing and pre-processing departments can be judged on the basis of differences between total number of hours available for crushing and the actual hours crushed during a particular season. No sugar mill has a record of total hour available equal to the total hours crushed. At least 10 percent of the total hours are lost due to various reasons, which is treated as normal loss of hours. If any unit shows its performance lesser than the allowable normal loss hours, such units are put under the category of '**efficient time managing units**'. The manufacturing section-in-charge is responsible to keep

the records of lost hours. Generally the lost hours are attributable to five major causes viz., cane shortage, mechanical, process, cleaning and miscellaneous such as rain, holiday, etc.

Chatt. Shahu S.S.K.L. has got (on an average) 4,217 hours (Table 3.21) for processing purpose during study period, out of which 4,007 hours were utilized for crushing purpose and the rest 210 hours were lost due to various reasons, which amounted to just 5 percent of hours were lost, much below the allowable normal loss hours of 10 percent, indicating a high degree of time management. During 1995-96, the unit enjoyed the highest number of crushing (233) days hence the number of hours (5504) were more and the lost hours were (374) also more but the lost percentage was less than 10 percent. During 2003-04 the situation was quite opposite, both hours available were less (2844) and hours crushed (2759) were also less, hence the lost hours were just 85 hours. A notable point in all the selected units is that there was no record of hour lost during the process. The sugar manufacturing process is a continuous process. If any section (crushing, juice heating, syrup tanks, crystallisers, centrifugals or bagging point) encounters any problem, the continuity and sequence of the process get interrupted. Under such circumstances unit will be stopped and an immediate action will be initiated.

In order to ascertain, which of the five causes is the cause for concern, the share of hours lost (average figure) and attributed to each cause have been

converted into percentage and compared with the total hours lost, which is considered as cent percent.

Table No 3.21

**Total Hours Crushed and Hours Lost Due to Various Reasons
in Chatt. Shahu S.S.K.L. During the Study Period**

(Figures in number of hours)

Year	Total Hours Available	Total Hours crushed	Hours Lost Due to Following Reasons					
			Total Hours Lost	Sugarcane shortage	Mechanical	Process	Cleaning	Miscellaneous Rain, Holiday, etc.
1994-95	4013	3736	277	7	144	00	118	39
1995-96	5504	5130	374	63	52	00	136	124
1996-97	3875	3730	145	11	21	00	85	28
1997-98	3912	3787	125	6	17	00	85	17
1998-99	4831	4594	237	73	18	00	120	26
1999-00	4500	4264	236	32	85	00	75	44
2000-01	4252	4029	223	28	106	00	38	51
2001-02	4106	3912	194	7	118	00	37	32
2002-03	4330	4127	203	9	101	00	61	32
2003-04	2844	2759	85	3	35	00	33	12
Average	4217	4007	210	23.8	66.6	00	78.8	40.5
Percentage of Hours Lost as Compared with Total Hours Available	100	95	5	--	--	--	--	--
Percentage of Hours Lost as Compared with the Total Hours Lost	---	---	100	11	32	00	38	19

Source: Manufacturing Reports of Chatt. Shahu S.S.K.L.

The Chatt. Shahu S.S.K.L. was observed to have lost (on an average) 38 percent of the time for cleaning; 32 percent of the time lost due to mechanical fault and 11 percent of the time lost due to cane shortage. During 1998-99, 73 hours were lost due to short supply of cane because the mill's authority did not inform the cane suppliers properly in time and the same situation repeated during 1995-96 also. No process loss was observed to have recorded during the study period.

During the study period, on an average Malaprabha S.S.K.L. lost 10 percent (Table 3.22) of the total hours available for crushing. The total lost hours were 397 out of which 149 hours for cleaning and 100 hours were for mechanical fault and the rest were lost due to other reasons. Malaprabha S.S.K.L. also has shown continuous production efficiency because the time lost during the process was nil. In this unit the time lost due to mechanical fault, cleaning and cane shortage were the notable points. When it is compared with the allowable time lost of 10 percent, it fits within the allowable range. But Malaprabha S.S.K.L. still has further scope to achieve a high degree of efficiency by making proper planning as done by the Chatt. Shahu S.S.K.L.

During 1995-96 the unit was observed to have lost 366 hours due to mechanical fault indicated inefficiency of engineering department and 302 hours lost due to miscellaneous reasons. During 1996-97, 345 hours were observed to have lost due to cane shortage, which indicated failure of cane cutting order-issuing section.

Table No 3.22

**Total Hours Crushed and Hours Lost Due to Various Reasons
in Malaprabha S.S.K.L. During the Study Period**

(Figures in number of hours)

Year	Total Hours Available	Total Hours crushed	Hours Lost Due to Following Reasons					
			Total Hours Lost	Sugarcane shortage	Mechanical	Process	Cleaning	Miscellaneous Rain, Holiday, etc.
1994-95	5125	4685	439	35	73	00	188	143
1995-96	5991	5087	904	16	366	00	219	302
1996-97	3714	3084	630	345	157	00	110	17
1997-98	2812	2515	297	90	37	00	122	48
1998-99	5073	4549	524	77	141	00	228	79
1999-00	3826	3481	345	46	80	00	184	34
2000-01	3991	3714	277	41	7	00	166	58
2001-02	2834	2523	311	62	111	00	135	2
2002-03	3056	2854	202	47	19	00	135	2
2003-04	1465	1424	41	36	9	00	00	00
Average	3789	3392	397	79.5	100	00	149	68.5
Percentage of Hours Lost as Compared with Total Hours Available	100	90	10	--	--	--	--	--
Percentage of Hours Lost as Compared with the Total Hours Lost	---	---	100	20	25	00	38	17

Source: Manufacturing Reports of Malaprabha S.S.K.L.

Table No 3.23

**Total Hours Crushed and Hours Lost Due to Various Reasons
in Sanjivani S.S.K.L. During the Study Period**

(Figures in number of hours)

Year	Total Hours Available	Total Hours crushed	Hours Lost Due To Following Reasons					
			Total Hours Lost	Sugarcane shortage	Mechanical	Process	Cleaning	Miscellaneous Rain, Holiday, etc.
1994-95	3466	2684	782	284	223	00	92	183
1995-96	4001	3168	833	348	269	00	102	114
1996-97	2863	2016	847	470	230	00	55	92
1997-98	2479	1606	873	581	128	00	62	102
1998-99	3562	2815	747	159	158	00	199	230
1999-00	3048	2231	817	497	169	00	70	81
2000-01	3048	2499	549	244	127	00	59	118
2001-02	1819	1313	506	432	45	00	00	28
2002-03	2647	2171	476	215	74	00	128	58
2003-04	2422	1877	545	352	78	00	75	39
Average	2932	2234	698	358.2	150.1	00	84.2	104.5
Percentage of Hours Lost as Compared with Total Hours Available	100	76	24	--	--	--	--	--
Percentage of Hours Lost as Compared with the Total Hours Lost	---	---	100	51	22	00	12	15

Source: Manufacturing Reports of Sanjivani S.S.K.L.

Sanjivani S.S.K.L. was observed (Table 3.23) to have shown a poor time management and co-ordination between the departments. On an average, 698

hours were lost during the study period. The ratio between the total available hours and the hours lost was 76:24 (about 3:1), which was observed to be poor time management. The time lost due to cane shortage was 51 percent, due to mechanical fault 22 percent and process interruption was observed to be nil.

The time spent for cleaning, mechanical and miscellaneous were proportionate with total number of hours available when Sanjivani S.S.K.L. was compared with other two selected units. But the total time lost in terms of hours was very high. The over exploitation of capacity utilisation was also observed due to the unplanned supply of sugarcane during the study period.

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CHAPTER IV

FINANCIAL PERFORMANCE OF

SELECT UNITS

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FINANCIAL PERFORMANCE OF SELECT UNITS

4.1 INTRODUCTION

In India, the financial health of sugar factories is severely affected by number of reasons. All the major problems of the sugar sector are inter-linked. One problem leads to another problem. Low percentage of sugar in sugarcane leads to low recovery rate; obsolete technology leads to high production cost; accumulation of sugar stock leads to high interest burden; State Advised Price (SAP) leads to additional burden of temporary loan and so on. All these factors ultimately pull down the profit line on performance graph of the sugar factories. Financial health is the pivotal point of all economic activities of every business institution. Financial health determines the longevity of the sugar mills. Now-a-days, financial analysts diagnose the 'Wealth Health' of sugar mills by peeping deep into the annual reports of the concerns.

The financial performances of corporate bodies generally evaluated with the help of 'Ratio Analysis', which is universally accepted accounting tool. The major draw back of the traditional financial ratios is that each ratio gives a verdict of one particular area, which cannot be consolidated. Hence, one cannot analyse and compute the consolidated effect of various ratios with the help of traditional financial ratios.

In this chapter, an attempt was made to analyse and compute the consolidated effect of various ratios to ascertain the degree of financial health

of the selected sugar factories with the help of a universally accepted hybrid ratio, an analytical tool **Edward Altman's Z-score Model** suggested by Professor **Edward Altman** and the comparison of '**Wealth Health**' among the selected units with the help of statistical tools '**Mean**', '**Standard Deviation**' and '**Coefficient of Variation**' also carried out. The study is confined to the issues relating to the financial performance only. Non-financial aspects like marketing, personnel, etc. are not taken into consideration.

In order to get more accurate result of the health conditions of the selected units, the dominating figures of the financial statements (from 1994-95 to 2003-04) were grouped into seven major components viz., Working Capital, Total Assets, Net Profit, Net Sales, Equity Capital, Total Debts and EBDIT (Earning Before Depreciation Interest and Tax).

Edward I. Altman's Z- Score Model

Edward I. Altman, professor of finance in School of Business in **New York University** developed a new model of consolidated ratios to predict business failures. Professor Altman observed that the large number of business failures especially in large and medium scale organizations in America. The business failures phenomenon received a great exposure during 1970s. Between 1972 and 1979 about 35,200 firms a year petitioned by the courts to liquidate or to reorganize under the protection of the nation's bankruptcy laws. He also observed that the corporate failure was no longer the exclusive province of the small businesses but occurs increasingly among the large industrial and financial corporations.

In any economic system, the continuous entry and exit of productive entities are natural phenomena, but any entry and an exit put a burden on

resources of our society. The resources of society go waste. Hence, there was a need of concrete theory, which could predict business failure in near future so that the corporate leaders can take appropriate action to reorganize their capital structure. In the late 1960, professor Altman came up with a new theory known as **Altman's Z-score model**.

The Z-score model is a linear analysis. In order to arrive at a final profile of variables, in the formula, the list of 22 potentially helpful variables of traditional ratios were condensed into five standard ratios viz., **Liquidity, Profitability, Solvency, Leverage and Activity**. These variables were further modified and tested with 66 business corporates in which equal number of bankruptcy units were taken for the study. Based of the empirical study, Professor **Altman** invented the following **formula**¹ with Standard Variables and Standard Rates.

$$\mathbf{Z\text{-Score} = 1.2 x_1 + 1.4 x_2 + 3.3 x_3 + 0.6 x_4 + 0.999 x_5}$$

Now-a-days many researchers in Japan, West Germany, Brazil, Australia, England, Canada, France, etc., have been using this formula with different variables and fixed rates, which suit to their economic conditions.

In case of traditional ratio analysis, every ratio gives its own judgment that cannot be consolidated to arrive final decision, whether the firm is really sick or not but the **Z-Score Model** gives a final judgment. Hence, the academicians all over the world have accepted the Z-score model as a credible model. The capital analysts and financial experts prefer to predict financial health of a business unit through the z-score model, which is superior to traditional ratio analysis.

4.2 Variables of Ratios of the Selected Units

Table No 4.1

Variables of Ratios of Chatt. Shahu S.S.K.L.

(Figures in lakh Rs.)

Year	Major Variables of Ratios						
	Working Capital	Total Assets	Net Profits	Net Sales	Equity Capital	Total Debts	*EBDIT
1994-95	1,301.12	4,286.21	3.24	3,922.93	268.69	3,863.72	616.81
1995-96	1,381.81	4,494.75	1.40	4,651.19	274.27	4,511.07	750.47
1996-97	2,666.50	5,809.85	8.25	5,998.20	243.88	6,972.83	864.43
1997-98	2,056.12	5,417.27	3.66	6,871.18	268.45	5,721.87	547.40
1998-99	2,093.29	5,609.68	10.55	7,256.42	283.27	5,758.83	786.24
1999-00	3,341.10	7,731.04	8.57	9,187.76	282.22	8,916.62	953.11
2000-01	5,127.24	10,251.77	14.94	10,750.22	566.79	12,658.64	1259.37
2001-02	4,515.08	9,817.74	2.19	10,253.50	625.70	11,275.10	1,260.95
2002-03	835.43	6,120.44	(-) 251.61	9,063.15	653.79	3,345.96	849.31
2003-04	(-) 157.17	6,265.32	11.72	8,176.52	710.00	1,432.73	899.25

Source: Annual Reports of Chatt. Shahu S.S.K.L. *EBDIT Earning Before Depreciation, Interest and Tax

The Chatt. Shahu S.S.K.L. has shown (Table 4.1) upward trend in the working capital and the total assets till 2000-01 afterwards the unit has shown drastically falling scenario. In 2003-04 negative figures of working capital indicated that the quantum of current liabilities exceeded the current assets. The weak financial performance during 2001-02 and 2002-03 period affected the total assets structure. The interpretation at this juncture by looking at the performance of individual variables does not hold good unless one look at the consolidated variables in the form of Z-scores (Table No 4.5) for the year 2003-04 in which the financial health appears to be far better than the 1994-95 and 1995-96.

Low profitability is a common phenomenon in Indian co-operative sugar factories. The Chatt. Shahu S.S.K.L. is not an exception to this. One of the best performing units in Asia also experienced loss in 2002-03.

So far as the net sales are concerned, Chatt. Shahu S.S.K.L. has shown continuously an upward trend. It indicated that the factory succeeded in attracting the farmers within the jurisdiction and also from out side the catchments area by virtue of its good wealth health. The unit did not get sufficient cane during 2003-04 due to drought and white woolly diseases in the region, resulted in reduction in the quantum of production.

During 2002-03 and 2003-04 a drastic reduction in the working capital structure reduced the quantum of total debts. When it was compared to 2000-01, the total debts were reduced to 26 percent and 11 percent during 2002-03 and 2003-04 respectively. It is due to delayed payments to its creditors; the mill realised its sugar stock by way of exports and made use of its own resources instead of borrowing a large amount form banks. The factory's gross earning i.e. EBDIT (Earning Before Depreciation, Interest and Tax) also shown a difference of Rs.400 lakh in 2002-03 and 2003-04 due to the reduction in sales. A similar situation was also observed during 1997-98. During the study period only the capital structure has shown upward trend forever.

Table No 4.2
Variables of Ratios of Malaprabha S.S.K.L.

(Figures in lakh Rs.)

Year	Major Variables Of Ratios						
	Working Capital	Total Assets	Net Profits	Net Sales	Equity Capital	Total Debts	*EBDIT
1994-95	1,616.55	3,633.00	1.51	6,331.51	240.12	1,864.53	284.30
1995-96	2,471.75	4,709.09	1.06	6,764.17	313.02	2,523.44	617.69
1996-97	3,273.23	5,858.13	1.09	7,698.90	312.09	4,012.74	751.76
1997-98	1,608.82	4,538.84	1.40	8,268.51	313.16	2,345.57	719.97
1998-99	2,029.17	5,035.50	1.43	6,041.08	365.88	2,804.03	625.78
1999-00	3,596.33	6,709.48	1.45	7,856.85	365.89	4,268.18	835.97
2000-01	5,243.91	8,421.39	2.16	6,248.98	367.22	5,526.65	904.20
2001-02	6,557.76	9,872.92	2.46	6,425.25	750.26	6,586.89	1,008.50
2002-03	3,492.12	6,994.78	(-) 680.87	8,058.17	800.25	4,123.35	352.37
2003-04	1,501.93	4,910.53	(-) 711.73	5,106.05	800.66	2,816.02	(-) 11.77

Source: Annual Reports of Malaprabha S.S.K.L. *EBDIT Earning Before Depreciation, Interest and Tax

The situation of Malprabha S.S.K.L. was not different; setback trends (Table 4.2) have been observed in working capital structure during 1997-98, 1998-99, 2002-03 and 2003-04. The policy of top management created this situation. The delay in payment of cane bills dues increased the current liability resulted in reduction in the working capital during 1997-98 and 1998-99.

During 2002-03, four year old BhagyaLaxmi S.S.K.L (near by sugar factory) announced higher price for cane (Rs. 820 Per MT but the SMP was Rs. 800 Per MT) to attract the cane suppliers of Malprabha S.S.K.L. At that time Malprabha S.S.K.L. had no way out except to announce higher price of Rs. 825 Per MT. Bhagyalaxmi S.S.K.L. closed down after the crushing season without making payment to the farmers in time. But the additional burden of the price difference of Rs.25 Per MT (825 - 800) on 5,01,367 MT amounted to Rs.1,25,34,175 eaten up the entire Reserve Fund of Malprabha S.S.K.L. and labelled the profit-making factory into loss accumulating one due to cane price competition. Unfortunately very next year (2003-04) drought situation affected sugarcane production in the region. This resulted in reduction in the sugar production.

The factory produced 6.61 lakh quintals of sugar during 2000-01, but it could not produce more than 2.51 lakh quintals during 2003-04 and the drought environment in the region created a financial drought in the balance sheet of Malprabha S.S.K.L.

Interesting observation was, during 2001-02 the factory actually produced 4.41 lakh quintals of sugar but sales account has shown 6.42 lakh quintals. During the year additional number of bags were sold from the earlier sugar stock and hence, the unit did not get the pinch of loss during 2001-02.

During 2002-03, the actual production was more (5.65 lakh quintals) but factory incurred a loss of Rs. 680.87 lakh due to the impact of sugarcane price competition prevailed in the region. The earning before depreciation, interest and tax (EBDIT), which was purely depending upon the net sales and the operating expenses, also reduced during 2002-03 and 2003-04. In 2001-02, the Equity Capital has shown two-fold increase as compared to the previous year 2000-01 because it was resolved to increase the face value of farmers' (class 'A' category members) share in the general meeting.

