CHAPTER – III
PROFILE OF STUDY AREA AND SELECT UNITS

3.1 Introduction

“Sugar (sucrose) is a carbohydrate that occurs naturally in every fruit and vegetable. It is the major product of photosynthesis, the process by which plants transform the sun’s energy into food. Sugar is separated for commercial use from sugarcane and sugar beet in which it is abundantly available. Sugar is solid or liquid substance which is white or colourless when it is pure. It is distributed to Industrial and Home users in several forms.”

The sugar industry is the most advanced processing industry in the agriculture sector in India. Sugar is one of the oldest commodities in the world and traces its origin in 4th century A.D in India and China. In those days sugar was manufactured only from sugar cane. But both countries lost their initiatives to the European, American and Oceanic countries, as the eighteen century witnessed the development of new technology to manufacture sugar from sugar beet. It fact, Indian sugar industry is the largest in the world with its average production ranging from 100 to 120 lakhs tones and is the second largest agro- based industry in the country presented about 4 million hectares of land is under sugar cane with an average yield of 70 tons per hectare. India is the largest single producer of sugar including traditional cane sugar sweetness, Khandasari and Gur equivalent to 26 million tons raw value followed by Brazil in the second place at 18.5 million tones. Even in respect of white crystal sugar, India has ranked No.1 position in 7 out of last 10 years. During 1998 - 99 India produced 17.0 million tons (155 lakh tones with sugar) while Brazil in 1ST place produced 18.5 million tones.
From a modest beginning in 1930-31 when tariff production was granted to it, the industry has made rapid strides. Because of a higher cane price announced by government, production of 125 lakh tones of sugar was foreseen for 1994-95, the inventory level is expected to return to comfortable levels and by 1995-96, India could well be exporting sugar. An output of 145-150 lakh tones is visualized for 1995-96 which should leave the country with an exportable surplus of 15 lakh tones. At that Stage, a buffer stock of 10 lakh tones may be created, which will take care of any shortfall in production in coming years.

Sugar industry was initially concentrated in the sub tropical states of Uttar Pradesh and Bihar, but since the second plan it has dispersed in to the Deccan area and the Southern states. About 35 million farmers (including their families) constituting about 7 per cent of the rural population are engaged in growing sugar cane. The industry absorbs a sizable portion of the cane crop and provides the farmer with resources to meet his commitments. Each sugar factory deals with thousands of cane farmers ranging from 7000 to 8000 in the Southern States and Maharashtra to 30,000 - 45,000 in Northern India.

Sugar cane being a highly perishable crop cannot be transported over long distances. Hence, the factories have necessarily to be set up with in economic distances. Having regard to this basic characteristic of the industry, the concept of a minimum distance between one factory and another has come to be accepted. The existence of traditional units making Gur and Khandasari is another feature of the industry. The Gur and Khandasari units enjoy freedom and fiscal advantages while the mills are controlled and sugar is subject to various levies. In the early 1930’s nearly two third of sugarcane production was utilized for production of alternative sweetness Gur and Khandasari with better standard of living and higher incomes, the sweetness demand has shifted to white sugar. Currently, about one third of sugarcane production is utilized by the Gur and Khandasari sectors are completely free from controls and taxes which are applicable to sugar sector.
Sugar industry has undergone a significant change during the recent past and India has emerged as a net exporter of sugar which was being imported for many years. In view of the comfortable position in regards to indigenous output, the Government has decided to give boost to sugar exports.

3.2 History

The discovery of sugarcane, from which sugar as it is known today, is derived dates back unknown thousands of years. It is thought to have originated in New Guinea, and was spread along routes to Southeast Asia and India. The process known for creating sugar, by pressing out the juice and then boiling it into crystals, was developed in India around 500 BC.

Its cultivation was not introduced into Europe until the middle-ages, when it was brought to Spain by Arabs. Columbus took the plant, dearly held, to the West Indies, where it began to thrive in a most favourable climate. It was not until the eighteenth century that sugarcane cultivation was began in the United States, where it was planted in the southern climate of New Orleans. The very first refinery was built in New York City around 1690; the industry was established by the 1830s. Earlier attempts to create a successful industry in the U.S. did not fare well; from the late 1830s, when the first factory was built. Until 1872, sugar factories closed down almost as quickly as they had opened. It was in 1872 before a factory, built in California, was finally able to successfully produce sugar in a profitable manner. At the end of that century, more than thirty factories were in operation in the U.S.

3.3 Industry Structure

Indian sugar industry can be broadly classified in to two sub sectors, the organized sector i.e. sugar factories and the unorganized sector i.e. manufacturers of traditional sweeteners like Gur and Khandasari. The latter is considered to be a rural industry and enjoys much greater freedom than sugar mills.
The production of traditional sweeteners Gur and Khandsari is quite substantial. Although the trends indicate a progressive shift from traditional sweeteners to white sugar over the years, they still account for about 37% of total sweetener consumption in India.