Table No 4.3
Variables of Ratios of Sanjivani S.S.K.L.

(Figures in lakh Rs.)

Year	Major Variables of Ratios						
	Working Capital	Total Assets	Net Profits	Net Sales	Equity Capital	Total Debts	*EBDIT
1994-95	939.12	1,193.48	(-) 60.57	887.01	1,253.88	1,018.49	(-) 8.39
1995-96	1,226.21	1,511.17	95.62	1,361.12	1,283.92	1,316.95	179.62
1996-97	1,663.59	1,998.20	92.07	1,734.43	1,329.17	1,563.12	251.29
1997-98	1,258.70	1,651.69	(-) 74.71	1,981.57	1,347.87	1,191.51	102.88
1998-99	1,246.67	1,690.41	(-) 110.40	1,659.10	1,352.87	1,817.76	32.72
1999-00	1,546.97	1,980.98	(-) 48.96	2,213.00	1,361.89	1,919.68	155.44
2000-01	1,749.56	2,175.53	(-) 128.59	1,757.14	1,362.64	2,426.69	72.50
2001-02	1,432.45	1,825.31	(-) 531.09	1,400.91	1,518.63	2,158.19	(-) 275.87
2002-03	1,239.38	1,604.65	(-) 746.59	1,285.13	1,637.55	2,637.58	(-) 488.97
2003-04	1,602.58	1,953.69	(-) 540.77	1,130.56	1,839.91	3,161.29	(-) 295.39

Source: Annual Reports of Sanjivani S.S.K.L. *EBDIT Earning Before Depreciation, Interest and Tax.

The financial performance of Sanjivani S.S.K.L. is a little bit different (Table 4.3) from other two selected units. Like other two factories, Sanjivani S.S.K.L. has also shown a gradual increase in its working capital structure till 2000-01. But next two following years 2001-02 and 2002-03 down ward trends have been observed in the working capital structure. It was because during 2001-02, the factory did not get sufficient amount of gate cane. The mill received just 19,066 MT (19%) of gate cane as compared to the quantum of

gate cane reached 1,00,445 MT (61%) during 2000-01. During 2002-03, the unit delayed the payment of cane bill dues and there was a reduction in sales. All these factors reduced the working capital requirements of the mill.

In the past 31 (1973-74 to 2003-04) years of its business venture, Sanjivani S.S.K.L. earned profits in just seven years only. Rest of the years incurred losses due to the insufficient supply of sugarcane. The accumulated loss was about Rs.28 crore till the end of 2003-04. Very interesting fact is to be noted that Sanjivani S.S.K.L. earned a net profits of Rs. 95 lakh during 1995-96 and Rs. 92 lakh during 1996-97. Neither Chatt. Shahu S.S.K.L. nor Malprabha S.S.K.L. earned such a huge amount of profits during their entire lifetime business venture.

The Equity Capital structure has shown a gradual upward trend. During 2001-02, 2002-03 and 2003-04 the Equity Capital structure has increased at the rate of 11 percent, 8 percent and 12 percent respectively. It is not due to the contribution of farmer members. The Government of Goa buys shares every year to the extent of the actual capital deficiency incurred due to losses. During the study period (over a period of ten years) Sanjivani S.S.K.L. could not generate the minimum income required to recover the depreciation, interest and tax for four years.

The impacts of the above interpretations have been tabulated in quantitative form in the following tables. The selected major variables have been utilized to compute dominating five ratios. The five major ratios that give five dimensional performance *viz.*, liquidity, profitability, solvency, leverage and activity have been tabulated in order to get final Z-scores in the tables.

4.3 Value of 'X' In Z-Score and Z-Scores of the Selected Units

Table No. 4.4

Value of x in Z-scoring of Chatt. Shahu S.S.K.L.

Year	Working Capital To Total Assets x_1	Net Profits To Net Sales x_2	EBDIT To Total Assets x_3	Equity Capital To Total Debts x_4	Net Sales To Total Assets x_5
1994-95	0.304	0.00083	0.134	0.070	0.915
1995-96	0.308	0.00030	0.167	0.061	1.035
1996-97	0.459	0.00139	0.149	0.035	1.032
1997-98	0.380	0.00053	0.101	0.047	1.268
1998-99	0.373	0.00145	0.140	0.049	1.294
1999-00	0.432	0.00093	0.123	0.032	1.188
2000-01	0.500	0.00139	0.123	0.045	1.049
2001-02	0.460	0.00021	0.128	0.055	1.044
2002-03	0.136	(-) 0.02776	0.139	0.195	1.480
2003-04	(-) 0.025	0.00143	0.144	0.495	1.307

Source: Computed.

Generally all the sugar factories have to invest their huge capital in fixed assets; hence the ratio between working capital and total assets shows less than one. During 2003-04 the ratio (Table 4.4) x_1 has shown negative figure because of the impact of excess current liabilities over current assets.

The relation between net profits and net sales was observed to have had a negligible relationship. The profit concept of 'net return on investments should be more than the prevailing bank rate in every economic venture' could not be achieved by the Indian sugar industry even after a century. One could see the quantified relation between these two variables, which was less than 0.002 in all the selected units. Chatt. Shahu S.S.K.L. has incurred a loss of Rs 2.5 crore during 2002-03. The impact of this significant loss was also about 0.02776 in x_2 ratio. This significant event has shown an insignificant influence on Z-scores.

The gross earning (EBDIT) to total assets ratio has its own impact in Z-score model. This ratio indicates gross return on its total investments. Chatt.

Shahu S.S.K.L. has shown more than 10 percent improvement in its balance sheets every year in this regard.

So far as equity to debt (popularly known as Debt Equity Ratio) ratio is concerned the unit has shown healthy signs. During 2002-03 and 2003-04 the management has taken a decision to reduce the quantum of temporary loans. The unit utilized its internal sources to fulfil its financial needs. More over, an immediate realization of sugar stock in the foreign market reduced the burden of holding stock throughout the year.

Since Chatt. Shahu S.S.K.L. has produced and sold a sizable amount of sugar, the ratio between sales to total assets had shown more than one, a significant value except during 1994-95.

Further, the arrived values of the ratios (x_1 , x_2 , x_3 , x_4 and x_5) have been multiplied with the standard values given in the Z-score model. The computed figures have been tabulated in the Table No 4.5 to Table No 4.10. All the products of standard values and ratios have been added to arrive Z-score for each year.

Table No. 4.5
Z-Scoring of Chatt. Shahu S.S.K.L.

Year	Working Capital To Total Assets $1.2 x_1$	Net Profits To Net Sales $1.4 x_2$	EBDIT To Total Assets $3.3 x_3$	Equity Capital To Total Debts $0.6 x_4$	Net Sales To Total Assets $0.99 x_5$	Z-score
1994-95	0.365	0.00116	0.442	0.042	0.914	1.74
1995-96	0.370	0.00072	0.551	0.037	1.034	1.99
1996-97	0.551	0.00195	0.492	0.021	1.031	2.10
1997-98	0.456	0.00074	0.333	0.028	1.267	2.08
1998-99	0.448	0.00200	0.462	0.029	1.293	2.23
1999-00	0.518	0.00130	0.406	0.019	1.187	2.13
2000-01	0.600	0.00195	0.406	0.027	1.048	2.08
2001-02	0.552	0.00029	0.422	0.033	1.043	2.05
2002-03	0.163	(-) 0.03886	0.459	0.117	1.479	2.18
2003-04	(-) 0.030	0.00200	0.474	0.298	1.306	2.05

Source: Computed.

Edward Altman has stated the standards to be followed to classify the units as per their Z-Scores. If an unit scores more than 2.66 points treated as 'Financially good', if Z-Scores is in between 1.86 to 2.66 points the units fall under category of 'Likely to become sick' and if Z-Score is less than 1.86 such units are treated as 'Continued to be sick'

Although Chatt. Shahu S.S.K.L. has been recognized as the top-performing unit in Asia, nine out of ten years the Z-scores (Table 4.5) of the unit falls under the categories of 'Likely to Become Sick Unit'. During 1994-95 it was under financially 'Sick Category'. None of the years its financial performance fell under the category of 'Financially Good' unit as per the categories made under Altman Z-score model.

Table No. 4.6
Value of X in Z-scoring of Malaprabha S.S.K.L.

Year	Working Capital To Total Assets X ₁	Net Profits To Net Sales X ₂	EBDIT To Total Assets X ₃	Equity Capital To Total Debts X ₄	Net Sales To Total Assets X ₅
1994-95	0.445	0.00024	0.078	0.129	1.743
1995-96	0.525	0.00024	0.131	0.124	1.436
1996-97	0.559	0.00014	0.128	0.078	1.314
1997-98	0.354	0.00017	0.159	0.133	1.822
1998-99	0.403	0.00023	0.124	0.131	1.200
1999-00	0.536	0.00019	0.125	0.088	1.171
2000-01	0.623	0.00035	0.107	0.066	0.742
2001-02	0.664	0.00039	0.102	0.114	0.651
2002-03	0.514	(-) 0.08449	0.052	0.194	1.186
2003-04	0.306	(-) 0.13939	(-) 0.002	0.284	1.040

Source: Computed.

It was observed (Table 4.6) that the quantitative relation between working capital to total assets was little bit higher side in case of Malaprabha SSKL as compared to the Chatt. Shahu S.S.K.L., which indicated higher share of working capital in total assets as compared to Chatt. Shahu S.S.K.L.

The net profits to net sales ratios have shown significant negative values during 2002-03 and 2003-04 because the unit incurred losses during those two years.

The EBDIT to total assets ratios have shown a similar performance as in the case of Chatt. Shahu S.S.K.L. The figures of the last two years (2002-03 and 2003-04) were the results of the sugarcane price competition and drought.

The Debt Equity ratios have scored more than 10 percent for seven years except during 1996-97, 1999-2000 and 2000-01 because Malaprabha S.S.K.L. has borrowed more loans from outside during these three years. In 2003-04, the unit crushed only 50 percent of sugarcane as compared to the earlier years and hence the unit was not in need of more temporary loans from banks. The episode resulted into stretch in the debt equity ratio to the extent of 28 percent.

In order to arrive Z-scores the computed ratios have been multiplied with the standard rates given in the Altman's Z-score model.

Table No. 4.7
Z-Scoring of Malaprabha S.S.K.L.

Year	Working Capital To Total Assets $1.2 x_1$	Net Profits To Net Sales $1.4 x_2$	EBDIT To Total Assets $3.3 x_3$	Equity Capital To Total Debts $0.6 x_4$	Net Sales To Total Assets $0.99 x_5$	Z-score
1994-95	0.534	0.00034	0.257	0.077	1.741	2.61
1995-96	0.630	0.00034	0.432	0.074	1.434	2.57
1996-97	0.670	0.00020	0.422	0.047	1.312	2.45
1997-98	0.425	0.00023	0.525	0.080	1.820	2.85
1998-99	0.484	0.00032	0.409	0.079	1.199	2.17
1999-00	0.643	0.00027	0.413	0.053	1.170	2.28
2000-01	0.747	0.00039	0.353	0.040	0.741	1.88
2001-02	0.797	0.00055	0.337	0.068	0.650	1.85
2002-03	0.617	(-) 0.11829	0.172	0.116	1.185	1.97
2003-04	0.367	(-) 0.19515	(-) 0.007	0.170	1.039	1.37

Source: Computed.

The ultimate scores revealed (Table 4.7) very interesting facts that the Malaprabha S.S.K.L. has scored 2.85 points (standard is 2.66 points to be declared as 'Financially Good') in 1997-98 even though the unit crushed less amount (4.89 lakh MT) of sugarcane. Before that (1996-97) the unit had crushed 7.58 lakh MT of sugarcane. The impact of better performance in the last year has shown its chain reaction in the next year. Rest of the seven years, the unit has fallen under the category of 'Likely To Become Sick' and financial years 2001-02 and 2003-04 Malaprabha S.S.K.L. was under 'Financially Sick Category'.

Table No. 4.8
Value of X In Z-Scoring of Sanjivani S.S.K.L.

Year	Working Capital To Total Assets X ₁	Net Profits To Net Sales X ₂	EBDIT To Total Assets X ₃	Equity Capital To Total Debts X ₄	Net Sales To Total Assets X ₅
1994-95	0.787	(-) 0.068	(-) 0.007	1.231	0.743
1995-96	0.811	0.070	0.117	0.975	0.901
1996-97	0.833	0.053	0.126	0.850	0.868
1997-98	0.762	(-) 0.038	0.062	1.131	1.200
1998-99	0.738	(-) 0.067	0.019	0.744	0.981
1999-00	0.781	(-) 0.022	0.078	0.709	1.117
2000-01	0.804	(-) 0.073	0.033	0.562	0.808
2001-02	0.785	(-) 0.380	(-) 0.151	0.704	0.768
2002-03	0.772	(-) 0.581	(-) 0.305	0.621	0.801
2003-04	0.820	(-) 0.478	(-) 0.151	0.582	0.579

Source: Computed.

The working capital to total assets ratio (Table 4.8) of Sanjivani S.S.K.L. was the highest rate as compared to the other two selected units. The gap between working capital and total assets increases, as and when business organizations invest their resources in fixed capital for modernizations, automation, and beautification. But the Sanjivani S.S.K.L. has not made any major investments in fixed assets after its inception because

the mill did not get sufficient surplus in its lifetime to go for major modifications. Hence, the total assets remained more or less the same. More over on an average, the unit crushed less than 1.5 lakh MT of sugar cane per year. All these facts kept the working capital to total assets ratio remained at higher side (between 0.738 to 0.833) during the study period.

The status of the net profits and net sales ratios were not at all good. Out of ten years, only two years (1995-96 and 1996-97) the unit had shown better performance (0.070 and 0.053) as compared to Chatt. Shahu S.S.K.L. (0.0003 and 0.0013) and Malaprabha S.S.K.L. (0.0002 and 0.0001) during the same period. Rest of the eight years Sanjivani S.S.K.L. experienced only losses.

The EBDIT to total assets ratio was also not good because the unit did not get sufficient amount of sugarcane even to reach Break Even Point (BEP). As per the standard specify by the Govt. of India, 'unit of 1250 MT per day crushing capacity shall crush minimum of 2 lakh MT of sugarcane to call as good performing unit' Hence, Sanjivani S.S.K.L has to crush minimum 2 lakh MT of sugarcane to reach its BEP.

The Debt Equity ratios were observed to be strong enough. During 1994-95 and 1997-98, the quantum of equity capital was more than the debts. By looking at these ratios, one could conclude that in spite of continuous losses, the Sanjivini S.S.K.L.'s debt position was good enough. But the fact was that the Government of Goa continuously injecting the required lifeblood (drained out due to losses) in the form of additional capital and subsidy.

The net sales to the total assets ratios have also shown a healthy picture. During 1997-98 and 1999-2000, total sales figure exceeded the total assets, because of the increased sales during the year. It was observed that the unit crushed less amount of sugarcane in those two years as compared to the previous years. The study revealed that the productions of the previous years (1996-97 and 1998-99) had given the effect of increased sales in 1997-98 and 1999-2000. The advantage of less investment in total assets has changed the performance scenario of Sanjivini S.S.K.L. Hence, a better performance was visible, even though the unit could not produce the required quantum of sugar and earned profits.

Table No. 4.9
Z-Scoring of Sanjivini S.S.K.L.

Year	Working Capital To Total Assets $1.2 x_1$	Net Profits To Net Sales $1.4 x_2$	EBDIT To Total Assets $3.3 x_3$	Equity Capital To Total Debts $0.6 x_4$	Net Sales To Total Assets $0.99 x_5$	Z-score
1994-95	0.944	(-) 0.095	(-) 0.023	0.739	0.742	2.31
1995-96	0.973	0.098	0.657	0.585	0.900	3.21
1996-97	1.000	0.074	0.416	0.510	0.867	2.87
1997-98	0.914	(-) 0.053	0.205	0.679	1.199	2.94
1998-99	0.886	(-) 0.094	0.063	0.446	0.980	2.28
1999-00	0.937	(-) 0.031	0.257	0.425	1.116	2.70
2000-01	0.965	(-) 0.102	0.109	0.337	0.807	2.12
2001-02	0.942	(-) 0.532	(-) 0.498	0.422	0.767	1.10
2002-03	0.926	(-) 0.813	(-) 1.007	0.373	0.800	0.28
2003-04	0.984	(-) 0.670	(-) 0.498	0.349	0.578	0.74

Source: Computed.

No doubt Sanjivini SS.K.L. has been incurring losses, but the financial assistance from the Government of Goa and the less amount of investment in total assets have promoted the unit (Table 4.9) into the category of

'Financially Good' for four years (1995-96,1996-97,1997-98 and 1999-2000); 'Likely to become Sick Category' for three years (1994-95,1998-99 and 2000-01) and 'Sick Category' for continuous there years from 2001-02 to 2003-04 during the study period.

4.4 Comparative Z-scoring Analysis of the Selected Units

In order to get a comparative analysis, the Z-scores of the selected units have been tabulated in Table 4.10 and the same have been plotted in Chart No 4.1.