Since the sugar industry in the country uses only sugarcane as an input, sugar companies have been established in large cane growing states like Uttar Pradesh, Maharashtra, Tamil Nadu, Karnataka, Punjab and Gujarat. Uttar Pradesh leads the tally by contributing 24 per cent of the country’s total sugar production and Maharashtra stands next with 20 per cent contribution.

The farmers’ co-operatives own and operate the largest chunk of the industry’s total capacity. They are concentrated primarily in Maharashtra and eastern Uttar Pradesh. The largest number of sugar companies in the private sector is located in southern India, in the states of Tamil Nadu, Andhra Pradesh and Karnataka.

Out of 453 sugar mills in the country, 252 are in the co-operative sector, 134 are in the private sector and 67 are in the public sector. Besides 136 units in the private sector are in various stages of implementation. A few such units are under implementation in the co-operative sector as well. But no new units have been proposed in the public sector.
3.4 Government Policy

Sugar is a controlled commodity in India. It is covered under the purview of the Essential Commodities Act, 1955. The government controls sugar capacity additions through industrial licensing, determines the price of the major input which sugarcane, decides the quantity that can be sold in the open market, fixes the prices of the levy quota sugar, etc.

Government control over all aspects of the production and sale of sugar extends to the level of wholesalers in the distribution chain. All sugar wholesalers need to obtain a license issued by the government before they can begin to operate. Also they should confirm to government notifications for the amount of inventories they can maintain. The government policies for the sugar industry are broadly classified in the following section for the better understanding.

3.5 Licensing Policies

Till recently is used to be amongst the nine industries under licensing provision. The major criterions for issuing new licenses are as follows:

New sugar factories should have minimum economic capacity of 2500 TCD with no maximum limit on capacity. However, in industrially backward areas, co-operative & public sector new units would expand their capacities to 2500 TCD with in a period of five years of going in to production.

New sugar factories are permitted to maintain the minimum distance of 18 kilometers between the proposed new sugar factories and an existing already licensed sugar factory. Other things being equal, preference in licensing is given to proposals from the co-operative sector, public sector, private sector, etc, in that order.
3.6 Technology and Manufacturing Process

Sugar (sucrose) is a carbohydrate that occurs naturally in every fruit and vegetable. It is a major product of photosynthesis, the process by which plants transform the sun’s energy into food. Sugar occurs in greatest quantities in sugarcane and sugar beets from which it is separated for commercial use.

The natural sugar stored in the cane stalk or beet root is separated from rest of the plant material through a process known as refining.

For sugarcane, the process of refining is carried out in following steps:

1. Pressing of sugarcane to extract the juice.
2. Boiling the juice until it begins to thicken and sugar begins to crystallize.
3. Spinning the crystals in a centrifuge to remove the syrup, producing raw sugar.
4. Shipping the raw sugar to a refinery where it is washed and filtered to remove remaining non-sugar ingredients and colour.
5. Crystallizing, drying and packaging the refined sugar.

3.7 Production Process and By-Products

Sugar is primarily extracted from sugarcane and beet. The difference between the production processes of sugar from the two raw materials is minor. Extraction of the cane juice from the sugar cane, usually by crushing the sugar cane (at this stage the sweet juice contains many impurities - the soil from the fields, some small fibres and green extracts from the plant).

After settling out much of the dirt and other impurities, the juice is thickened into syrup by boiling off much of the water (evaporation). The syrup is placed into a very large pan for boiling and more water is boiled off until conditions are right for sugar crystals to grow.
IN INDIA THE PROCESS OF MANUFACTURING SUGAR IS AS FOLLOWS

- Sugarcane
- Extraction of Juice
- Clarification of Juice
- Bagasse
- Co-generation of power
- Evaporation
- Pan Boiling
- Crystallization
- Centrifugation
- Recovery
- Molasses
- Industrial & Portable Alcohol
Once the crystals have grown the resulting mixture of crystals and syrup is spun in centrifuges to separate the two (like spinning clothes in a washer). The crystals are then given a final dry with hot air before being stored. The final raw sugar is like a soft brown sugar and is stored in a large sticky mountain. It can be used like that but usually it gets dirty in storage and has a distinctive taste, which most people don’t want. That is why it is further refined to produce white sugar for human consumption. Additionally, because one cannot get all the sugar out of the juice, there is a sweet by-product made - molasses.