Table No 4.10
Z -Scores of the Selected Units

Year	Chatt. Shahu S.S.K.L.	Malaprabha S.S.K.L.	Sanjivani S.S.K.L.
1994-95	1.74	2.61	2.31
1995-96	1.99	2.57	3.21
1996-97	2.10	2.45	2.87
1997-98	2.08	2.85	2.94
1998-99	2.23	2.17	2.28
1999-00	2.13	2.28	2.70
2000-01	2.08	1.88	2.12
2001-02	2.05	1.85	1.10
2002-03	2.18	1.97	0.28
2003-04	2.05	1.37	0.74
Average	2.063	2.200	2.055

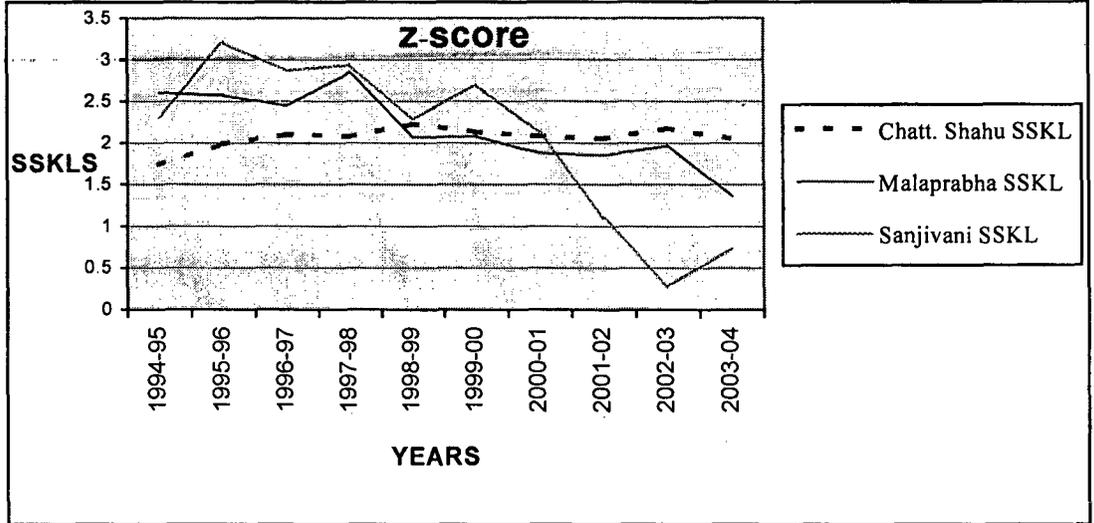
Source: Computed.

In terms of mean value (the average) performance of the selected units indicated (Table 4.10) that the Malaprabha S.S.K.L. has shown better performance (2.2) followed by Chatt. Shahu S.S.K.L. (2.063) and Sanjivani S.S.K.L. (2.055) but all of them fall under 'likely to become sick' category. This

is because ratios of net profit to net sales and debt equity were very weak in selected sugar co-operative mills.

Chart No. 4.1

Graphical representation of Z-scores of the select units



In order to analyse which unit was actually sound and which unit has shown consistency² in maintaining its financial soundness, the computed Z-scores have been analysed with the help of statistical tools viz., (i) **Mean**; (ii) **Standard Deviation**; and (iii) **Co-efficient of Variation**. The computed figures have been tabulated in Table No 4.11

Table 4.11

Mean Value, Standard Deviation and Co-efficient of Variation of Z-scores of the Selected Units

S.No.	Name of the select units	Mean Value (\bar{x})	Standard Deviation (σ)	Co-efficient of Variation (cv)
1	Chatt. Shahu S.S.K.L.	2.063	0.1257	6.093
2	Malaprabha S.S.K.L.	2.200	0.4200	19.091
3	Sanjivani S.S.K.L.	2.055	0.9544	46.420

Source: Computed.

4.5 Consistency in Financial Health

The Co-efficient of Variation (Table 4.11) of Chatt. Shahu S.S.K.L. was 6.09 percent followed by Malprabha S.S.K.L. 19.09 percent and Sanjivani S.S.K.L. was 46.42 percent, which indicated that Chatt. Shahu S.S.K.L. has maintained a high degree of financial consistency followed by Malprabha S.S.K.L. and Sanjivani S.S.K.L.

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CHAPTER V
PROFILE AND PROBLEMS
OF SUGARCANE GROWERS

CHAPTER V

PROFILE AND PROBLEMS OF SUGARCANE GROWERS

5.1 Introduction

The farmers are vital role players in agro-based production units, hence only the consolidated results of financial, cost and technical performance of such units cannot be considered as total performance, unless the performance of key role players is added with such performance. Based on this statement, an attempt has been made in this chapter to analyse profiles and problems of sugarcane growers of selected units. The primary data relating to the farmers have been collected through a pre-tested structured questionnaire. The questionnaire consists of three parts *viz.*, sugarcane growers' personal profile, agriculture profile and problems faced by the sugarcane growers.

5.2 Age-wise Distribution of Farmers

To analyse the age group of sugarcane growers, the farmers were classified into three groups *viz.*, farmers below 35 years (young), in between 36 to 50 years (middle age) and above 51 years (old).

Table 5.1 revealed that 20 percent of the farmers of the Chatt. Shahu S.S.K.L. were young, 37 percent of the farmers were middle aged and 43 percent have crossed 50 years.

Table No. 5.1**Age-Wise Distribution of Farmers**

(Figures in percentage)

Units	Above 35 years	35 to 50 years	Above 51 years
Chatt. Shahu S.S.K.L.	20	37	43
Malaprabha S.S.K.L.	10	43	47
Sanjivani S.S.K.L.	14	43	43

Source: Computed.

In case of Malaprabha S.S.K.L., just 10 percent of the farmers were found to have fallen under the category of young farmers, 43 percent represent the middle aged and the rest 47 percent were under the old age category.

As far as the Sanjivani S.S.K.L. is concerned, 14 percent of the farmers were below 35 years and 43 percent represented by middle aged and an equal number of farmers were in old age group.

5.3 Farmers' Family Size and Occupational Distribution

The size of the farmer's family also influences the sugarcane cultivation. It is observed that whenever more number of family members directly involved in cultivation activity, a higher amount of output and better quality crops were produced in such fields.

The survey report revealed that on an average there were 5 adults, 2 children of below 14 years, altogether 7 members in a farmer's family of Chatt. Shahu S.S.K.L. So far as maximum numbers were concerned, a few families have 10 adults and 6 children; maximum membership was 13, out of which on an average 4 members were found to have directly participated in

agriculture activity; one person out of every two families was observed to have gone for out side job.

All the families responded that their main occupation was agriculture except 3 percent of the farmers who have trading business and it was their main family business.

The farmer's Family size of Malaprabha S.S.K.L. is concerned, on an average there were 4 adults (maximum 6 adults in few families), a child (actual average was less than 0.6 and maximum 4 children in a few families) and each family had 5 members (maximum 6 members in few families). On an average 2 adults work in fields, one adult out of every two families goes for out side job. The survey revealed that the agriculture activity was the main occupation of all the respondents.

So far as the Sanjivani S.S.K.L is concerned, on an average there were 4 adults (maximum 8 members in few families), a child (actual average was 1.4 and maximum number of children were 7) in a family, the average membership in a family was 6 and 14 were the maximum number. On an average 3 people work in the cane fields and one person out of every two families goes for out side work. All the farmers' agreed that their main occupation was agriculture.

5.4 Farmers' Educational Profiles and their Family

The educational qualification of farmers and their family members certainly has its own influence on the quality of agriculture activities. The educated farmers generally gather more information relating to the crops that they grow and about the markets where they sell their agriculture produce. It was also observed that more number of educated farmers approached

financial institutions for agriculture loans rather than village based moneylenders.

Educational level of farmers and other family members can be observed from the Table No. 5.2.

Table No. 5.2
Farmers' and Their Family Members' Educational Level
(Figures in percentage)

Person and Units	Levels of Education				
	Illiterate	VII th	X th	XII th	Graduate
1. Farmer					
Chatt. Shahu S.S.K.L.	3	37	33	20	7
Malaprabha S.S.K.L.	0	17	17	23	43
Sanjivani S.S.K.L.	10	33	33	10	14
2. Spouse					
Chatt. Shahu S.S.K.L.	47	33	17	3	0
Malaprabha S.S.K.L.	7	30	40	10	13
Sanjivani S.S.K.L.	23	40	27	7	3
3. Children					
Chatt. Shahu S.S.K.L.	--	24	43	20	13
Malaprabha S.S.K.L.	--	30	11	14	45
Sanjivani S.S.K.L.	--	35	26	17	22

Source: Computed.

Table 5.2 revealed that the consolidated survey report of Chatt. Shahu S.S.K.L. showed that 3 percent of the farmers were illiterate, 37 percent of them have completed their primary education, 33 percent of the farmers finished their secondary education, 20 percent of them cleared pre-university courses and the rest 7 percent of the farmers particularly young ones were graduates.

It is very unfortunate to know that about 47 percent of the farmers' spouses were illiterate, 33 percent studied up to primary school, 17 percent of them were metric passed, 3 percent of them cleared XIIth standard and none of them have seen college education. The educational level of the farmers' children was concerned, 13 percent of them completed graduation, 20 percent of them were XIIth standard, 43 percent of them in high school and the rest 24 percent were in primary schools.

The educational level of Malaprabha S.S.K.L.'s farmers was concerned, none of the farmers was found illiterate, 17 percent of them finished primary education and the same number cleared S.S.C examination, 23 percent of the farmers cleared their pre-university examination and 43 percent of them were graduates.

So far as their spouse educational level was concerned, 7 percent were illiterate, 30 percent of them completed their primary education, 40 percent cleared S.S.C. 10 percent cleared Pre-university examination and 13 percent of the farmers' wives were graduates.

It is evident that majority of the farmers (43%) and their spouses (13%) were graduates. It was also observed that most of the farmers preferred to give professional education to their children. More than 45 percent of their children completed graduation and majority of them were B.E, B.Tech, B.Ed and a few of them were M. Tech. M.D. post-graduates. 14 percent of the children were in XIIth standard, 11 percent were in Xth standard and 30 percent were in primary schools.

The survey revealed that 10 percent of the sugarcane growers of Sanjivani S.S.K.L. in Goa were illiterate, 33 percent of them have completed their primary education and the same number of farmers completed high school

education, 10 percent of them passed higher secondary examination and 14 percent of the farmers were graduates.

So far as the farmers' spouses educational level was concerned, 23 percent of them were illiterate, 40 percent of them did primary education, 27 percent passed S.S.C exam, 7 percent of them XIIth passed and 3 percent of them completed college education. So far as the children's educational level was concerned, 22 percent of them completed their graduation, 17 percent were in XIIth standard, 26 percent were in Xth standard and 34 percent of the children were in primary schools.

5.5 Distribution of Agriculture Income

It is a common phenomenon that farmers and businessmen do not want to disclose their real income. It was observed that the income disclosed by the farmers did not tally with their quantum of sugarcane produced. The income (Net income) generated after deducting the cost of cultivation was considered for this study. Based on their annual income, the farmers were classified into five income slabs viz., less than Rs.50,000, Rs.50,001 to Rs.1 lakh, Rs. 1,00,001 to Rs.2 lakh, Rs. 2,00,001 to Rs.4 lakh and above Rs.4 lakh.

Table No. 5.3
Distribution of Agriculture Income

(Figures in percentage)

Units	Above Rs. 50,000	Rs. 50,000 To Rs. 1 lakh	Rs. 1 lakh To Rs. 2 lakh	Rs. 2 lakh To Rs. 4 lakh	Above Rs. 4 lakh
Chatt. Shahu S.S.K.L.	40	37	10	3	10
Malaprabha S.S.K.L.	37	33	27	3	0
Sanjivani S.S.K.L.	54	23	13	10	0

Source: Computed.

It is evident that 40 percent (Table 5.3) of the Chatt. Shahu S.S.K.L.'s farmers earned less than Rs.50,000, 37 percent were in between Rs.50,000 and Rs.1 lakh, 10 percent of the farmers income was in between Rs.1 lakh and Rs.2 lakh, 3 percent earned more than Rs.2 lakh but less than Rs.4 lakh and 10 percent of the farmers income was more than Rs.4 lakh per annum.

So far as the farmers of the Malaprabha S.S.K.L. were concerned, 37 percent of the farmers earned less than Rs.50,000, 33 percent of farmers were in between Rs.50,000 and Rs.1 lakh, 27 percent of the farmers income was more than Rs.1 lakh but less than Rs.2 lakh, 3 percent of the farmers income was more than Rs.2 lakh but less than Rs.4 lakh and none of the farmer in M.K.Hubli area earned more than Rs.4 lakh per annum.

The income distribution of the farmers in Goa was concerned, 54 percent of the farmers earned less than Rs.50,000, 23 percent of the farmers' income from agriculture was in between Rs.50,000 and Rs.1 lakh, 13 percent of them earned more than Rs.1 lakh but less than Rs.2 lakh, 10 percent of the farmers income was more than Rs.2 lakh and less than Rs.4 lakh and none of the farmers' annual income exceeded above Rs.4 lakh.

5.6.1 Area Under Cultivation, Irrigation and Under Sugarcane Crop

In order to ascertain the total area of land under cultivation, portion of cultivated land under irrigation and cultivated land allotted for sugarcane crop, three inter linked questions were put before the respondents. Further to know reasons behind the portion of land left out idle without cultivation, an additional question was asked to the respondents. The responses of the respondents pertaining to these three variables are displayed in Table. 5.4.

Table No. 5.4

Area Under Cultivation, Irrigated and Under Sugarcane Crop

(Figures in average acres)

Units	Area Under Cultivation	Area Irrigated	Area Under Sugarcane
Chatt. Shahu S.S.K.L.	4.3 (100%)	4.2 (97%)	4.1 (95%)
Malaprabha S.S.K.L.	7.8 (100%)	7.3 (93%)	6.7 (85%)
Sanjivani S.S.K.L.	8.6 (100%)	5.1 (59%)	4.7 (55%)

Source: Computed.

On an average, Chatt. Shahu S.S.K.L.'s farmers (Table 5.4) have 4.3 (mean value) acres of land of which 4.2 acres (97%) of land was irrigated in which 4.1 acres (95%) of land was allotted for sugarcane crop. The farmers of the said area opined that lack of water supply, non-availability of labourers in time and shortage of electricity were the main causes for the portion of land left out either idle or not used for sugarcane crop.

The farmers of Malaprabha S.S.K.L. owned 7.8 (average) acres of land of which 7.3 acres (93%) of land was under irrigation and sugarcane was grown in 6.7 acres (85%) of cultivated land. The farmers also expressed the same problems as revealed by the kagal farmers for their inability to cultivate entire land.

The average land holding by the farmers in Goa was almost two times (8.6 acres) as compared to Kagal area farmers (4.3 acres) but just 5.1 acres (59%) of land was under irrigation out of which sugarcane was grown in 4.7 acres (55%) of the cultivated land. Nearly 50 percent of the land was left out without cultivation due to hilly area, rocky land, lack of water during summer and flood during monsoon.

5.6.2 Farmers' Classification Based on Land Holding

In order to ascertain the farmers' land holding status, the farmers were grouped into three categories viz., marginal (less than 2.5 acres), small (more than 2.5 acres but less than 5 acres) and others (more than 5 acres).

The survey revealed that in case of Chatt. Shahu S.S.K.L., 47 percent of the farmers were marginal, 30 percent were small and 23 percent of them did fall under other group (more than 5 acres). In case of Malaprabha S.S.K.L., the land holding pattern was observed to be quite different. Just 7 percent of the farmers were marginal, 43 percent fall under small group and 50 percent of them held more than 5 acres. An equal number (37%) of Sanjivani S.S.K.L.'s farmers fall under the marginal and small group farmers, 26 percent of them were owned more than 5 acres of land.

5.7 Crop Pattern

In order to know, what other crops that the farmers grow in their field besides sugarcane crop, information was sought from the farmers in this regard and the same is depicted in the Table No. 5.5.

Table No. 5.5
Sugarcane and Other Crops Grown by Farmers

(Figures in Percentage)

Crops	Chatt. Shahu S.S.K.L.	Malaprabha S.S.K.L.	Sanjivani S.S.K.L.
i. Sugarcane	100	100	100
ii. Cotton	0	3	0
iii. Tobacco	0	0	0
iv. Rice	13	67	40
v. Wheat	13	3	0
vi. Jowar	10	17	0
vii. Oil seeds	50	3	7
viii. Fruits	0	17	40
ix. Vegetable	20	10	40
x. Others	67	0	33

Source: Computed.

It can be witnessed from the Table 5.5 that farmers from all the selected area were found to have cultivated sugarcane as main crop. The farmers of kagal area cultivated maize (67%), oil seeds (50%), vegetable (20%), rice (13%), wheat (13%) and Jower (10%). Some of the farmers in Kolhapur district were observed to have planted tobacco but none of the kagal *taluka* farmers of Kolhapur district cultivated tobacco. The farmers of Malaprabha S.S.K.L. cultivated rice (67%), Jowar (17%), fruits (17%), vegetable (10%), cotton (3%), wheat (3%) and oil seeds (3%). The farmers in Goa cultivated rice (40%), fruits (40%), vegetable (40%), cashew nut (33%) and oil seeds (7%).

5.8 Cattle Wealth

Indian farmers generally keep cattle in their home because these cattle consume agriculture waste and produce manure for fields. These cattle full fill farmers' requirement of milk, fuel, fertiliser and some time provide transport (bullock cart) services. It is a common phenomenon among sugarcane growers that they maintain hybrid cows and buffalos without incurring additional green fodder cost and earning a good amount of return by selling cattle milk.

Table No. 5.6
Cattle Population Maintained by the Farmers

Units	(Figures in Percentage)		
	Cows	Ox	Buffalos
Chatt. Shahu S.S.K.L.	50	20	77
Malaprabha S.S.K.L.	50	57	50
Sanjivani S.S.K.L.	47	40	30

Source: Computed.

It is evident (Table 5.6) that almost all the farmers were observed to have had cattle in their houses. The farmers of Chatt. Shahu S.S.K.L. have got hybrid cows (30%), ox (20%) and buffalos (77%). Fifty percent of the Malaprabha S.S.K.L. farmers were observed to have had cows, 57 percent of the farmers have ox and 50 percent of them have got buffalos. A similar observation was observed among the farmers in Goa; 47 percent of the farmers were observed to have got cows, 40 percent of them had ox and 30 percent of the farmers got buffalos.

5.9 Type of Fertilizer Used

All farmers of the selected units were observed to have used fertilizer in their fields and the old farmers preferred to use only cattle manure to reduce the cost and avoid the damage caused by chemical fertilizer. A large number of farmers have used both cattle manure and chemical fertilizers.

Table No. 5.7

Type of Fertilizer Used by the Farmers

(Figures in Percentage)

Units	Cattle Manure	Chemical	Both
Chatt. Shahu S.S.K.L.	17	3	80
Malaprabha S.S.K.L.	0	20	80
Sanjivani S.S.K.L.	7	7	86

Source: Computed.

It is evident (Table 5.7) that 17 percent of the *kagal* farmers used only cattle manure, 3 percent of them have used only chemical fertilizer and rest 80 percent of them used both type of fertilizers. The farmers of M.K.Hubli area were observed to have not used only cattle manure; 20 percent of the farmers have used only chemical fertilizer and the rest 80 percent of them put both types of fertilizers in their sugarcane fields. An equal number (7%) of the

farmers in Goa were observed to have used cattle manure or chemical fertilizer and rest 86 percent of them have used both types of fertilizers in their sugarcane fields.

5.10 Transport and Agriculture Tools

Indian farmers use tractors, power tillers (also called as cultivator) and bullock carts to sow their agriculture land as well as for transportation purpose. In order to know how many farmers have tractors, power tillers, bullock carts and traditional tools, required for cultivation, gathered information from the farmers in this regard is disclosed in Table No. 5.8.

Table No. 5.8

Type of Transport Mode and Agriculture Tools with Farmers

(Figures in Percentage)

Units	Tractor	Power Tiller	Bullock cart	Traditional tools
Chatt. Shahu S.S.K.L.	83	7	73	40
Malaprabha S.S.K.L.	40	0	33	67
Sanjivani S.S.K.L.	7	10	3	33

Source: Computed.

It can be learnt from the Table 5.8 that 83 percent of the farmers of the Chatt. Shahu S.S.K.L. have got tractors, 7 percent have power tillers, 73 percent of them have bullock carts and 40 percent of the farmers have all types of traditional tools. The consolidated survey of *M.K. Hubli* area revealed that 40 percent of the Malaprabha S.S.K.L.'s farmers have tractors, 33 percent of them have bullock carts, 67 percent have traditional tools and none of them has got power tiller. A small number (7%) of the farmers in Goa have tractors, 10

percent of them have power tillers, just 3 percent farmers have bullock carts and 33 percent of them have traditional tools.

5.11 Causes for Decrease in Interest in Agriculture Activities

Majority of the farmers were observed to be interested to go for out side salaried jobs rather than doing their family occupation i.e. agriculture. In order to find out 'why our young generation prefer to go for jobs?' and 'what are the genuine reasons that (the farmers think) behind the declining interest in agriculture activities, six possible reasons were identified and put before the farmers to elucidate. An open-ended question was also asked to the farmers so that they can disclose other reasons, which were not included in the possible six alternatives.

Table No. 5.9
Causes for Declining Interest in Agriculture Activities

(Figures in Percentage)

S. No.	Causes	Chatt. Shahu S.S.K.L.	Malaprabha S.S.K.L.	Sanjivani S.S.K.L.
i	Increase in cultivation cost	97	30	83
ii	Decrease in profit margin	93	80	57
iii	Easy availability of jobs / more remunerative jobs	50	0	0
iv	Reduction in support from Government	83	33	20
v	Reduction in support from sugar mill	30	3	10
vi	More profit if land is given for industrial/ commercial purposes	3	3	10
vii	Other reasons	0	0	10

Source: Computed.

Chatt. Shahu S.S.K.L.'s farmers felt (Table 5.9) that increase in cultivation cost (97%), reduction in profit margin (93%), reduction in Govt. support (83%) and easy availability of remunerative jobs (50%) were the main causes for reduction in the interest in agriculture activities. A few farmers

indicated that the reduction in support from sugar mill itself (30%) and alternative use of land (3%) were also affected the farmers' interest.

Maximum number of Malaprabha S.S.K.L.'s farmers told that decrease in profit margin (80%), increasing cultivation cost (30%) and reduction in support from Government (33%) were the major causes. A few of them told that the reduction in support from sugar mill (3%) and alternative use of agriculture land (3%) were other causes. Because of these reasons a large number of farmers of M.K. Hubli area have motivated their sons and daughters to go for higher education.

Increasing cost of cultivation (83%) and decreasing profit margin (57%) were the two major causes as felt by the farmers in Goa. A few farmers specified that reduction in support from Government (20%), reduction in support from sugar mill (10%) and more profit could be earned if the same land was given for commercial purpose (10%) were the main reasons for reducing interest in agriculture. A notable point was that the farmers of Bicholim, Tisk, and Surla area preferred to go for mining work where they could get guaranteed jobs with handsome salary rather than carrying out crop cultivation.

5.12 Problems Faced By Sugarcane Growers

The sugarcane growers in India face two-dimensional problems *viz.*, **off the fields and on the fields**, in other words problems encountered during cultivation as well as marketing of sugarcane.

5.12.1 On the fields: Timely availability of basic requirements such as seeds, fertilisers, pesticides, etc, in sufficient quantity is one of the important factors influencing sugarcane cultivation. There are nine main factors affecting

sugarcane production viz., fertility of land, seeds, supply of water, labour, finance, fertilizer, pesticides, technical guidance and demand for sugarcane. Non-availability of any one of these factors may hamper the sugarcane cultivation and yields in terms of quality and quantity. The farmers of the selected units were asked to rank all these nine major factors as per their non-availability or as problem. The survey revealed the following facts.

The farmers of the Chatt. Shahu S.S.K.L.'s have pointed out that non-availability of sufficient finance was the first major problem (ranked as the first problem) for them followed by other problems such as insufficient water supply, seeds, additional labour, fertilizer, non-availability of technical guidance from concerned authority and no stable demand for sugarcane.

The farmers of M.K. Hubli have given stress to only four problems faced by them. The farmers' first and foremost problem was non-availability of additional labour force. It was evident that the average number of adults in the family were 4 of which just 2 were observed to have engaged in agriculture activities, which indicated the ratio between work force available and actually engaged in agriculture was reduced to half. Further, these farmers specified that insufficient supply of water was their second constraint, non-availability of finance was the third problem and fluctuating demand for sugarcane was the fourth one.

The sugarcane growers in Goa also indicated that non-availability of additional work force was their first problem followed by non-availability of sufficient water. Other problems (as ranked by the farmers) were non-availability of financial help, technical guidance from sugar mill, Government agriculture departments, pesticides and fertilizers in time.

5.12.2 Off the fields: Indian farmers face many marketing problems. The sugarcane growers encounter different problems right from cutting of cane to till they receive their payments from sugar mills. All types of marketing problems were identified and grouped into six common problems in the following table.

Table No. 5.10

Problems Faced by Sugarcane Growers

(Figures in Percentage)

S.No.	Problems	Chatt. Shahu S.S.K.L.		Malaprabha S.S.K.L.		Sanjivani S.S.K.L.	
		YES	NO	YES	NO	YES	NO
i	Low rate for sugarcane	93	7	100	0	100	0
ii	Waiting in a long queue	97	3	3	97	10	90
iii	Dishonest in weighing at weigh bridge	70	30	0	100	0	100
iv	Unnecessary deductions in the name of toll, charges, etc.	60	40	0	100	10	90
v	Delay in payment of instalments	17	83	0	100	27	73
vi	Shortages of sugarcane buyers	7	93	0	100	10	90

Source: Computed.

It is evident (Table 5.10) that 93 percent of the farmers of the Chatt. Shahu S.S.K.L. felt that low rate for sugarcane was the major problem, waiting in a long queue was an another problem faced by 97 percent of the cane suppliers, 70 percent of the farmers observed dishonesty in weighing at the mill's weigh-bridge, 60 percent of them were expressed unhappiness with unnecessary deductions in the name of toll and other charges. Delay in cane bill payment (17%) and shortage of sugarcane buyers (7%) were other problems as experienced by the farmers.

Cent percent of the farmers from Malaprabha S.S.K.L., strongly felt that they did not get appropriate price for their sugarcane. The difference between cost of cultivation and cane price was very low, resulting in low rate of return.

A meagre percentage of the farmers were observed to have faced problem of waiting in a long queue. None of the respondents has experienced any other problems except those.

All the respondents of the Sanjivani S.S.K.L., felt that they were not happy with the present sugarcane pricing policy, 27 percent of the farmers did not receive their cane bill in time, 10 percent of the farmers complained about waiting in a long queue for their turn to unload sugarcane, 10 percent of the farmers felt about the unnecessary deduction and non-availability of competitive buyers in Goa.

5.13 Source of Finance

All farmers need money for seeds, labour charges, fertilizer, pesticides, etc. Majority of the farmers prefer to borrow money for agricultural activities from private moneylenders rather than approaching banks. The various sources of finance that were preferred by the farmers are displayed in Table No. 5.11.

Table No. 5.11
Sources of Finance

(Figures in Percentage)

S.No.	Sources	Chatt. Shahu S.S.K.L.	Malaprabha S.S.K.L.	Sanjivani S.S.K.L.
i	Own Savings	77	30	43
ii	Credit From Sugar Mill	10	0	20
iii	Cooperative Banks	13	0	27
iv	Primary Agricultural Credit Societies (PACS)	93	67	17
v	Nationalized Banks	13	67	33
vi	Private Banks	3	0	3
vii	Money Lenders	0	0	3
viii	Relatives	17	0	10
ix	Friends	17	0	13
x	Others	3	0	3

Source: Computed.

The survey revealed (Table 5.11) that 50 percent of the farmers of Chatt. Shahu S.S.K.L. were found to have invested less than Rs.50,000 for agriculture purpose, 13 percent of them have spent in between Rs.50,000 and Rs. 1 lakh, 24 percent of the farmers spent in between Rs.1 lakh and Rs.1.5 lakh and rest the of them invested more than Rs.1.5 lakh in agriculture activities. The minimum and maximum expenditure made by the farmers was in between Rs.40,000 and Rs.4,00,000.

So far as the source of finance was concerned, 77 percent of the cane growers utilised their own savings, 10 percent of the farmers took credit from sugar mills, 13 percent of them approached Co-operative banks, 93 percent of them obtained loan from Primary Agriculture Credit Society (PACS), 13 percent availed from nationalised banks, 3 percent of them approached private banks, 34 percent of the farmers borrowed from relatives and friends, 3 percent of them made use of other source, other than the specified source of finance here and none of them observed to have approached money lenders.

The survey revealed that 53 percent of the sugarcane growers of Malaprabha S.S.K.L. were in need of finance less than Rs.50,000 for their agriculture activities, 24 percent of them did required between Rs.50,000 and Rs.1 lakh, 13 percent of them required Rs.1 lakh and Rs.1.5 lakh and rest 10 percent invested more than Rs.1.5 lakh. The minimum and maximum spending range was in between Rs.35,000 and Rs.2.5 lakh.

So far as the sources were concerned, 30 percent of the farmers invested their own savings in agriculture activities, 67 percent approached PACS and a similar percent of the cane growers stepped into the nationalised

banks. No other sources have been exploited other than these three sources by the cane growers of *M.K.Hubli* area.

It is evident that 50 percent of the farmers in Goa invested less than Rs.50,000 in sugarcane fields, 27 percent spent in between Rs.50,000 and Rs.1 lakh, 13 percent of them spent in between Rs.1 lakh and Rs.1.5 lakh and rest 10 percent were observed to have invested above Rs.1.5 lakh. It is observed that the minimum and maximum investment range was in between Rs.15,000 and Rs.2 lakh. It is evident that the farmers in Goa have exploited all possible sources of finance available; 43 percent of the farmers managed with their own savings, 20 percent took help of sugar mill's credit facilities, 27 percent approached co-operative banks, 17 percent availed from PACS loans, 33 percent of the farmers have stepped into the nationalised banks, 3 percent have approached private banks, 3 percent of the farmers approached moneylenders, 10 percent took help of relatives, 13 percent of cane growers took help of their friends and 3 percent of them made use of other sources.

5.14 Ratio Between Agriculture Credit Applied and the Amount Sanctioned by the Banks

The sugarcane cultivators may apply to banks or PACS for a required amount of agriculture credit. All these institutions may not grant full loan applied for. The financial institutions sanction loans as per the norms laid down by the apex bodies of the concerned institutions.

The survey revealed that 73 percent of the Chatt. Shahu S.S.K.L. farmers applied for loan for less than Rs.50,000, 15 percent of them applied for loan in between Rs.50,000 and Rs.1 lakh, 4 percent of the farmers asked

Rs.1 lakh and Rs.1.5 lakh and 8 percent of the farmers found to have asked for a loan amount exceeding Rs.1.5 lakh. On an average, the *Kagal taluka* farmers availed the loans to the tune of 80 percent of the actual amount applied for. The rang (minimum and maximum amount) of loan applied was Rs.15,000 and Rs.3,00,000.

It is evident that 69 percent of the farmers from Malaprabha S.S.K.L. applied for loan of rupees less than 50,000, 10 percent of them asked for between Rs.50,000 and Rs.1 lakh, 16 percent of them were in between Rs.1 lakh Rs.1.5 lakh and 5 percent of the farmers required for more than Rs.1.5 lakh. The loan requirement of the farmers was observed to be between Rs.25,000 and Rs.2.5 lakh. A notable point was that the lending institutions sanctioned cent percent loans to all the farmers.

The farmers' borrowing pattern in Goa was rather different as compared to other two units; 40 percent of them asked for less than Rs.50,000 and another 40 percent of the farmers' requirement was between Rs.50,000 and Rs.1 lakh, 10 percent of them asked for Rs.1 lakh to Rs.1.5 lakh and 10 percent of them asked for more than Rs.1.5 lakh loan. On an average the credit requirement of the farmers was observed to be between Rs.20,000 to Rs.2 lakh and all the farmers were found to have got almost 90 percent of their requirements.

5.15 Factors Preventing Farmers from Visiting Banks and PACS

It was a common phenomenon that the Indian farmers prefer to visit local moneylenders because of easy and quick availability of loans. But these moneylenders charge very high rate of interest and exploiting the poor and

illiterate farmers. Looking at this problem, Government of India and Reserve Bank of India introduced various agriculture loan schemes for farmers through various financial institutions. Apart from all these efforts, sizable group of farmers do not come forward to take agriculture loan from legally approved institutions. In order to ascertain the factors that have prevented sugarcane growers from visiting banks and PACS, nine possible reasons were identified and allowed the farmers to give their views.

Table No. 5.12

Factors Preventing Farmers from Visiting Banks and PACS

(Figures in Percentage)

S.No.	Factors Preventing	Chatt. Shahu S.S.K.L.	Malaprabha S.S.K.L.	Sanjivani S.S.K.L.
i	No need of Bank Loans	7	30	10
ii	Never approached banks before	3	0	0
iii	Do not know the bank loan procedures	7	0	3
iv	Unnecessary / lengthy loan procedures	3	0	20
v	High rate of interest	13	0	20
vi	Inadequate security / Security problem	3	0	13
vii	Unclear title of the land	3	0	27
viii	Non-cooperation from bank staff	7	0	0
ix	Do not get the loan in time	10	0	23
x	Other reason	0	0	3

Source: Computed.

As far as the farmers of the Chatt. Shahu S.S.K.L. were concerned (Table 5.12), 7 percent of the farmers felt that they were not in need of bank loan and 3 percent of them never approached banks before, 7 percent of the farmers did not know bank loan procedure, 3 percent of them felt that bank loan procedures were time consuming and lengthy, 13 percent felt that lending rate of interest was high, 3 percent of them could not get loan due to

inadequate security, the same number of farmers could not apply for loan because of unclear title of lands, 7 percent of the farmers opined that they did not get co-operation from the bank employees and 10 percent of farmers applied for loan but did not get in time.

As far as the Malaprabha S.S.K.L. farmers were concerned; 30 percent of the farmers expressed that they were not in need of bank loans and it is cleared that 30 percent of the farmers invested their own savings for sugarcane cultivation. It is also evident that those who applied for loans have got full amount.

Loans availing pattern of the Sanjivani S.S.K.L. showed that 10 percent of the farmers invested their own savings, 3 percent did not know the bank procedures, 20 percent of the farmers felt that the bank loan procedures were lengthy, equal number of farmers expressed that the interest rate charged was high and 13 percent of the farmers could not get loan due to security problem. 23 percent of the farmers did not get loan amount in time and 3 percent opined that the loan sanctioning procedures needed to be simplified.

5.16 Degree of Co-operation and Guidance Received from Concerned Persons

Every now and then one or the other changes that have been taking place in the field of sugarcane cultivation, production, marketing etc. In case of cultivation, it may be the introduction of new sugarcane seeds, cultivation methods, use of fertilizers, pesticides etc. or may be the introduction of new schemes of irrigation, loans, insurance, etc. The farmers should get information about these things from time to time from the concerned mills. Presently there are three linking mechanisms in force through which

sugarcane growers receive information and guidance viz., the sugar factory, slip boys (appointed by the factory who convey message to the farmers of their jurisdiction or village) and from the Agriculture Officers of Government Departments.

In order to ascertain how far these links are effectively and efficiently working and providing guidance to the needy farmers in their region, the sugarcane growers were asked to give their opinions.

Table No. 5.13
**Degree of Co-operation and Guidance Received from Sugar Mills,
Slip (Field) Boys and Government Agriculture Department**

(Figures in Percentage)

S.No.	Agency	Chatt. Shahu S.S.K.L.		Malaprabha S.S.K.L.		Sanjivani S.S.K.L.	
		YES	NO	YES	NO	YES	NO
i	Sugar Factory	43	57	100	0	73	27
ii	Slip Boys/Field Boys	0	100	100	0	73	27
iii	Govt. Agriculture Department	3	97	57	43	69	33

Source: Computed.

The farmers of Chatt. Shahu S.S.K.L. have expressed (Table 5.13) that 43 percent of them received co-operation and guidance from sugar factory, 3 percent received co-operation from the Government Agriculture Department and none of them received any type of guidance from slip boys who were specially appointed to provide information and to extend helping hand to the farmers.

The farmers of Malaprabha S.S.K.L. have opined in a favourable way towards all caretakers. All the farmers were found to have received guidance from sugar factory as well as from slip boys, and 57 percent of them sought

help from Government Agriculture Department while cultivating sugarcane in their fields.

The farmers in Goa received equal co-operation from all three agencies; 73 percent of the farmers told that they got the guidance from factory as well as from slip boys and 67 percent received from Government Agriculture Department.

5.17 Services Provided By The Factories

Most of the sugar mills in India provide many services to their member farmers in which two services play a vital role viz., pre-harvest supply of basic materials and post-harvest transportation. In order to ascertain the types of transportation used by the farmers, amount of co-operation received from the sugar factory and the degree of trust that the farmers had in the materials supplied by the mills, the farmers of the selected units were sought their views and the farmers survey revealed the following facts:

5.17.1 Transportation: It is observed that the sugarcane was transported from the fields to the factory either by the farmers' own vehicles or hired vehicles or with the help of sugar factory's transportation service.