3.8 Sugar Cycle

Domestic sugar industry typically follows a 4 to 5 year cycle. Higher sugarcane production results in a fall in sugar prices and non payment of dues to farmers. This compels the farmers to switch to other crops thereby causing a shortage of sugarcane, consequently an increase in sugarcane prices and extraordinary profits. Taking into account the prevalent higher prices for cane, farmers then switch back to sugarcane. As a result of lower sugar price realizations of sugar mills, the sugarcane arrears increase. The increase in sugarcane arrears results in lower sugarcane production, resulting in lower sugar production for the next 2-3 years. Because of lower sugar production the sugar prices shoot up resulting in increased area under sugarcane cultivation during the next season.
3.9 Raw Materials

Sugarcane

In India, sugar is produced only from sugarcane as the country’s climatic conditions are suitable for cane cultivation. Sugarcane being an agricultural crop is subject to the unpredictable vagaries of nature, yielding either a bumper crop or a massive shortfall in its cultivation from year to year. The quality of sugarcane improves with age, reaching a peak, and gradually declining. A rapid deterioration begins from the moment of harvest. To overcome this problem and to make the most of juice purity, cane has to be crushed within 8 to 10 hours of cutting.

The usual sugarcane constituents along with their content in sugarcane as a % of total weight are as follows.
Sugarcane Constituents

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Per cent of total weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>69-75</td>
</tr>
<tr>
<td>Sucrose</td>
<td>8-16</td>
</tr>
<tr>
<td>Reducing sugars</td>
<td>0.5-2</td>
</tr>
<tr>
<td>Organic substances</td>
<td>0.5-1</td>
</tr>
<tr>
<td>Nitrogenous bodies</td>
<td>0.5-1</td>
</tr>
<tr>
<td>Ash</td>
<td>0.3-0.8</td>
</tr>
<tr>
<td>Fibre</td>
<td>10-16</td>
</tr>
</tbody>
</table>

Sugarcane Juice

Sugarcane juice is acidic in nature. Besides sugar it contains many other organic and inorganic and soluble as well as insoluble substances in varying amounts, together called as non-sugars, to the extent of 3 to 7.5% of total quantity. These insoluble suspended matters make the juice viscous and turbid. The constituents of sugarcane juice as a per centage of total quantity are as follows:

Sugarcane Juice Constituents

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Per cent of total quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>75-85</td>
</tr>
<tr>
<td>Sucrose</td>
<td>10-21</td>
</tr>
<tr>
<td>Other sugars</td>
<td>0.3-3</td>
</tr>
<tr>
<td>Other organic substances</td>
<td>0.2-0.6</td>
</tr>
<tr>
<td>Nitrogenous bodies</td>
<td>0.5-1</td>
</tr>
</tbody>
</table>
By-Products of Sugarcane

The Sugar mill produces many by-products along with sugar. A typical sugarcane complex of 3000 ton capacity can produce 345 ton of sugar, 6000 litres of alcohol, 3 ton of yeast, 15 ton of potash fertilizer, 25 ton of pulp, 15 ton of wax, 150 ton of press-mud fertilizer and 750KW of power from bagasse. There are essentially three main by-products generated by the sugar industry.

1. Molasses

Molasses is the final effluent obtained in the preparation of sugar by repeated crystallization. It is the end product from a refining process carried out to yield sugar. Sucrose and invert sugars constitute a major portion (40 to 60 per cent) of molasses. The yield of molasses per ton of sugarcane varies in the range of 3.5 to 4.5 per cent.

Molasses is mainly used for the manufacture of ethyl alcohol (ethanol), yeast and cattle feed. Ethanol is in turn used to produce potable liquor and downstream value added chemicals such as acetone, acetic acid, butanol, acetic anhydride, MEG, etc. Some of the alcohol based chemicals like MEG, acetic acid, acetone etc., face stiff competition from production through the petro-chemicals route. It is also an important constituent for the production of compound cattle feed.

2. Bagasse

Bagasse is a fibrous residue of cane stalk that is obtained after crushing and extraction of juice. It consists of water, fibre and relatively small quantities of soluble solids. The composition of bagasse varies based on the variety of sugarcane, maturity of cane, method of harvesting and the efficiency of the sugar mill. The usual bagasse composition is as follows:
Bagasse is usually used as a combustible in the furnaces to produce steam which in turn is used to generate power. It is also used as raw material for production of paper and as feed stock for cattle. It is also used for generation of steam and power required for processing of sugarcane.

**Press-Mud**

It is rich source of manure for crops. A ton of sugarcane crushed produces around 350 kg of bagasse, 45 kg of molasses and 510 kg of press mud.

**Substitutes and Complimentary Products of Sugar**

Sugar substitutes can be divided into two major categories:

1. **Gur and Khandsari:** Gur is unrefined sugar and Khandsari is non-centrifuged sugar. These are mostly used in villages and by rural folk as sweeteners’ and also as important sources of nutrition.

2. **Artificial sweeteners:** These are compounds providing the sweeteners’ of sugar without the calorific value. It is mostly used by diabetics, heart patients and obese people.