Table No. 5.14

Type of Transportation Used by the Farmers

(Figures in Percentage)

S.No.	Types of Transportation	Chatt. Shahu S.S.K.L.		Malaprabha S.S.K.L.		Sanjivani S.S.K.L.	
		YES	NO	YES	NO	YES	NO
i	Own vehicle	0	100	20	80	7	93
ii	Hired vehicle	0	100	0	100	3	97
iii	Sugar factory's transport service	100	0	80	20	83	17

Source: Computed.

A large number of farmers (Table 5.14) were observed to have made use of factory's transportation service because many farmers did not have their own vehicles and they did not want to hire vehicles at high rent. In such circumstances, only the alternative left to the farmers was to make use of factory's transportation service.

Table No. 5.15

Degree of Co-operation Received from Sugar Factories

(Figures in Percentage)

S.No.	Variable	Chatt. Shahu S.S.K.L.		Malaprabha S.S.K.L.		Sanjivani S.S.K.L.	
		YES	NO	YES	NO	YES	NO
i	Do they come in time to pickup sugarcane?	93	7	100	0	83	17
ii	Do they cooperate with you?	97	3	100	0	60	40
iii	Do they ask some advance from you?	60	40	0	100	3	97

Source: Computed.

The survey revealed (Table 5.15) that all the farmers of Chatt. Shahu S.S.K.L. made use of available factory's transportation facility; 93 percent reported that the cane cutting team with their vehicles reached the field in time, 97 percent agreed that factory's cane cutting team co-operated with them, 60 percent of the farmers were unhappy that cane cutting contractors asked some advances.

The farmers of Malaprabha S.S.K.L. have disclosed different views; 20 percent of the farmers made their own arrangements to transport sugarcane and the rest 80 percent opted for factory's transportation service. All those who opted for factory transportation facility have expressed that the cane cutting team was punctual and extended their co-operation. None of them said that the cane cutting contractors asked some advance to do work properly.

The cane cultivators in Goa made use of all types of transportation; 7 percent of the farmers have their own vehicles to transport cane from field to factory, 3 percent of the farmers preferred to hire vehicles and 83 percent of them made use of factory's transportation and services of cane cutting team, 83 percent of them were happy that the factory transport came and collected the sugarcane as per the date of cutting order issued by the factory, 60 percent felt that they have received co-operation from factory's transportation service, 3 percent of them told that the contractors asked some advance.

5.17.2 Seeds, Fertilizers and Pesticides: In India almost all sugar mills are providing suitable seeds, fertilizers and pesticides to the member farmers. Sugar mills buy them in bulk and distribute to the interested farmers at a discounted rates. Both farmers and mills enjoy the benefits of bulk buying and quality materials. It is observed that many times the materials provided by the factory management failed to yield good results in farmers' fields. That is how many farmers did not come forward to take them even at subsidised rates.

In order to ascertain whether the farmers of the selected units have had bitter experience in this regard and to ascertain the degree of confidence shown by the farmers in such basic materials, the farmers' views were sought.

Table No. 5.16
Degree of Confidence Shown by the Farmers in Materials
Supplied by the Sugar Factories

(Figures in Percentage)

S.No.	Materials Supplied	Chatt. Shahu S.S.K.L.		Malaprabha S.S.K.L.		Sanjivani S.S.K.L.	
		YES	NO	YES	NO	YES	NO
i	Seeds	97	3	57	43	77	23
ii	Fertilizers	97	3	30	70	53	47
iii	Pesticides	90	10	83	17	80	20
Average		94.6	5.4	56.6	43.4	70	30

Source: Computed.

The opinion survey revealed (Table 5.16) that 97 percent of the farmers of the Chatt. Shahu S.S.K.L. were observed to have shown trust in seeds and fertilizers supplied by the mill and 90 percent shown trust in pesticides. The farmers of Malaprabha S.S.K.L. were observed to have shown less confidence in seeds (57%) and fertilizers (30%) but more trust in pesticides (83%) provided by the factory. The farmers in Goa were observed to have shown a little bit high degree of confidence as compared to the farmers of Malaprabha S.S.K.L. because 77 percent of them believed that the factory provides genuine seeds, 53 percent of them told mill supplies quality fertilizers and 80 percent of them have a good faith in pesticides provided by the mill.

5.18 Factories Interaction With Farmers

The special feature of sugar industry is that the relation between the sugarcane growers and the factory is always well knit. Both of them should work for reciprocal benefits because the benefits are interrelated and progress is correlated. Hence, the sugar factories must take care of sugarcane growers by providing materials and information as and when required. In order to improve the relation between the farmers and the factory, the managements of the mills must arrange farmers' meetings, seminars and workshops, get together, festivals, etc., and also impart the knowledge required about the cane cultivation by arranging study tours and conducting field experiments, etc.

In order to analyse the degree of relation between the factory and the farmers and the level of care taking attitude of the selected units, five possible parameters have been identified and the same were asked to the farmers.

Table No. 5.17

Degree of Sugar Factories Interaction with Farmers

(Figures in Percentage)

S.No.	Types of interaction	Chatt. Shahu S.S.K.L.		Malaprabha S.S.K.L.		Sanjivani S.S.K.L.	
		YES	NO	YES	NO	YES	NO
i	Farmers' Meetings	80	20	83	17	100	0
ii	Study Tours	0	100	3	97	57	43
iii	Field Experiments	0	100	17	83	40	60
iv	Seminars/ Workshops	30	70	0	100	40	60
v	Festivals/ Get Together	60	40	0	100	17	83

Source: Computed.

Chatt. Shahu S.S.K.L.'s farmers (80%) have agreed (Table 5.17) that the factory's management conducted meetings for farmers from time to time, 30 percent of the farmers were called for seminars and workshops, which were organised by the factory's management and 60 percent of the farmers have attended the get together and festivals held in the factory's premises but the mill's management never arranged any type of study tours and field experiments for its farmers.

The farmers (83%) of Malaprabha S.S.K.L. have agreed that the mill conducted meetings for farmers regularly, 3 percent of them have enjoyed study tours and 17 percent of them have got training under the field experiments schemes. None of them told whether the factory arranged seminars, workshops, festivals and get together, etc.

Cent percent of the farmers in Goa attended farmers' meetings without fail, 57 percent of the farmers got the chance to go for study tours, 40 percent of the farmers have acquired knowledge through practical experiments in fields, 40 percent of them called for seminars and workshops and 17 percent of the farmers enjoyed festivals and get together programmes arranged by the management of Sanjivani S.S.K.L.

5.19 New Techniques and Technologies in Sugarcane Cultivation

The techniques and technologies of sugarcane cultivation are changing everyday. Sophisticated hybrid seeds and improved plantation methods have already entered in the global market. Because of inherent problems of agriculture, Indian farmers cannot adopt and adapt with those techniques and technologies within short span in their fields. There are seven common problems in sugarcane cultivation, which do not allow the farmers to go for or adopt new cultivation techniques and technologies. In this segment of investigation, an attempt has been made to ascertain the actual problems of farmers, which act as constraints in adopting new techniques and technologies in sugarcane cultivation of selected units.

Table No. 5.18
Constraints in Adopting New Techniques and Technologies in
Sugarcane Cultivation

(Figures in Percentage)

S.No..	Types of Constraints	Chatt. Shahu S.S.K.L.		Malaprabha S.S.K.L.		Sanjivani S.S.K.L.	
		YES	NO	YES	NO	YES	NO
i	More Labour	43	57	73	27	57	43
ii	Limited Land	93	7	60	40	43	57
iii	High Cost	100	0	83	17	37	63
iv	Non-Availability of Materials	77	23	0	100	13	87
v	Non-Availability of Technical Guidance	50	50	0	100	27	73
vi	Lack of Co-operation from Sugar Factory	40	60	0	100	33	66
vii	Lack of Co-operation from Slip Boys / Field Boys	20	80	0	100	17	83

Source: Computed.

The opinion survey revealed (Table 5.18) that 43 percent of the farmers of the Chatt. Shahu S.S.K.L. were observed to have not shown any interest in new technology which demanded more labour, 93 percent have felt

that it was not suitable for marginal and small farmers who have a limited land and all of them accepted that the adoption of new technology increases the cost due to additional investments, 77 percent of them have not shown any interest because of non-availability of required materials, 50 percent have felt that they may not get proper guidance from concerned agencies, 40 percent of them felt that the sugar mills did not extend co-operation, and 20 percent of the farmers were reluctant because of non-availability of co-operation from slip boys.

The farmers of Malaprabha S.S.K.L. confined themselves with only three reasons; 73 percent of the farmers have felt that new technology needs more labour, 60 percent of them told that limited land factor was the main hurdles and 83 percent of them estimated that new technology means additional cost and additional investments. None of them specified any other reasons.

A few farmers in Goa stressed that all seven factors were responsible for lack of interest towards new technology; 57 percent of the farmers have felt that new technology needs more labour, 43 percent of them told limited land factor did not allow them to go for new venture, 37 percent of them have felt that new technology means additional cost, 13 percent of the farmers expressed fear of non-receipt of required guidance in time from concerned persons, 33 percent complained that they did not get the co-operation from sugar mill and 17 percent viewed that they did not get co-operation from slip boys in past.

CHAPTER VI

SUMMARY OF FINDINGS,

CONCLUSIONS AND SUGGESTIONS

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SUMMARY OF FINDINGS, CONCLUSIONS AND SUGGESTIONS

6.1 Introduction

The undertaken study has introspected the performance of three selected co-operative sugar factories located each one in Maharashtra, Karnataka and Goa, in terms of the supply trend of sugarcane and sugar production; total cost of sugar production; operational viability and financial feasibility; profiles and problems of cane growers and a comparative performance of three selected units. The analysis has revealed the following broad findings:

6.1.1 Cost Performance

(i) Cost of Sugarcane Procurement: This was the major cost among all the cost components of production. The Chatt. Shahu S.S.K.L. incurred (mean value) Rs. 839.50 (in terms of percentage 71.6% and the highest cost among all the cost components) per bag. Malaprabha S.S.K.L. incurred (mean value) Rs. 881.60 (67.5%) and Sanjivani S.S.K.L. (mean value) Rs. 989.70 (64.7%) per bag.

The Chatt. Shahu S.S.K.L. was observed to have incurred the lowest sugarcane cost per bag in terms of rupee value followed by Malaprabha S.S.K.L. and Sanjivani S.S.K.L. respectively. The value in percentage indicated the actual share in the total cost in inverse order because of the higher operational efficiency achieved by the Chatt. Shahu S.S.K.L., which condensed the share of operational cost, resulted into increased cane

procurement cost. It further indicated that the cost of sugarcane procurement was the first highest major cost in all the three selected units.

The sugarcane procurement cost analysis revealed that the sugarcane procurement management of the Chatt. Shahu S.S.K.L. was more efficient as compared to the sugarcane procurement management of the other two units.

(ii) Manufacturing Expenses: The Chatt. Shahu S.S.K.L. incurred (mean value) Rs. 82.80 (6.9%) per bag, Malaprabha S.S.K.L. Rs. 88.20 (6.6%) and Sanjivani S.S.K.L. Rs. 153.50 (9.8%) per bag. Chatt. Shahu S.S.K.L. and Malaprabha S.S.K.L. were observed to have incurred more or less the same amount of manufacturing expenses per bag. The production efficiency of Sanjivani S.S.K.L. was observed to be very poor because the unit incurred almost twice the amount as compared to other two units.

Based on all these analysis, Chatt. Shahu S.S.K.L. and Malaprabha S.S.K.L. have shown a high degree of manufacturing efficiency and Sanjivani S.S.K.L. indicated a low degree of production performance.

(iii) Administrative Expenditure: The Chatt. Shahu S.S.K.L. incurred (mean value) Rs 21.50 (1.8%) per bag, Malaprabha S.S.K.L. Rs 45.30 (3.4 %) and Sanjivani S.S.K.L. Rs 33 (2.0%) per bag. Malaprabha S.S.K.L. was observed to have spent liberally on the administrative expenses followed by Sanjivani S.S.K.L. and Chatt. Shahu S.S.K.L. The Chatt. Shahu S.S.K.L. and the Sanjivani S.S.K.L. have shown a high degree of cost consciousness in administrative expenses as compared to the Malaprabha S.S.K.L.

(iv) Salary and Wage Bills: The Chatt. Shahu S.S.K.L. paid (mean value) Rs. 92.70 (8.0%) per bag, Malaprabha S.S.K.L. Rs. 167.60 (12.4%) and Sanjivani S.S.K.L. Rs. 236.20 (14.6%) per bag. The Chatt. Shahu S.S.K.L. was observed to be more efficient in manpower expenses management because it incurred the least amount of salary and wage per bag followed by Malaprabha S.S.K.L. But Sanjivani S.S.K.L. loaded heavy amount of salary bill on per bag of sugar production, which indicated very poor manpower management.

An analysis of '**Manpower Strategy**' in the selected units revealed that the Chatt. Shahu S.S.K.L. ran its operations below the number of workers specified by the commissioner of sugar and the ratio between actual manpower and the standard specified was 1220:1299. A high degree of automation and modernization have attributed to reduce the requirement of manpower in the unit. The number of employees employed in Malaprabha S.S.K.L. was observed to be more than the standard stated because the ratio was 1750:1299. Sanjivani S.S.K.L. has employed the less number of employees because the ratio between the actual and the standard was 625:878.

(v) Depreciation: The Chatt. Shahu S.S.K.L. charged (mean value) Rs. 37.40 (3.3%) per bag, Malaprabha S.S.K.L. Rs. 25 (1.7%) and Sanjivani S.S.K.L. Rs. 27.80 (1.8%) per bag. The Chatt. Shahu S.S.K.L. was observed to have charged the highest amount of depreciation due to heavy investments in plant capacity expansion and modernization followed by the Malaprabha S.S.K.L. and Sanjivani S.S.K.L.

(vi) Interest on Key Loan: The Chatt. Shahu S.S.K.L. charged (mean value) Rs. 96.60 (8.4%) per bag, the Malaprabha S.S.K.L. Rs. 111.50 (8.4%) and the Sanjivani S.S.K.L. Rs. 123.30 (7.1%) per bag. The Chatt. Shahu S.S.K.L. was observed to have charged the least amount of interest on key loan burden per bag followed by the Malaprabha S.S.K.L. and the Sanjivani S.S.K.L. But the percentage indicated that Chatt. Shahu S.S.K.L. and Malaprabha S.S.K.L. have accounted heavy share of interest burden per bag of sugar as compared to the Sanjivani S.S.K.L.

This analysis further indicated that any increase in the efficiency of manufacturing and administrative departments and the reduction in wage bills burden was due to investments in plant capacity expansion, automation and modernization and the same has led to the increase in depreciation and interest on key loan burden. On the whole, the Chatt. Shahu S.S.K.L. was observed to have produced sugar at the lowest cost (mean value) (Rs.1,170 per bag), which was followed by Malaprabha S.S.K.L. (Rs.1, 319) and Sanjivani S.S.K.L. (Rs.1,563) respectively. As far as the cost performance was concerned, Chatt. Shahu S.S.K.L. was the most efficient unit, the Malaprabha S.S.K.L. efficient unit, but Sanjivani S.S.K.L. was poor.

6.1.2 Sugarcane Cultivation, Supply and Price Trend

(i) Area Under Sugarcane Cultivation: The Chatt. Shahu S.S.K.L. (on an average) has 6,125 hectares (ha) of land under its jurisdiction for sugarcane cultivation; Malaprabha S.S.K.L. has 15,750 ha. and the Sanjivani S.S.K.L. has 1,197 ha. of land. The Malaprabha S.S.K.L. was observed to have had

more land under its jurisdiction for sugarcane followed by Chatt. Shahu S.S.K.L. and the Sanjivani S.S.K.L.

Chatt. Shahu S.S.K.L. has paid the highest cane price to their cane suppliers but that price factor could not motivate the farmers of *Kagal taluka* to expand the sugarcane cultivation area. But other two factors viz., constant efforts made by the mill's agriculture department and an increase in the yield per hectare affected the area under sugarcane cultivation. It was also observed that these farmers prefer to shift their crop from sugarcane to any other crops if they suspect weak monsoon, very high demand for other crops or fall in sugarcane price in coming year.

Even though the Malaprabha S.S.K.L. has the largest area under its jurisdiction, it could not make use of it effectively. The farmers, who owned about 45 percent sugarcane cultivation area, were yet to be registered, as member suppliers for the mill. Moreover, these farmers were observed to have kept their selling option open whether to supply to the Malaprabha S.S.K.L. or sell to other competitors. The *gur* producers, local sugarcane juice sellers and other nearby sugar mills were the competitors. If the farmers do not find better price from the local competitors then only the cane growers march with their cane produces towards the Malaprabha S.S.K.L. as gate cane suppliers. It indicated that these farmers do not want to give cent percent sugarcane produce to their own mill. This was because the farmers wanted to encash their cane produce as early as possible by selling either to the *gur* producers or to the local juice sellers.

The sugarcane growers in Goa were observed to have been motivated to expand their sugarcane cultivation area. The content of sugar in sugarcane is based on the agro-climatic conditions. The agro-climatic condition is not

favourable for sugarcane cultivation in Goa. Hence, the recovery rate was observed to be very poor. The yield per hectare was less than 53 MT per hectare. The assurance of guaranteed market that was given by the sugar factory for their sugarcane also failed to motivate the cane growers in Goa. The analysis further showed that the area under sugarcane purely dependent upon the will and wish of the sugarcane growers.

(ii) Yield Per Hector: Yield per hectare is one of the parameters widely used to assess the performance of farms. So far as the State wise average yield was concerned, Karnataka State has shown the highest performance (89.1 MT/ ha), followed by Maharashtra (79.5 MT/ha) and Goa (52.6 MT/ha). When the average yield of the selected units were compared with the all India average (67.1 MT/ha) yield, Chatt. Shahu S.S.K.L. was observed to be above (74.2 MT/ha) the average; Malaprabha S.S.K.L. (48.1 MT/ha) and Sanjivani S.S.K.L. (52.6 MT/ha) were observed to be below the national average.