**3. Sugar Beet**

Sugarcane has been the source of sugar for centuries. However in 1590 an alternate crop i.e. sugar beet was discovered as an alternate input to make sugar. Syrup is prepared from the beets, which when boiled, is similar to sugar syrup. Modern varieties of beet with about 20 per cent sugar are developed from varieties which originally had only about 6-7 per cent sugar. The best varieties of beet yield
24-26 per cent sugar. Sugar beet is a crop of temperature and cold climate as compared to sugarcane which is a tropical crop requiring heat and warmth for growth and mild cold weather for maximizing sugar accumulation. It is because of these divergent climatic requirements that sugarcane and sugar beet are not generally cultivated in the same country except in some parts of Spain, USA and Pakistan. Sugar beet is a crop of short duration, being only five to six months, and its peak maturity is at the beginning of the summer months when sugarcane commences deterioration. Efforts are therefore being made to combine the two for a late crush to keep up recovery percentage. However, no serious attempts are made in India to cultivate beet that is suitable to its climatic conditions.

3.9 Types of Sugar

- Granulated Sugar

Sugar produced in India is mainly of granulated type. Granulated sugar is further classified into various types based on colour and grain size. According to the Indian Standards Specifications (ISI), there are around 20 grades of sugar based on the grain size and colours. The colour series has four grades designated as 30, 29, 28 and 27, while the grain size has five grades namely A, B, C, D, E. Bulk of production in the country is of C, D and E grains, branded as large, medium and small and has colour specification of 30. The D grade produced in the country is comparable to world standards.

There are many different types of granulated sugar. Most of these are used only by food processors and professional bakers and are not available in the supermarket. The types of granulated sugars differ in crystal size. Each crystal size provides unique functional characteristics that make the sugar appropriate for the food processor’s special need.
3. ‘Regular’ Sugar, Extra Fine or Fine Sugar

Regular sugar, as it is known to consumers, is the sugar found in every home’s sugar bowl and most commonly used in home food preparation. It is the white sugar called for in most cookbook recipes. The food processing industry describes “regular” sugar as extra fine or fine sugar. It is the sugar most used by food processors because of its fine crystals that are ideal for bulk handling and are not susceptible to caking.

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- **Fruit Sugar**

  Fruit sugar is slightly finer than “regular” sugar and is used in dry mixes such as gelatin desserts, pudding mixes and drink mixes. Fruit sugar has a more uniform crystal size than “regular” sugar. The uniformity of crystal size prevents separation or settling of smaller crystals to the bottom of the box, an important quality in dry mixes and drink mixes.

- **Bakers Special**

  Bakers Specials crystal size is even finer than that of fruit sugar. As its name suggests, it was developed specially for the baking industry. Bakers Special is used for sugaring doughnuts and cookies as well as in some commercial cakes to produce fine crumb texture.

- **Superfine, Ultrafine, or Bar Sugar**

  This sugar’s crystal size is the finest of all the types of granulated sugar. It is ideal for extra fine textured cakes and meringues, as well as for sweetening fruits and iced-drinks since it dissolves easily. In England, a sugar very similar to superfine sugar is known as caster or castor, named after the type of shaker in which it is often packaged.
Confectioners (Powdered) Sugar

This sugar is granulated sugar ground to a smooth powder and then sifted. It contains about 3 per cent corn starch to prevent caking. Confectioners’ sugar is available in three grades ground to different degrees of fineness. The confectioners’ sugar available in supermarkets is the finest of the three and is used in icings, confections and whipping cream. The other two types of powdered sugar are used by industrial bakers.

Coarse Sugar

Crystal size of coarse sugar is larger than that of “regular” sugar. Coarse sugar is normally processed from the purest sugar liquor. This processing method makes coarse sugar highly resistant to colour change or Inversion (natural breakdown to fructose and glucose) at high temperatures. These characteristics are important in making fondants, confections and liquors.

Sanding Sugar

Another large crystal sugar, sanding sugar, is used mainly in the baking and confectionery industries to sprinkle on top of baked goods. The large crystals reflect light and give the product a sparkling appearance.

Brown Sugars - Turbinado Sugar

This sugar is a raw sugar which has been partially processed, removing some of the surface molasses. It is a blond colour with a mild brown sugar flavour and is often used in tea.

Brown Sugar (Light and Dark)

Brown sugar consists of sugar crystals coated in molasses syrup with natural flavour and colour. Many sugar refiners produce brown sugar by boiling a special molasses syrup until brown sugar crystals form. A centrifuge spins the crystals dry. Some of the syrup remains giving the sugar its brown colour and molasses flavour.
Other manufacturers produce brown sugar by blending special molasses syrup with white sugar crystals. Dark brown sugar has more colour and a stronger molasses flavour than light brown sugar. Lighter types are generally used in baking and making butterscotch, condiments and glazes. Dark brown sugar has a rich flavour that is good for gingerbread, mincemeat, baked beans, plum pudding and other full flavoured foods.