The Karnataka State has shown very high rate of average yield performance. It was due to the best performance of Kaveri belt (above 120 MT per hectare) and Belguam belt. Malaprabha S.S.K.L. is situated in Belguam belt but has shown very poor performance. Malaprabha S.S.K.L. has also possessing the largest sugarcane cultivation area as compared to Chatt. Shahu S.S.K.L. and Sanjivani S.S.K.L. Any small amount of improvement in the yield certainly fetches a large amount of dividend to the mill and to the farmers. The agro-climatic condition is not favourable for sugarcane cultivation in Goa, and hence the yield and recovery rates were observed to be very poor. The farmers of the Chatt. Shahu S.S.K.L. have shown the

highest performance in the yield per hectare as compared to the other two selected units.

(iii) Sugarcane Supply Trend: All the units were observed to have experienced an upward and downward sugarcane supply trend during the study period. The Malaprabha S.S.K.L. was observed to have received the highest amount of local cane (on an average) of 5,30,616 MT per season from its own strong team of loyal members and 38,746 MT of gate cane followed by Chatt. Shahu S.S.K.L. (3,35,097 MT local: 2,07,611 MT gate cane) and Sanjivani S.S.K.L. (58,607 MT local: 87,273 MT gate cane). The Sanjivani S.S.K.L. was noticed to have dependent purely on gate cane (60%) suppliers followed by Chatt. Shahu S.S.K.L. (38%) and Malaprabha S.S.K.L. (7%). An equal importance and impartial treatment towards the gate cane suppliers certainly attracted the outside suppliers forever, which were learnt in case of the Chatt. Shahu S.S.K.L. because on an average, the ratio between locals and the gate cane suppliers was 62:38 during the study period.

On an average, the farmers in Goa could provide 58,607 MT of sugarcane per season, which was less even than 28 percent of Break-Even Point quantity requirements of Sanjivani S.S.K.L. and the same status was observed during the past three decades.

Correlation analysis between the sugarcane supply and the sugarcane price disclosed that the local (member) cane suppliers of Chatt. Shahu S.S.K.L. were observed to be more sensitive with the factory's pricing policy and hence, the co-efficient of correlation showed a positive (+0.75) result and the gate cane suppliers have shown a very weak negative correlation (-0.32), which indicated that any unfavourable pricing policy of the mill's management

certainly reduces the sugarcane supply from the members. Both the member suppliers and the gate cane suppliers of Malaprabha S.S.K.L. did not react much to the fluctuations of cane price and very weak negative correlations (-0.10 and -0.11) were observed between the price and supply trends.

Sanjivani S.S.K.L.'s local cane suppliers were observed to have a very weak positive (+0.02) correlation between the sugarcane supply and the sugarcane price. As against this, a weak negative correlation (-0.26) was observed in case of gate cane suppliers, which indicated that the local cane suppliers of Sanjivani S.S.K.L. have no feeling for the price hick since they have a limited supply capacity and confined attitude towards the sugarcane cultivation. Moreover no other competitors (gur and khandsari producers) influenced the supply trend in Goa. The gate-cane suppliers of Sanjivani S.S.K.L. full filled 60 percent of the cane requirements of the mill as the correlation result showed a negative sign and it indicated no relation between the cane price and the cane supply. Overall, there was no existence of correlation between sugarcane price and sugarcane supply.

(iv) Sugarcane Price: The Chatt. Shahu S.S.K.L. has paid on an average, Rs. 906 and Malaprabha S.S.K.L. has paid (Rs. 816) per MT to the locals as well as to the gate cane suppliers as per the recovery rates. The gate cane suppliers of Sanjivani S.S.K.L. have got higher cane price (Rs. 900) as compared to the local cane suppliers (Rs. 633). The Chatt. Shahu S.S.K.L. was observed to have paid the highest price to the locals and gate cane suppliers followed by the Sanjivani S.S.K.L. (paid only to the gate cane suppliers) and Malaprabha S.S.K.L. paid for both types of cane suppliers.

Neither Chatt. Shahu S.S.K.L. nor Malaprabha S.S.K.L. paid either the SMP or SAP to the farmers during 2002-03.

The comparative analysis revealed that the gate cane suppliers in Goa were observed to have received higher cane price benefits but they were deprived of certain benefits such as transport facility, harvest allowance, etc., which were given only to the local suppliers. The cane suppliers of Malaprabha S.S.K.L. were observed to have got higher price benefits as compared to the other selected mills even though the average recovery percentage was lower (10.62%) than the Chatt. Shahu S.S.K.L. (12.73%).

6.1.3 Operational Performance

(i) Production of Crystallized Sugar: All units have shown a wide fluctuation in the sugar production during the study period. The Chatt. Shahu S.S.K.L. has produced (mean value) 6,91,877 quintals of sugar where as the Malaprabha S.S.K.L. has produced 5,96,381 quintals of sugar and the Sanjivani S.S.K.L. 1,32,821 quintals of sugar.

The Chatt. Shahu S.S.K.L. was observed to have produced the highest number of bags, denoting the high degree production efficiency followed by the Malaprabha S.S.K.L. and Sanjivani S.S.K.L. The quantum of sugar production depends upon the availability of best quality and large quantity of sugarcane and the Chatt. Shahu S.S.K.L. was observed to have received the same during the study period.

(ii) Duration of Crushing Season: During the study period, the Chatt. Shahu S.S.K.L. crushed (mean value) 182 days; Malaprabha S.S.K.L. 154 days and the Sanjivani S.S.K.L. crushed 101 days and the all India average

was 146 days. Among all the three units, Chatt. Shahu S.S.K.L. was observed to have topped in the number of crushing days followed by Malaprabha S.S.K.L and both were above the averages of States and all India average. So far as the Sanjivani S.S.K.L.'s performance was concerned, it was (27%) below the all India average indicating a poor cane procurement management.

During 1995-96, all the three units were noticed to have crushed for a maximum number of days due to a bumper crop of sugarcane. Duration of the crushing season was highly influenced by the cane supply trend prevailing in the region. If an unit does not get sufficient (above normal capacity) amount of cane to crush, the situation may prolongs the crushing period and the slow flow of cane supply may increase the number of gross days affecting the efficiency and productivity of the units.

(iii) Rate of Recovery: As far as rate of recovery was concerned the Chatt. Shahu S.S.K.L. has shown 12.73 percent followed by Malaprabha S.S.K.L. (10.62%) and the Sanjivani S.S.K.L. (9.63%). The Chatt. Shahu S.S.K.L. was observed to have achieved the highest rate of recovery followed by the Malaprabha S.S.K.L. recording above the three States and all India averages and the Sanjivani S.S.K.L. was found to be below the national average. The recovery rate of Sanjivani S.S.K.L. was found to have fluctuated with the quantum of gate cane supply during the study period. Chatt. Shahu S.S.K.L. and the Malaprabha S.S.K.L. have received high quality sugarcane and hence, the recovery rates were also high. The recovery rate of Sanjivani S.S.K.L. was very poor because of poor quality local sugarcane, containing

less than 9 percent sugar. The local farmers could not produce and supply good quality cane due to very nature of the topography in Goa.

(iv) Man and Machine Efficiency: Chatt. Shahu S.S.K.L. has shown a very high (mean value of 88%) degree of men and machine efficiency (this percentage was over and above the standard specified (84%) by the Bhargava Sugar Industry Enquiry Commission (BSIEC) and the Govt. of India 86 percent) followed by Malaprabha S.S.K.L. (83%) and Sanjivani S.S.K.L. (78%). But as per the plant set up standard specification of 1987 issued by the Govt. of India, only the Chatt. Shahu S.S.K.L. has shown above the standard. Malaprabha S.S.K.L. has shown higher efficiency (83% one percent more) as per the BSIEC (82%) standard and three percent less as per the central Govt. specification (86%). Even though Sanjivani S.S.K.L. is old and with out-dated equipments, it was able to extract 78 percent of sugar and that too by crushing low quality of sugarcane. Though it did not indicate high efficiency but certainly matched with its age-old technology and quality of cane.

Based on the analysis, Chatt. Shahu S.S.K.L. was observed to have achieved the highest degree of production efficiency followed by the Malaprabha S.S.K.L. and Sanjivani S.S.K.L. respectively. No sugar factory can extract cent percent sugar content from sugarcane because a small amount of sugar content goes as normal process loss.

(v) Capacity Utilization: All the three selected units began their venture with 1,250 MT Crushing Capacity Per Day (CCPD). In the course of time Malaprabha S.S.K.L. and Chatt. Shahu S.S.K.L. have increased their crushing

capacity from 1,250 MT CCPD to 2500 MT CCPD and later on 3,500 MT CCPD. When a sugar factory makes use of stoppage time (to be kept for cleaning) for production purposes, the capacity utilisation (time) exceeds its normal capacity, which is allowed over and above 20 percent.

Both Chatt. Shahu S.S.K.L. and Malaprabha S.S.K.L. were observed to have crushed 13 percent more than the normal capacity and reaped the benefits of over utilization of men and machines. Sanjivani S.S.K.L. also exceeded (124%) the allowable over utilisation limit of 20 percent. An increase in the crushing capacity from 2500 MT to 3500 MT per day opened the gateway to the gate cane suppliers of Chatt. Shahu S.S.K.L. and it was observed to have marched a large number of gate cane suppliers towards the mill after increase in the crushing capacity, which indicated that the gate cane suppliers did not want to wait in long queues since they come from a long distance.

Sanjivani S.S.K.L. has shown a higher rate of capacity utilisation because of heavy rush of sugarcane suppliers within a few numbers of days, which indicated lack of proper planning of sugarcane inflow management during the crushing seasons. The cane related diseases and bad monsoon were the two major factors affecting the sugarcane supply in terms of cane quality as well as cane quantity.

(vi) Total Number of Hours Crushed and Hours Lost: The manufacturing records of Chatt. Shahu S.S.K.L. showed the time lost was about 5 percent to the total time available for crushing during the study period; the records of Malaprabha S.S.K.L. indicated 10 percent and Sanjivani S.S.K.L. revealed 24 percent of time lost. The allowable ratio between total number of hours

crushed and the total number of hours lost is 10:1, which means 10 percent in case of sugar industry.

Chatt. Shahu S.S.K.L. was observed to have achieved a high degree of time management followed by Malaprabha S.S.K.L. On the other hand, the Sanjivani S.S.K.L. was observed to have not planned its material management properly because of the dominance of uncertain gate cane suppliers.

6.1.4 Financial Performance:

(i) On an average, the financial health of the selected co-operative sugar factories was affected by the similar types of problems as encountered by the sugar sector at national level viz., low profit percentage, accumulated sugar stock and huge interest burden on temporary borrowings.

(ii) Net profits to sales relations were observed to be very poor because the relation between these two was less than 0.001 percent in all the three selected units, which indicated poor performance in the profitability.

(iii) It was observed that the capital structure of all the units showed an upward trend indicating a healthy capital structure of all units.

(iv) It was evident from the analysis that the performance of previous year influenced the current year's profits and sales because half of the previous year's sugar production was sold during current year.

(v) Huge capital investment in modernization and automation was observed in the form of fixed assets, thereby the Z-scores of x_1 , x_3 and x_5 variables of the Chatt. Shahu S.S.K.L. and the Malaprabha S.S.K.L. were found to have been reduced.

(vi) Chatt. Shahu S.S.K.L., one of the well-known healthy units in Asia has also shown a negative ratio of working capital during 2003-04 and also experienced heavy loss (Rs. 251.61 lakh) during 2002-03 because of reduction in the production due to poor monsoon and cane diseases.

(vii) Chatt. Shahu S.S.K.L. was observed to have earned huge amount of Earning Before Depreciation, Interest and Tax (EBDIT) by realizing its sugar stock in the international market. During the study period of 10 years, Sanjivani S.S.K.L. has shown negative performance of EBDIT for four years, which indicated that the unit could not recover even basic indirect expenses.

(viii) Z-scores of Chatt. Shahu S.S.K.L. indicated that the unit was 'likely to become sick' for nine years and 'sick' for one year during the study period. Z-scores of Malaprabha S.S.K.L. indicated that the unit was 'financial good' for one year, 'likely to become sick' for seven years and 'sick' for two years during the study period. So far as the Sanjivani S.S.K.L. was concerned, Z-scores indicated that the unit was 'financially good' for four years, 'likely to become sick' for three years and 'sick' for three years during the study period.

(ix) Sugarcane price competition among the units in and around the Belgaum district affected the financial health of Malaprabha S.S.K.L. The unhealthy cane

price competition also taught a good lesson to the member farmers of Malprabha S.S.K.L., who have approached other sugar mills being the registered members of mill and have not received sales proceeds in time from the mills where they supplied sugarcane.

(x) The Sanjivani S.S.K.L. was observed to be a starving unit. Its productions, profits and survival depended upon the attitude of gate cane suppliers. Out of 31 years of its business venture, the unit earned profits only during seven year. During 1995-96 and 1996-97, it earned maximum profit of Rs.95 lakh and Rs.92 lakh respectively whereas the maximum profit earned by Chatt. Shahu S.S.K.L was Rs.14.94 lakh (2000-01) and Malprabha S.S.K.L. was Rs.2.46 lakh (2001-02) during the study period.

(xi) Sanjivani S.S.K.L. was under the patronage of Government of Goa, which allocated uninterrupted supply of funds to make mill's losses good, hence, the total debts and equities got diluted.

(xii) Chatt. Shahu S.S.K.L was observed to have maintained a high degree of financial consistency followed by Malprabha S.S.K.L. and Sanjivani S.S.K.L. since the Co-efficient of Variations were 6.09 percent, 19.09 percent and 46.42 percent respectively.

(xiii) On an average, all the selected units have fallen under '**likely to become sick category**' according to the standard specified in Edward Altman's Z-Score Model because the ratios of net profits to net sales and debts and equities of the selected units were observed to be very weak.

Based on all these analysis, so far as the financial performance was concerned, Chatt. Shahu S.S.K.L. has shown the best performance in terms of consistency, better performance by Malaprabha S.S.K.L. and satisfactory performance by Sanjivani S.S.K.L.

6.1.5 Sugarcane Growers' Profiles and Problems:

(i) On an average 15 percent of the total number of farmers were young, 41 percent fall under the middle age group and 44 percent of the farmers were old in the selected units. More number of adult members from each farmer's family in *Kagal taluka* was observed to be directly engaged in agriculture activities as compared to the other two selected units.

(ii) *M.K. Hubli* (Malaprabha S.S.K.L.) farmers' educational level was observed to be higher than the other two selected units. It was also evident from the survey that the educational level of other family members (spouses and children) also was observed to be higher as compared to the other two selected units. Chatt. Shahu S.S.K.L.'s farmers were found to have not given much importance to education. Low level of education among the farmers' community certainly a set back that affected directly the agriculture process and production and indirectly the progress of the sugar mills.

(iii) Ten percent of the farmers in *Kagal* (Chatt. Shahu S.S.K.L.) *taluka* were found have earned more than Rs.4 lakh per annum by cultivating sugarcane crop and none of the farmers from *M.K.Hubli* area and from Goa were found to have earned more than Rs.4 lakh. More than 50 percent of the farmers in

Goa were found to have earned less than Rs.50,000, which indicated a very poor income earning performance by a large group of farmers in Goa.

(iv) The farmers of Chatt. Shahu S.S.K.L. (97%) and Malaprabha S.S.K.L. (93%) were observed to have enjoyed sufficient irrigation facilities as compared to the farmers of (59%) Sanjivani S.S.K.L. But the Malaprabha S.S.K.L.'s farmers complained (during personal interactions with them) about the shortage of water supply and it was because of the water supply through canals purely depends upon quantum of water reserve that again depends on quantum of rainfall during monsoon in the area. Due to topography of the land in Goa region, 50 percent of the agriculture land is unsuitable for cultivation because of that the farmers preferred to plant cashew trees on hill slopes and rocky areas.

The farmers of Chatt. Shahu S.S.K.L. and Malaprabha S.S.K.L. were found to have reaped higher yield due to high degree of soil fertility in the region as compared to the yield gained by the farmers in Goa.

(v) The survey revealed that Chatt. Shahu S.S.K.L. and Sanjivani S.S.K.L. were concerned, about 25 per cent of the farmers held more than 5 acres of land and in case of Malaprabha S.S.K.L. it was 50 percent, indicating a large number of the farmers in *M.K.Hubli taluka* having owned economic size land for sugar cane cultivation

(vi) Besides sugarcane cultivation, a large number of farmers in *Kagal taluka* were found to have cultivated maize and oil seeds. The farmers of Malaprabha S.S.K.L. were observed to have cultivated rice and the farmers in

Goa were observed to have given equal importance to cultivate rice, fruit, vegetable and cashew nuts. All most all the farmers were found to have cultivated one or the other crop.

(vii) More than 80 percent of the farmers (in all the selected units) were observed to have used both the chemical and the cattle manure as fertilizer in their fields, which indicated that the cane cultivators preferred to use both types manure.

(viii) A large number of the farmers of Chatt. Shahu S.S.K.L. were observed to have tractors (83%) and bullock carts (73%). In case of Malaprabha S.S.K.L., 40 percent of the farmers were observed to have tractors and 33 percent of the farmers have bullock carts. The farmers of Sanjivani S.S.K.L. were found to be not financial sound to buy and maintain tractors (only 7%) as compared to the other two selected units.

(ix) A large number of the Chatt. Shahu S.S.K.L. farmers (95%) and Sanjivani S.S.K.L. farmers (83%) felt that an increase in the cost of cultivation and decrease in profit margin (because cane price did not increase proportionately) were the main cause for reduction in the interest in agricultural activities among the young farmers. They also felt that *Kagal taluka* was just 20 km away from Kolhapur, (a commercial centre) where a plenty of job opportunities attracted their grown up young generation. The farmers in Goa felt that the availability of any salaried job will provide a guaranteed income to their sons and daughters. This attitude of the farmers created lethargy towards agriculture activities among the young generation.

More over the agriculture in Goa many times depends upon uncertain factors like monsoon and other factors. A decrease in profit margin was another major reason that was expressed by the majority of the farmers of the selected units.