❖ **Muscovado or Barbados Sugar**

Muscovado sugar, a British speciality brown sugar, is very dark brown and has a particularly strong molasses flavour. The crystals are slightly coarser and stickier in texture than “regular” brown sugar.

❖ **Free Flowing Brown Sugars**

These sugars are fine, powder-like brown sugars that are less moist than “regular” brown sugar. Since it is less moist it does not lump and is free-flowing like granulated white sugar.

❖ **Demerara Sugar**

Popular in England, Demerara sugar is a light brown sugar with large golden crystals which are slightly sticky. It is often used in tea, coffee or on top of hot cereals.

❖ **Liquid Sugars**

Liquid sugars were developed before today’s methods of sugar processing made transport and handling granulated sugars practical. There are several types of liquid sugar. Liquid sucrose (sugar) is essentially liquid granulated sugar and can be used in products wherever dissolved granulated sugar might be used. Amber liquid sucrose (sugar) is darker in colour and can be used where the cane sugar flavour is desirable and the non-sugars are not a problem in the product.
**Invert Sugar**

Inversion or chemical breakdown of sucrose results in invert sugar, an equal mixture of glucose and fructose. Available commercially only in liquid form, invert sugar is sweeter than granulated sugar. One form of liquid invert was specially developed for the carbonated beverage industry and can be used only in liquid products. This liquid sugar is actually part invert sugar combined with part dissolved granulated sugar. Another type, named total invert sugar syrup, is commercially processed and is almost completely invert sugar. It is used mainly in food products to retard crystallization of sugar and retain moisture.

3.10 Pricing of Sugarcane

Government of India regulates and control the rates of sugarcane supplied to the mills by farmers. The rates are fixed based on the Bhargarva Committee recommendations. The Statutory Minimum Price (SMP) announced by government of India year to year is used as a benchmark by the state governments to fix their rate Statutory Advised Price (SAP). The SAP world be a recovery linked average or jute a flat rate.

**Prices and Cyclicality**

The typical sugar cycle consists of around three years of surplus and around two subsequent years of deficit. We are coming out of a deficit and will be entering the surplus cycle. 2010-13 will be surplus years and the same cycle will continue. although prices will remain high, they will stabilize at around Rs.40 a kg. “Prices will subsequently come down because farmers have received much better cane prices than anticipated and that has led to a rise in area under cane. This again lays the basis for a surplus crop and subsequent lower prices.” Sugarcane accounts for 70 per cent of sugar price at the mill gate and Rs.4 a kg is added to this to arrive at the consumer price. January 2010 saw an ex-mill price of Rs.40 a kg and a consumer price of Rs.44 which broke and set several records. Prices reached unprecedented levels of Rs.44 in spite of imports of five million tonnes in April 2009 to meet the shortfall.
Booms and Busts

A recent report by ICRA Management Consulting Services (IMaCS) indicates that Indian sugar prices have mirrored the global increase. Prices reached cyclical low in 1986, 1991, 1998 and 2003. World and Indian sugar prices have historically been characterized by a high degree of volatility compared with other agricultural products, followed by a cycle of short booms with high price spikes and then long busts. Strong linkages have emerged between world sugar and oil prices in recent years, as sugar is a primary ethanol feedstock in Brazil, the dominant producer and exporter of both sugar and ethanol. Sugar prices increased by $340 a tonne in 2009 to $655 because of a sharp decline in closing stocks expected for 2009-10. On a calendar year basis, prices increased 39 per cent in 2009 to average $488 a tonne. Prices surged to $735 in January 2010, an increase of $150 a tonne over November. Prices could have moved even higher, had it not been for the world economic downturn, which curtailed demand and the weakening of national currencies relative to the dollar, which sustained exports from countries such as Brazil.

3.11 Import and Export Policy

The sugar Export promotion Act 1958 governs sugar exports, which stipulates that the government can use 20 per cent of the country’s total ‘production for sale abroad till a very recent past imports and exports were routed through Indian Sugar and General Industry Export Import Corporation Limited (ISGIEC), a consortium of apex organizations of private and co-operatives sugar mills and government agencies. Production has remained robust in almost all the months during the current sugar year, starting October 2005. Consequently, sugar production grew by a massive 48 per cent to 18.7 lakh tones during October - April 2005-06 as compared to the decline of 8 per cent during the corresponding period of 2004-05. In April, the government had revised the target for sugar year 2005-06 to 191 lakh tones from 181.7 lakhs tones fixed earlier.
Price of sugar has started gradually rising again in the domestic market. From Rs.18.6 per kg in March 2006, price of sugar went up Rs.19.4 per kg in May 2006. The government released 13 lakh tons of sugar as free sale quota for June 2006. With a levy quota of 1.55 lakh tones for June 2006, the total sugar available for June 2006, the total sugar available to June was 14.55 lakh tones. With adequate stocks available, the government was ready to release additional sugar in case of any indication of demand supply mismatch. Exports have also picked up with 2.8 lakh tons of sugar being exported during October-March 2005-06 as against 0.45 lakh tones of exports during the same period of 2004-05. Meanwhile, according to news experts, the government intended to promote sugar exports through free sale route in the sugar year starting October 2006.

**Large Imports**

In sugar year 2009, India imported five million tonnes of raw sugar after exporting a similar quantity in the 2008 season. “India’s SY2010 (sugar-year) imports could be at least the same as in SY2009 and possibly much higher depending on the extent of depletion of stocks. As a result, imports could be at least eight million tonnes in SY2010, with a possible reduction in SY 2011. However, this outlook is contingent on a normal monsoon season during 2010.” The shortages and excesses were part of the cycle. The shortages would be bridged by imports and that is a stop-gap arrangement and a right policy measure in the absence of an alternative. When the shortages reduce, imports must stop.

**Steep Changes in India**

In India, retail prices increased from around Rs.28 during April-June 2009 to Rs.31.30 in July-September and Rs.38 a kg in October-December. It peaked at Rs.44 in January 2010. This steepness in the price fall and rise is very rare and was seen decades ago. We could see high production not only in India but globally over the
next 2-3 years. When sugar prices rule high, farmers tend to increase sugarcane production and this brings down prices. This result in cane arrears and force farmers to switch cultivation to other crop which in turn leads to lower cane production and rising prices. There is predictability about sugar price trends for the last sixty years and one should not be too alarmed about price spikes and crashes as there is a definite pattern. Both international and domestic prices may be correcting a bit but that is to be expected. It is likely that sugar will be around Rs.40 kg level for the next 12-18 months.

**Tight Situation Ahead**

The industry does not suffer from capacity constraints and it has more to do with the cyclical nature of the industry. There is more than enough capacity across the country and there is no requirement of new capacity. The sugar season 2009-10 (October-September) is expected to see an extremely tight demand-supply position. The fundamental demand-supply tightness is likely to persist till December 2010 because 2009 saw severe drought conditions in several of the cane-growing areas. Indian sugar production, against the usual 26 million tonnes, was down at 16 million tonnes. Inventory at the end of 2008-09 seasons at 2.5 million tonnes was the equivalent of a little more than a month’s consumption as against the desired three months stock. Production during the period was down 44 per cent at 14.7 million tones. But consumption, growing at 3.5 per cent a year, has remained unaffected by the global slowdown and is at around 23 million tones. So India will import at least 4-5 million tons of sugar. The 2010-11 seasons too are unlikely to be much better and India could end up importing an equal amount. According to the AMaCS report, to augment domestic supplies, the government increased the levy obligation on sugar factories from 10 per cent to 20 per cent for sugar year 2010 (October 2009-September 2010)
Overregulated Industry

The bottom-line for the industry is that it has to cope with overregulation and any new crisis prompts a greater degree of control. The regulation starts right from setting the controversial statutory minimum price (SMP) for cane. There are also restrictions on the establishment of mills although the industry feels that capacity is not a constraint and there is, in fact, idle capacity. Besides, sugar releases are regulated through a unique mechanism. Producers also have to earmark 10 per cent of their production as levy sugar for sale through ration shops at less than production cost. The levy ratio was increased to 20 per cent in April 2009. India is the only country where a subsidy is given in the form of levy sugar where a per cent of production has to be sold at half the cost of production. There is no other industry anywhere where this is done. So for the processors or sugar manufacturers, we have to make up prices with 80 per cent of the production.

Time for Decontrol

Sugar price decontrol should happen soon along with some level of cane price decontrol. It could happen at the time of the next surplus season in 2011-12. It is time to bite the bullet and go ahead. The industry is only asking for a replication of the policy followed globally. It could easily follow the policy of Brazil which has a highly successful industry and has remained the global leader. Once there is complete deregulation, there will be no levy sugar and no quotas and the industry will be able to truly follow the open market system.

In essence, there is a need for a market based cane pricing mechanism as against the current cost plus statutory minimum price and a dismantling of the open market release mechanism that has caused unnecessary market intervention.
Ethanol Diversification

Ethanol as an automotive fuel has gained currency in several parts of the world and, besides being an environment friendly alternative, it is also cheap. Brazil successfully implemented a policy of ethanol blending auto fuel. In India, there is an existing policy decision five per cent blending in fuel (doping) although that not been implemented by oil refiners owing to differences arising about the price to be paid for ethanol. Indian sugar mills can be encouraged to diversify into ethanol production. The production of ethanol direct from sugarcane juice requires substantial investment for technological modifications. A few mills have produced ethanol on an experimental basis but are not doing any commercial production. A tonne of sugarcane yields about 100 kg of SUI and 45 kg of molasses, out of which 11 litres of ethanol can be extracted. If sugarcane juice were to be direct used, about 70 litres of ethanol can be obtained. Some important decisions are expected from the government in this regard soon. The first could be announcing a fixed rate for ethanol procurement for a lock-in period of three years which will obviate the need for oil companies to invite tenders and the sector would be on the mandatory usage of five per cent ethanol blending in fuel.