Based on the analysis, it is concluded that a increase in the cost of cultivation and decrease in the profit margin were observed to be the two major causes for reduction in the interest in agricultural activates among the young farmers.

(x) The farmers of M. K. Hubli and Goa were faced with an acute shortage of additional work force in their fields (observed by allotting ranks to the field problems). An insufficient water supply was observed to be the second major problem of these farmers followed by financial problem. The farmers of all the units (average 98%) were found to be unhappy with the prevailing sugarcane price policy of the Govt. and sugar mills.

(xi) The large number of farmers (93%) of the Chatt. Shahu S.S.K.L. have approached Primary Agricultural Co-operative Society (PACS) or / and invested their own savings (77%) in cane cultivation. The farmers of Malaprabha S.S.K.L. have approached PACS (67%), the nationalised banks (67%) and made use of their own savings (30%). The farmers (43%) of the Sanjivani S.S.K.L. invested their own savings and 33 percent of them approached either to the nationalised banks or the co-operative banks.

The analysis showed that the Primary Agricultural Co-operative Societies (PACS), nationalised banks and the farmers' own savings were found to be the three major sources of agricultural finance.

(xii) A large number of the farmers of kagal and M.K. Hubli area were observed to be in need of less amount of loan as more than 75 percent of the Chatt. Shahu S.S.K.L. and the Malaprabha S.S.K.L. were observed to have applied for an amount less than Rs.50,000 loan. The financial institutions around *M.K. Hubli* area were observed to have explained in detail to the farmers about the quantum of loan available and various provisions laid down by the sanctioning authority and hence the ratio between the amount of loan applied and the amount of loan sanctioned was 1:1. The range (minimum and maximum amount) of loan applied for was Rs.15,000 to Rs.3,00,000. The farmers' agricultural borrowing scene in Goa was slightly different, 40 percent of them asked for less than Rs.50,000 loan, and an equal number of the farmers were found to have applied for loan in between Rs.50,000 and 1 lakh; the range of loan applied was in between Rs.20,000 to Rs.2 lakh. On an average the farmers in Goa were found to have got 90 percent of their loan requirements.

(xiii) So far as the factors prevented the farmers from visiting banks and PACS were concerned, high rate of interest and not getting the loan in time were found to be the two main causes of the farmers of Chatt. Shahu S.S.K.L.; there was no need of bank loans observed to be the only reason expressed by the farmers of Malaprabha S.S.K.L.; and unclear title of the land, delay in sanctioning of the loans, the high rate of interest and lengthy loan procedures were the multi-dimensional problems were found to have faced by the formers in Goa.

(xiv) The slip boys of Chatt. Shahu S.S.K.L. were observed to have not (100%) taken any interest in providing cane cultivation guidance to the farmers. The agriculture department (100%) and slip boys (100%) of Malaprabha S.S.K.L. were found to have played an effective role in imparting cultivation knowledge to the needy farmers. Three fourth of the total number of farmers in Goa were found to have received co-operation from all the three concerned caretakers viz., mill's agriculture department, slip boys and Govt. agriculture departments.

On an average, the degrees of co-operation expressed to the farmers by the three concerned caretakers was observed to be very good in Malaprabha S.S.K.L. followed by Sanjivani S.S.K.L. and Chatt. Shahu S.S.K.L. respectively.

(xv) Cent percent of the Chatt. Shahu S.S.K.L.'s farmers were found to have used factory transport services to transfer sugarcane from fields to mill followed by the Sanjivani S.S.K.L. (83%) and Malaprabha S.S.K.L. (80%). This clearly speaks a continued trust and faith of the farmers in their respective sugar factories. On an average, 88 percent of the farmers preferred to make use of factory transport service.

(xvi) The management of Chatt. Shahu S.S.K.L. was found to have gained a high (94.6%) degree of confidence by providing suitable seeds, quality fertilizers and pesticides to their member farmers followed by the Sanjivani S.S.K.L. (70%) and Malaprabha S.S.K.L. (56.6%). The agriculture department of Malaprabha S.S.K.L. was observed to have provided low quality fertilizers to the sugarcane growers.

(xvii) The management of Chatt. Shahu S.S.K.L. was found to have not arranged any study tour and field experiments for their farmers. Similarly the management of Malaprabha S.S.K.L. was found to have ever thought of seminars, workshops and festivals for the farmers. On the other hand, cent percent of the farmers in Goa were found to have attended the farmers' meetings. This denoted that the awareness level of the Chatt. Shahu S.S.K.L. and the Malaprabha S.S.K.L. farmers to the latest developments in terms of methods of cultivation, seeds, fertilisers etc., was found to be poor and this will certainly affect the efficiency and productivity of the concerned sugar mills

(xviii) More labour requirement, limited land holding and additional cost and investments were found to be the major constraints for all the farmers while adopting the new cultivation techniques and technologies in sugarcane cultivation.

Further more, findings of the study proved the set hypotheses viz., the sugarcane procurement cost component dominates in the total cost and low price for sugarcane, high cultivation cost and insufficient water supply are the major problems of the farmers, as true and the existence of correlation between sugarcane supply and sugarcane price was as the other hand disproved.

6.2 SUGGESTIONS

The under taken study on the working and performance of the selected sugar co-operative factories exhibited some deficiencies and weaknesses in their performance. Based on the finding of the study, the following policy suggestions are made for the improvement of their performances.

6.2.1 Sugarcane Price

- A clear descriptive chart of Statutory Minimum Price (SMP) with proportionate bonus payable as per recovery rate needs to be given to all the sugarcane growers by the sugar factories as soon as the Government of India notifies the SMP. Based on that farmers can compute tentative revenue for their cane proceeds. This kind of knowledge sharing system will certainly improve the quality of sugarcane because every farmer will try to improve the sugar content in sugarcane crop and the farmers will also take more interest in adopting scientific methods of sugarcane cultivation.

- There is no link among Statutory Minimum Price (SMP), sugarcane production in the country and the demand for sugarcane. The Govt. of India should declare SMP based on the estimated sugarcane production in the coming season after considering monsoon and other factors (cost of cultivation, diseases affected in the region, etc.) that already affected the sugarcane crop so that the farmers can get the benefits of short supply of sugarcane.

o The farmers were observed to be not happy with the sugarcane price policy, and as a result, the farmers may likely to switch on to other crops that will fetch them more income in future and forever. Hence, the Govt. of India, apex bodies of sugar and the mills of the concerned regions must come out with suitable sugarcane price policy, which will benefit to both mills and farmers.

o The farmer members of Chatt. Shahu S.S.K.L. were observed to be more sensitive to the cane price, it is advised to frame a 'Farmers' Favour Price Policy' as framed by the Malaprabha S.S.K.L. (which has given more benefits to the farmers) because Chatt. Shahu S.S.K.L. also got high-grade cane from the members as well as from the non-members. Therefore, it is advised to follow '**High Price for High Recovery**' policy approach so that certainly mill can maintain and attract the gate cane suppliers.

o The units in and around the Belguam district were observed to have been following unhealthy competition like '**Price- Push and Cane-Pull**' to attract sugarcane suppliers of other units. In this regard, keeping in mind the long term interest of all the sugar manufacturing units, the units are advised to adopt certain good practices to attract gate cane suppliers, such as, increase in the capacity of the mills (more the crushing capacity lesser the time to wait in queue); unbiased treatment (treating members and the non-member suppliers on equity basis); and in time payment (cane bill payment within two instalments one within fifteen days). These practices will in future help to overcome such unhealthily competitions and will bring an improvement in the performance of the units.

A large number of farmers of Malaprabha S.S.K.L. were observed to have accused about the declining trend in the support from Government (83%) and sugar mill (30%) day by day. Both the Government of Maharashtra and sugar mills need to think over to bring back the farmers' interest towards agriculture. A proportionate increase in cane price with the rate of inflation will always keep compensating an increasing cost of cultivation and a decreasing profit margin. Hence, it is advised to link sugarcane price with the increasing general price index of the nation.

6.2.2 Sugar Production

- A plant modernization and automation is regarded to be one of the key factors, which can increase efficiency of the units. In this context, the Sanjivani S.S.K.L. and the Malaprabha S.S.K.L. are advised to go for advanced production technology so as to reduce the per bag cost of production. Towards this end, plant modernization policy as adopted by the Chatt. Shahu S.S.K.L. may be thought in case of both the units.
- The administrative cost of the Malaprabha S.S.K.L. was noticed to be higher as compared to the administrative cost of other two selected units. Therefore, this unit is advised to analyse the sub cost-components of administration and accordingly initiate certain measures to monitor the administration cost so as to minimise spending on the administrative overheads.

Chatt. Shahu S.S.K.L. was found to have saved a lot on salary and wage bill but the same cost burden popped up in the per bag cost in the form of depreciation and interest on key loan. This showed that the top management has not given a thought to the '**Cost and Benefits**' effect on the total cost before making new heavy investments. Hence, the sugar mills are advised to prepare their heavy investment plans keeping in view the 'Cost and Benefit' effect on the total cost in the near future.

o Over utilisation of crushing capacity beyond a particular limit is not advisable and hence in case of Sanjivani S.S.K.L., it is advised to spread the crushing load throughout the crushing season by developing and implementing a proper sugarcane cutting order plan containing a database of farmers, area, and variety of sugar cane planted, date of planting and date of maturity will certainly address the problem of over loading.

o Sanjivani S.S.K.L. was observed to have been facing inherent problems of low quality sugarcane and insufficient quantity of sugarcane supply. In order to overcome the said problems, it is advised to go for a high yielding sugarcane variety with high degree of sugar contents, which suits agro-climatic conditions of the region so as to enhance sugarcane productivity on the one hand and bring down the cost of sugar production on the other. Converting the gate cane suppliers as registered members is another means to ensure a guaranteed cane supply to the factory.

- The time lost for cleaning and miscellaneous purposes is considered to be inevitable in all the units but the hours lost due to cane shortage and mechanical losses can be controlled with the help of proper cane cutting order planning and proper management of machines and spare parts.

6.2.3 Interest Burden

- All the selected units were found to have paid a large amount of interest on key loans, which indicated a crunch of mill's earning goes without proper planning that can be plugged in certain ways. The factory can make use of its internal source (reserve) to pay off the sugarcane bills of cane growers instead of borrowing from co-operative banks, so that the interest burden on key loan can be reduced.

Management of the mills also can request the wealthy farmers to keep their money as fixed deposits in the factory itself, which can be given as loan to the needy farmers. So that factory can reduce its interest burden on key loans, which is borrowed from co-operative banks to maintain the sugar stock. Factory can announce a little bit higher rate of interest on deposits and little bit lower rate of interest on landings as compared to the interest rates of co-operative banks so as to attract both the parties.

The sugarcane growers generally borrow from financial institutions to buy their basic requirements such as seeds, pesticides, fertilizers, etc. If factory itself takes initiative to meet such basic requirements of the farmers, then the

cane growers need not approach any financial institutions. The farmers and the mills can share the benefits of large scale buying from suppliers.

Majority of the farmers in Goa opined that they were not getting loan in time. Hence, the authorities of sugar mills and the concerned Govt. agencies need to take necessary steps towards this end so as to enable the farmers to avail the financial assistance without any delay. Another best solution to this problem is, sugar mills can open their own **Farmers' Co-operative Credit Societies** so that the member farmers can approach their own credit society instead of going to the different banks and moneylenders for their agriculture credit needs. Instead of applying for key loan, the deposits of farmers can be utilised for this purpose.

- A huge amount of interest was observed to have been paid to hold sugar stock because of the government policy and therefore the government should take care of holding sugar stocks in public warehouses. If it is not possible to hold entire stock, the government can hold at least levy quota, which belongs to Public Distribution System. This will reduce the warehouse cost and stock holding cost of every sugar mill.

6.2.4 Man Power Management

- Chatt. Shahu S.S.K.L. and Sanjivani S.S.K.L. were observed to have run their operations with the manpower below the number of employees specified by the commissioner of sugar as per their capacity. The number of employees

employed in Malaprabha S.S.K.L. was found to be more than the standard stated; the ratio between the actual workforce and the standard specified was 1750:1299. Hence, it is advised that the Malaprabha S.S.K.L. should cut down its additional work force by making a thorough study on manpower requirement within the units and comparing with the manpower employed by the of other units.

- Sanjivani S.S.K.L. is not in need of seasonal employees because the factory does not have distillery unit. These seasonal employees are also paid in off-season. It is advised that the Sanjivani S.S.K.L. may introduce Voluntary Retirement Scheme (VRS) for its tired workers so that the wage bill can be cut down to the extent of not less than Rs.1.5 crore (estimated) per year. The required manpower can be appointed during the crushing season on temporary basis.

6.2.5 Sugarcane Cultivation and Supply

- Today the farmers are more interested in high yielding variety of sugarcane, hence the sugar mills must try to help the farmers in getting high yielding variety of seeds. Over and above, the farmers need to be imparted the knowledge of scientific methods of cultivation.
- Malaprabha S.S.K.L. was observed to have shown a very low performance so far as yield per hectare is concerned in spite of the unit is being in the high performance zone. Therefore, it is advised to the mill's agriculture department to conduct extensive survey of farmers to ascertain the reasons for low

performance in the fields, so as to initiative necessary steps to improve the field performance.

o Malaprabha S.S.K.L. was observed to have had a large area of sugarcane fields under its jurisdiction but almost 50 percent of the sugarcane-cultivated fields have not registered by the sugarcane growers on the members of role. Therefore, the mill's management is advised to put its efforts to gain the confidence of the unregistered (45%) sugarcane growers and get them as registered member suppliers. An action plan towards this end will fetch a large amount of dividend to the unregistered cane growers as well as to the mill.

o The management of Sanjivani S.S.K.L. should convince its farmers the causes and effects of continuous short supply of local sugarcane to the factory. The change in the farmers' attitude may change the destiny of Sanjivani S.S.K.L., to some extent. The farmers in Goa should try to grow sugarcane to the tune of 2,00,000 MT per year and expand the cane cultivation area at least to the tune of 5,000 hectares (at present rate of yield 52.6 per hectare) so that the mill can get BEP quantity of cane from local suppliers to achieve '**No Profit No Loss**' target. Another alternative to this problem is converting the gate cane suppliers into member suppliers so that guaranteed cane supply can be assured.

o The survival of Sanjivani S.S.K.L. was dependent on gate cane supplier (60%), hence, the unit is advised to maintain a good relationship with them by framing a '**well-nit policy**' so as to over come the problems of uncertainty of

gate cane supply and short supply of sugarcane forever, which can be achieved by converting the gate cane suppliers into registered member; giving equal treatment (which will avoid confusion in the minds of local suppliers also) in terms of concessions; and by attracting large numbers of sugarcane growers not only from Belgaum district area but also from costal belt of North *Kanara* district. If the management of mill does not take any action in this regard, Sanjivani S.S.K.L. will not get gate cane in future because the farmers of the North Kanara district of Karnataka are planning to establish a separate sugar mill at *Joyada taluka*, which is a centre for all the gate cane suppliers of Goa. They may likely to march towards the new factory in future to get the benefits of higher recovery rates. This is major threat before the Sanjivani S.S.K.L. in particular and the farmers of Goa in general. It is high time to attract gate cane supplier permanently since they are not sensitive with the price factors.

- During an interaction with the farmers, it was observed that the farmers' knowledge about the recent developments in sugarcane cultivation in terms of mechanised farming, seeds, fertilisers and pesticides was poor. Therefore, in the interest of the sugar mills, it is necessary to organise workshops / seminars/ study tours in those areas so as to enable their awareness in the recent developments.

- It is evident form the field survey of the farmers of Malaprabha S.S.K.L. that they did not have trust in seeds and fertilizers provided by the mill and a similar view was expressed by the farmers in Goa. Against this background, both the

units are advised to initiate appropriate measures, which can promote confidence among the farmers. Both the units should analyse the actual causes behind the no confidence in the hearts and minds of the farmers.

◦ Whenever the sugar factories want to introduce new cultivation techniques and technologies, the factory management is advised to create required environment so that the farmers can easily adopt them without much more difficulties. The required environment should be introduced step by step, such as discussing the pros and cons of introducing new cultivation techniques and technologies, requirements in the form of man, material, money; taking the sugarcane growers into confidence by arranging meeting, workshops etc.; ascertaining the number of farmers who are ready to accept; and providing them training in the factory's cane field.

◦ During personal interaction with the agriculture officers of the selected units, it was revealed that the officers faced problems while convincing new technology and planting methods to the middle aged and aged farmers and also expressed their happiness that the farmers of less than 40 years old were more co-operative and quick in adopting new methods of cane cultivation. The agriculture officers of the selected units are advised to take the cane growers in to confidence by arranging meetings and workshops.

◦ Chatt. Shahu S.S.K.L. has a good number of young farmers in their members' roll and hence, the factory can make use of such young generation to impart

knowledge of new technology and new methods of sugarcane cultivation in order to reap high yield in the fields and high production in mill.

- Waiting in a long queue is one of the factors affected the gate cane suppliers, and hence, to over come this problem all the mills are advised to prepare a systematic and pre-planned members and gate cane suppliers list as a part of material management planning. Neither the sugarcane growers alone nor the mill's agriculture department can over come the problem of quality and quantity of sugarcane. It needs reciprocal efforts and hence, regular meetings with farmers may improve the quality and quantity of the sugarcane supply.

6.2.6 Problems of Sugarcane Growers

- It is observed that all the farmers of select units were under the clutches of three major problems *viz.*, shortage of labour, insufficient water supply and deficiency of finance. It may be difficult on the part of the sugar mills to supply additional workforce to the farmer members but certainly the mills can take up the action plan to solve the farmers' problem of finance (already discussed) and water supply to some extent.

- So far as the water problem is concerned, mills can also think of what are other water sources available or can be developed in the region. Many sugar mills have taken initiative to rejuvenate old lakes, wells, some initiated to dig additional tube wells and wells. Irrigation departments have taken initiative to impart knowledge about rain harvesting, drip irrigation and new methods of cane planting to reduce the water requirements such as circular style etc.

A large number of farmers of Chatt. Shahu S.S.K.L. were observed to have expressed their unhappiness about the mill's sugarcane weighing procedures and unauthorised deductions, which indicated red signal for the management of Chatt. Shahu S.S.K.L. therefore, it is advised to the management to bring necessary changes to check malpractices in cane weighing, which can strengthen the loyalty of the farmers towards the mill, else it may affect the goodwill of the mill in future.

- The banks must explain in detail to the farmers about various procedures laid down by the sanctioning authority and the quantum of agriculture loan can be applied under the various schemes, so that the farmers can avoid approaching other unreliable sources. This can be done through the farmers meeting and agriculture loan *melas*.

- A large number of farmers in Goa were found to have not availed the loans in time. Hence, it is advised to the bankers in Goa, to come out with concrete solution such as arranging workshops on agriculture loans and schemes; imparting knowledge about the procedures to be followed to get the loans; and explaining the power of sanctioning authority to avoid the doubts in the minds of farmers. A few farmers of *Kagal taluka* never visited banks and some of them did not get co-operation from bank employees. Looking at the background, it is advised to the mill's management and bank authorities to arrange bank awareness programmes for farmers.

● The farmers of Chatt. Shahu S.S.K.L. were found to be neither properly informed nor properly guided either by the slip boys or by the Government Agriculture Department and hence, the management of Chatt. Shahu S.S.K.L. should take note of it and adopt an action plan such as arranging workshops or meetings at village level from time to time to the farmers.

● A large number farmer of Malaprabha S.S.K.L. were found to have no trust in seeds and fertilizers provided by the mill and a few farmers in Goa also felt a similar view. Hence, both the units need to analyse the actual causes behind **'No Confidence Concept'** in the hearts and minds of the farmers through an informal interaction with them and accordingly initiate necessary measures to build trust and confidence in the farmers.

6.2.7 Financial Performance

● All the units were observed to have very low (less than 0.003 %) return ratio of net profits to net sales, which can be improved by reducing interest burden on key loan (already suggested). As soon as the farmers receive their cane bills, they spend a part of it and the rest they keep in banks. These farmers may be convinced to keep their earnings in the factory itself as a deposit instead of keeping it in other banks. In India, the farmers demand their sugarcane bills immediately due to their bitter experience with the factories in the past. Management can take them into confidence and the differences can be sorted out by giving them a full proof and guaranteed assurance of payment on demand.

● No unit was observed to have prepared its financial statements in a uniform format, hence, it is very difficult to make intra-firm or inter-firm comparisons. It is advised to follow a uniform format for all types of cost statements, manufacturing reports and annual reports. The federal sugar authorities can discuss this matter during annual conferences and workshops and take a policy decision on these matters. This is the right time to introduce uniform costing, financial and management reporting systems in the entire sugar industry since the sugar industry is already influenced by the galloping impact of globalisation. Uniformity may give new look to sugar cooperatives.

6.3 Unexplored Areas In The Field Of Sugar Sector For Further Research

The sugar sector research works can be broadly classified into six major categories, *viz.*, **sugarcane; sugarcane cultivation; sugar production; marketing of sugar and consumption pattern; by-products of sugar industry; and sugar policies of Government.**

So far sugarcane is concerned a large number of empirical studies have been under taken and going on in various Sugarcane Research Centres in India. Many research studies have been also done on cane cultivation with special references to the problems and prospects of sugarcane growers. A few engineering scholars have modified the sugar production technology to improve the extracting capacity at low cost in consultation with cost experts. The areas like marketing of sugar and consumption pattern, by-products of sugar industry,

sugar policies of Government, etc., are yet to be deeply penetrated by the research scholars.

If one wants to pursue research in sugar sector, one can study the following areas, which are yet to be investigated:

i. So far no one has prepared sugarcane mapping based on a thorough research study, which may help sugarcane cultivators and sugar mills. Most of the research on sugarcane undertaken by the Sugarcane Research Centres in India do not get wide publicity hence, such research work does not reach in the fields of the cane cultivators in India. Such research piece should contain various sugarcane varieties available, which is the suitable region for such varieties to cultivate and yield details. The title of the research may be **'study of sugarcane with special reference to sugarcane mapping (India or World)'**

ii. **'Study of By-products of sugar industry with special reference to Ethanol production and its impact on Indian Economy'** can be analysed in the light of increasing demand for oil and role of ethanol in controlling / stabilising Indian economy.

iii. Some of the sugar mills produce raw sugar to save the cost of chemicals, which is a heavy burden for them, and such raw sugar has good demand in many countries (e.g. China). The subject can be analysed under title **'the policy adopted by the Indian sugar mills to produce raw sugar and its impact on Indian Economy'**.

iv. It is observed that there is no uniformity followed by the sugar mills in India in keeping their accounts, which hinders the inter-firm and intra-firm comparison process. An interested research scholar can evaluate the accounting

system of Indian sugar mills under the title **'evaluation of accounting system followed by the Indian sugar mills'** and also he can develop and propose a new standardised accounting system for the Indian sugar mills.

v. **'Problems and prospects of sugar industry in major sugar producing countries in the world - a comparative study of select (Five/Ten) major sugar producing countries'**.

vi. **'The Indian Government policies towards the sugar sector and its impact on Indian economy'** can be analysed in the light of - sugarcane price policy, control policy, etc.

vii. Many Indian sugar mills are exporting sugar and also selling sugar within the country under their brand name. More than 50 percent of sugar is used as raw material in food processing industry in India. Based on this back ground one can study **'the marketing of sugar and consumption patter in India'**.

viii. The share^{of} beet sugar (USA produces) is 25 percent of the total sugar production in world. Nobody has under taken any study to **'compare the cane sugar and beet sugar production'**.

ix. One can evaluate the performance of three different business organisations, which are in the same field (i.e. sugar production) which can be studied under the title **'the performance evaluation of co-operative sector, private sector and public sector sugar mills - A comparative study of select mills'**.

x. **'The role of Primary Agricultural Credit Society (PACS) in sugar cane cultivation'** this can be studied by selecting a few sugar mills and PACS with in the jurisdiction of such mills.

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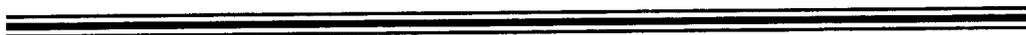
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ANNEXURES



ANNEXURE I
PERFORMANCE ANALYSIS OF COOPERATIVE SUGAR
FACTORIES IN MAHARASHTRA KARNATAKA AND
GOA: A COMPARATIVE STUDY OF SELECT UNITS
QUESTIONNAIRE

RESPONDENT: FARMER. **PART A - PERSONAL PROFILE**

1. Name of the farmer _____ 2. Age _____
 3. Name of the village: _____ . 4. Name of the block / Taluka: _____
 5. How many members are there in your family?

Adults	Children below 14 years	Total

6. Educational qualifications of the farmer's family:

S No	Members	Illiterate	Up to vii th	X th	XII th	Graduate
i	Farmer					
ii	Wife					
iii	Others:					
iv						
v						
vi						

PART B - AGRICULTURAL PROFILE

7. Is agriculture your main occupation? (Mark ✓)

Yes		No	
-----	--	----	--

8. How many adults are engaged in agricultural activities?

9. How many adults are going for out side work/jobs/service?

10. What is your net income from agriculture per year? (mark ✓)

Less than Rs. 50,000	Rs. 50,000 To 1,00,000	Rs. 1,00,000 To 2,00,000	Rs. 2,00,000 To 4,00,000	Above Rs. 4,00,000

11. How much agriculture land do you sow/cultivate? _____ Hectare / Acres.

12. How much agriculture land is irrigated? _____ Hectare / Acres.

13. How much agriculture land is for sugarcane cultivation? _____ Hectare / Acres.

14. If any portion of the land is not used specify the reason: _____

14. Which of the following crops do you grow in your field? (Mark ✓)

i	Sugarcane		vi	Jowar	
ii	Cotton		vii	Oilseeds	
iii	Tobacco		viii	Fruits	
iv	Paddy		ix	Vegetables	
v	Wheat		x	Others	

15. How many cattle do you have?

Cows	Ox	Buffalos	Total

16. Which of the following do you use as fertilizer in your field? (Mark ✓)

Cattle manure	Chemical fertilizers	Both

17. Which of the following transport / agricultural equipments do you have?

Tractor	Power Tiller	Bullock cart	Traditional tools

18. Which of the following reasons do you think is a result of decrease in the interest in agricultural activities among the farmers? (Mark ✓)

i	Increase in cultivation cost	
ii	Decrease in profit margin	
iii	Easy availability of jobs / more remunerative jobs	
iv	Reduction in support from Government	
v	Reduction in support from sugar mill	
vi	More profit if land is given for industrial / commercial purposes	
vii	Other reasons:	

PART C – PROBLEMS

19. Are you facing the following problems while marketing your sugarcane? (Mark ✓)

		Yes	No
i	Low rate for sugarcane		
ii	Weighting in a long queue		
iii	Dishonest in weighing at weigh bridge		
iv	Unnecessary deductions in the name of toll, charges, etc.		
v	Delay in payment of instalments		
vi	Shortages of sugarcane buyers		

20. Which of the following do you think major problem(s) in sugarcane cultivation?
(Rank them by giving 1st problem, 2nd, 3rd, so on)

i	Water	
ii	Labour	
iii	Finance	
iv	Seeds	
v	Fertilizers	
vi	Pesticides	
vii	Technical guidance	
viii	No stable demand for sugarcane	

21. How much amount do you require for agricultural activities? Rs. _____

22. Form which of the following sources do you get finance for agriculture? (Mark ✓)

i	Own savings		vi	Private banks	
ii	Credit from Sugar mill		vii	Money lenders	
iii	Cooperative banks		viii	Relatives	
iv	Primary agricultural credit society (PACS)		ix	Friends	
v	Nationalized banks		x	Others	

23. If you approach Banks/ Primary Agricultural Credit Society (PACS):

		Rs
i	How much amount did you apply for loan?	
ii	How much amount did banks / (PACS) sanction for you?	

24. If you **DO NOT** approach Banks/ Primary Agricultural Credit Society (PACS):
Which of the following factors prevented you to visit them? (Mark ✓)

i	No need of Bank Loans	
ii	Never approached banks before	
iii	Do not know the bank loan procedures	
iv	Unnecessary / lengthy loan procedures	
v	High rate of interest	
vi	Inadequate security / security problem	
vii	Unclear title of the land	
viii	Non-cooperation from bank staff	
ix	Do not get the loan in time	
x	Other reason:	

25. Do you receive cooperation/guidance for the following people? (Mark ✓)

		Yes	No
i	From sugar factory		
ii	From field boys/slip boys		
iii	From Govt. Agriculture Officers		

26. How do transport your sugarcane to the factory? (Mark ✓)

		Yes	No
i	Own vehicle		
ii	Hired vehicle		
iii	Sugar factory transport service		

27. If you are making use of sugar factory transport: (Mark ✓)

		Yes	No
i	Do they come in time to pickup sugarcane?		
ii	Do they cooperate with you?		
iii	Do they ask some advance from you?		

28. Do you think sugar factory provides proper and reliable: (Mark ✓)

		Yes	No
i	Seeds		
ii	Fertilizers		
iii	Pesticides		

29. Is your sugar factory conducting /arranging: (Mark ✓)

		Yes	No
i	Farmers' meetings		
ii	Study tours		
iii	Field experiments		
iv	Seminars/ workshops		
v	Festivals/ get together		

30. Which of the factors do you think would not allow you to go for / adopt new techniques / technology in sugar cultivation?

		Yes	No
i	More labour		
ii	Limited land		
iii	High cost		
iv	Non-availability of materials		
v	Non-availability of technical guidance		
vi	Lack of cooperation from sugar factory		
vii	Lack of cooperation from field boy/sleep boys		

ANNEXURE II

Working notes of computation of Karl Pearson's product movement coefficient of correlation between X and Y variables i.e. Sugarcane Price Paid and Sugarcane Supply.

Sugarcane Price Paid and Sugarcane Supplied to Chatt. Shahu S.S.K.L.

Local cane (i) $\bar{x} = \frac{\sum x}{n}$ i.e. = 906.4

(ii) $\bar{y} = \frac{\sum Y}{n}$ i.e. = 334.7

(iii) $\frac{\sum x^2}{n}$ i.e. = 832807.0

(iv) $\frac{\sum y^2}{n}$ i.e. = 120236.1

(v) $\frac{\sum xy}{n}$ i.e. = 310554.5

(vi) $n = 10$

(vii) $r_{x, y} = +0.75$ (Strong positive correlation since value is in between 0.7 and 1)

Gate cane: (i) $\bar{x} = \frac{\sum x}{n}$ i.e. = 906.4

(ii) $\bar{y} = \frac{\sum Y}{n}$ i.e. = 207.6

(iii) $\frac{\sum x^2}{n}$ i.e. = 832807.0

$$(iv) \frac{\sum y^2}{n} \text{ i.e.} = 58256.9$$

$$(v) \frac{\sum xy}{n} \text{ i.e.} = 184015.5$$

$$(vi) n = 10$$

$$(vii) r_{x,y} = -0.32 \text{ (Weak negative correlation since value is in between } -0.7 \text{ and } 0)$$

Sugarcane Price Paid and Sugarcane Supplied to Malaprabha S.S.K.L.

$$\text{Local cane: (i) } \bar{x} = \frac{\sum X}{n} \text{ i.e.} = 816.0$$

$$(ii) \bar{Y} = \frac{\sum Y}{n} \text{ i.e.} = 530.8$$

$$(iii) \frac{\sum x^2}{n} \text{ i.e.} = 640160.0$$

$$(iv) \frac{\sum y^2}{n} \text{ i.e.} = 305328.0$$

$$(v) \frac{\sum xy}{n} \text{ i.e.} = 430614.0$$

$$(vi) n = 10$$

$$(vii) r_{x,y} = -0.10 \text{ (Weak negative correlation since value is in between } -0.7 \text{ and } 0)$$

$$\text{Gate cane: (i) } \bar{x} = \frac{\sum x}{n} \text{ i.e.} = 816.0$$

$$(ii) \bar{Y} = \frac{\sum Y}{n} \text{ i.e.} = 38.4$$

$$(iii) \frac{\sum x^2}{n} \text{ i.e.} = 640160.0$$

$$(iv) \frac{\sum y^2}{n} \text{ i.e.} = 2217.5$$

$$(v) \frac{\sum xy}{n} \text{ i.e.} = 30868.5$$

$$(vi) n = 10$$

$$(vii) r_{x, y} = -0.11 \text{ (Weak negative correlation since value is in between } -0.7 \text{ and } 0)$$

Sugarcane Price Paid and Sugarcane Supplied to Sanjivani S.S.K.L.

$$\text{Local cane (i) } \bar{x} = \frac{\sum x}{n} \text{ i.e.} = 633$$

$$(ii) \bar{y} = \frac{\sum Y}{n} \text{ i.e.} = 58.1$$

$$(iii) \frac{\sum x^2}{n} \text{ i.e.} = 443090.0$$

$$(iv) \frac{\sum y^2}{n} \text{ i.e.} = 3099.5$$

$$(v) \frac{\sum xy}{n} \text{ i.e.} = 38500$$

$$(vi) n = 10$$

$$(vii) r_{x, y} = +0.02 \text{ (Weak positive correlation since value is in between '0' and } 0.7)$$

Gate cane: (i) $\bar{x} = \frac{\sum x}{n}$ i.e. = 900.5

(ii) $\bar{y} = \frac{\sum Y}{n}$ i.e. = 86.7

(iii) $\frac{\sum x^2}{n}$ i.e. = 821543.3

(iv) $\frac{\sum y^2}{n}$ i.e. = 8662.1

(v) $\frac{\sum xy}{n}$ i.e. = 77164.3

(vi) $n = 10$

(vii) $r_{x,y} = -0.26$ (Weak negative correlation since value is in between -0.7 and 0)

ANNEXURE III

FINANCIAL PERFORMANCE OF THE SELECTED UNITS

Working notes of computation of Mean Values:

(i) Mean of Chatt. Shahu S.S.K.L. $(\bar{x}) = \frac{\sum X}{N} = \frac{20.63}{10} = 2.063$

(ii) Mean of Malaprabha S.S.K.L. $(\bar{x}) = \frac{\sum X}{N} = \frac{22}{10} = 2.200$

(iii) Mean of Sanjivani S.S.K.L. $(\bar{x}) = \frac{\sum X}{N} = \frac{20.6}{10} = 2.055$

Computation of Standard Deviation (S.D.):

(II) (i) Standard Deviation (S.D.) of Chatt. Shahu S.S.K.L

$$\sigma = \sqrt{\frac{\sum (X - \bar{x})^2}{N}} \text{ Where } \sum X = \sum Z\text{-score.}$$

$$\sum x^2 = 41.3041, \quad \bar{x}^2 = (20.63)^2, \quad N = 10$$

$$\sigma_X = 0.1257$$

(ii) Standard Deviation (S.D.) of Malaprabha S.S.K.L

$$\sigma = \sqrt{\frac{\sum (X - \bar{x})^2}{N}} \text{ Where } \sum X = \sum Z\text{-score.}$$

$$\sum x^2 = 50.016, \quad \bar{x}^2 = (22)^2, \quad N = 10$$

$$\sigma_X = 0.4200$$

(iii) Standard Deviation (S.D.) of Sanjivani S.S.K.L.

$$\sigma = \sqrt{\frac{\sum (X - \bar{x})^2}{N}} \text{ Where } \sum X = \sum Z\text{-score.}$$

$$\sum X^2 = 51.3395, \quad \bar{x}^2 = (20.55)^2, \quad N = 10$$

$$\sigma X = 0.9544$$

Computation of Co-efficient of Variation (CV):

$$(III) \text{ Co-efficient of Variation (CV)} = \frac{\text{S.D.} \times 100}{\text{Mean}} \text{ OR } \frac{\sigma X \times 100}{\bar{x}}$$

$$(i) \text{ CV of Chatt. Shahu S.S.K.L.} = \frac{0.1257}{2.063} \times 100 = 6.093$$

$$(ii) \text{ CV of Malaprabha S.S.K.L.} = \frac{0.62}{2.200} \times 100 = 19.091$$

$$(iii) \text{ CV of Sanjivani S.S.K.L.} = \frac{0.945}{2.055} \times 100 = 46.420$$