3.12 Problems of Sugar Industry

The Indian sugar industries have been characterized by instability represented by the large and recurring imbalance between the demand for and supply of sugar which leads to control and decontrol of production. The sugar mills have to meet a keen competition from Gur and Khandsari (kinds of sugar) producers who are the other users of sugarcane and this factor aggravate the uncertainties and difficulties of sugar mills in the matter of cane supply. The cost of production of sugar in India is relatively higher. This is due to poor yields of cane per hectare. Sickness is seen to inflict all sugar producing regions of the country. The sugar economy continues to be a highly controlled one. The industry requires compulsory licensing under the existing policy. There is a statutory minimum price (SMP) for sugarcane fixed by the Centre and State advised price (SAP), over and above the SMP, fixed by the State governments.
3.13 World Sugar Industry Scenario

The world sugar market has experienced and continues to experience considerable price volatility. The world indicator price for raw sugar has witnessed a succession of peaks and downward corrections in 2010 before reaching to a 30-year high of USD 795 / tonne in February 2011. The reason for this global price volatility was global sugar deficit in previous two seasons due to failure of crops because of adverse seasonal condition which resulted in low production of sugar and due to high demand the prices have risen. World sugar stocks, which had already been drawn down, fell to their lowest level in 20 years in 2010-11, supporting higher as well as more volatile market prices. International sugar prices have eased in year 2012, as there was a bumper crop around the world which has resulted in fall of prices around the globe and the global balance moves into a larger surplus that allows the start of stock rebuilding.

**World Sugar Balance Moves into surplus**
World sugar production less consumption
- 2008 and 2009 world sugar balances were in negatives as the production was less than consumption.
- 2008 and 2009 were bad crop years due to seasonal adversities, and it has pushed the global sugar prices up.
- 2010 was a crop year as compared to a couple of previous year.
- 2011 has been a good year and sugar stock has risen considerably after 3 years.

**World prices to decline but to remain on a higher plateau**
Evolution of world sugar prices in nominal (left figure) and real terms (right figure) to 2020

![Graph showing the evolution of world sugar prices](Image)

Source: OECD

**Present Market trends and prospects**

World sugar prices are projected to decline from historical highs, but prices will remain higher on an elevated plateau and to average higher in real terms to 2020-21, compared with the past decade. The margin between raw sugar and white sugar is expected to decline from the high level in 2010 and then to average above USD 90/tonne over the projected period, which will be due to increased sales of white sugar by traditional sugar exporters and from new destination refineries in the
Middle East and Africa. World sugar prices are expected to follow a wave pattern over the projected period, the pattern will be quite similar to the past decade, as a result of a continuation of government policies that intervene in sugar markets in many countries and production cycles in Asia, particularly in India, that causes large, periodical swings in trade between imports and exports. As a consequence, world prices are projected to fall in 2012-13 as production will be at peak in India and production will rise in other countries and additional exports are placed on (or lower imports are drawn from) the world market. Subsequently, the cycle in India enters the down phase leading to a shortfall in production and the need for large imports to meet consumption needs that boost the world price in 2015-16. The upturn in the cycle then recommences leading to a further drop in world prices in 2017-18 and so on.

Brazil is the leading sugar producer and exporter and dominates as global trading nation; Brazil has attained the status of a “price setter” in the world market with international sugar prices usually correlated with its relatively low production costs. Sugar production costs in Brazil, along with those of other major exporters of Australia and Thailand, have increased in recent times with the appreciation of their currencies against the US dollar. The size of the annual sugar cane crop in Brazil, together with its allocation between ethanol and sugar production are key factors underlying the projection of international sugar prices to 2020-21. Sugar production in Brazil is expected to continue to account for less than 50 per cent of its enormous sugarcane harvest which should approach 1 billion tonne by the close of the decade.
Global Sugar Trade

Over the last decade, there have been a number of structural changes affecting the evolution of trade patterns which will continue to influence international sugar transactions in the coming period. These include increased concentration in sugar export trade, with a smaller number of global exporters, and a decline in the volume of white sugar traded internationally. The reform of the sugar regime in the European Union led to an abrupt decline in white sugar exports, of the order of 6-7 Mt, as production quotas were progressively reduced below consumption requirements. As a consequence, the EU has switched from a large net exporter of white sugar to a large importer of mainly raw sugar for further refining and sale in the domestic market. The white sugar trade is expected to recover over the coming years. This will occur as more refined sugar is exported by traditional exporters in response to the high white sugar premium at the start of the Outlook and as new destination refineries in a number of countries in Africa and the Middle East progressively come on stream and begin to export increasing quantities of white sugar to neighbouring countries and regional markets.
Global emerging trends

- Global sugar demand will increase to 198 mn tonnes in 2021 compared with 168mn tonnes in 2010.

- Asia will remain the biggest consumer of sugar, increasing its share of total consumption from around 45 per cent in 2010, to 50 per cent in 2021. In Asia also China will be the biggest importer by 2020.

- India’s consumption will nearly double over the next 20 years and Chinese consumption will overtake EU consumption in around 2014.

- By 2030, it is forecast that India and China will respectively constitute 17.6 per cent and 14.7 per cent of the total global consumption.

- Total consumption in Europe is expected to remain stable over the next 20 years with declining per capita consumption in several of the largest EU economies being offset by increasing consumption in less developed countries.

- Africa will begin to emerge as a major consumer, increasing its contribution in global consumption from 9 per cent to 13 per cent in 2030, with strong growth in several countries as a result of high rates of population and GDP growth.
Asia is set to become the largest consumer of sugar by 2020 and it will be consuming half of the world sugar, China and India will be the largest consumers in Asia.

Consumption of Sugar will fall in North America and EU but the fall will be offset by rise in consumption by Africa.

3.14 Sugar Production till 15th March, 2013

1. 210.5 lakh tons of sugar has been produced in the current season upto 15th March, 2013 which is about 1% lower than last year when 212.5 lakh tons was produced.

2. Number of mills still operating as on 15th March 2013 has come down from 520 to 390 now i.e. 130 mills have been already closed. On the same day last year, only 74 sugar mills closed their operations in the country. Most of the closure has happened in Maharashtra followed by Karnataka where, as compared to last year, when 160 and 53 mills were running, 108 and 27 mills are operating now, respectively.

Source: UN Department of Economics & Social Affairs: Population Division
3. The all India average recovery of 10.04 per cent is lower by 0.1 point per cent than that of last year. Around 2100 lakh tons of sugarcane has been crushed till 15th March, 2013 which is again almost similar to last year.

4. Uttar Pradesh has produced 59 lakh tons till 15th March, 2013 against 60.4 lakh tons last year. 119 mills are still under operation as compared to 107 last year. The recovery upto 15th March, 2013 is 9.05 per cent as compared to 8.95 per cent last year.

5. As was expected, the production from Maharashtra has slowed down during the last 15-20 days and for the first time in the season, the actual production is lower than last year when upto 15th March, 72.25 lakh tons have been produced as compared to 72.7 lakh tons last year. The recovery is also lower this year at 11.23 per cent as compared to 11.44 per cent last year.

6. Karnataka has produced 31.8 lakh tons as compared to 32.6 lakh tons last year. The production in Tamil Nadu is 11.5 lakh tons as compared to 11.1 lakh tons last year, whereas in Andhra Pradesh it is 9.2 lakh tons as compared to 9.7 lakh tons last year and in Gujarat it is 9.4 lakh tons as compared to 8.8 lakh tons last year.

7. Considering the actual production so far and trends of production from some of the important States, ISMA has also reviewed the sugar production estimates for the current sugar season and has revised its 2012-13 season estimates to 246 lakh tons, which is about 3 lakh tonne higher than their previous estimates given in January, 2013.

**Production of Sugarcane**

In India, sugarcane is the basic raw material for Sugar and jaggery as well as khandsari. The area under sugarcane cultivation has increased from 42.20 million hectares in 1999 - 2000 to 45.20 million hectares in the year 2002-03 (Table No.3.1).
The growth in the area of cultivation has recorded an increase of 7.11 per cent during this period. The decreasing market price of sugar in the global market and the unchanged Minimum Support Price prevented the sugar mills from increasing the sugar cane price. As a result, the cane cultivation for the next two years has drastically declined. The area under cultivation was decreased by 19.03 per cent and the yield of sugar cane also decreased by 17.50 per cent during this period.

Many of the cooperative sugar mills and private sugar mills have gone for co-generation during the crushing season 2005-06. The increased State Advisory Price of sugar cane during this period influenced the sugar cane growers to cultivate sugar cane. During the crushing season 2006-07 the area under sugar cane cultivation has increased by 22.62 per cent over the preceding year and the sugar cane production has also increased to 355.52 million tonnes showing an increase of 2644 per cent over the immediate preceding year. The next crushing season also recorded similar trend in both areas under sugar cane cultivation and sugar cane production.

The excessive sugar production during these two years in the world caused a decrease in sugar prices both in global and domestic markets. The sugar mills in India have faced many problems like unsold stock in their ware houses and the lower domestic sugar price which is less than the cost of production. As a result, the sugar mills both under cooperative sector and private sector were unable to pay the sugar cane arrears to their farmers. The nonpayment of cane price arrears and the lower sugar cane price influenced the sugar cane growers to opt for other remunerative crops. As a result, the area under sugar cane cultivation and the sugar cane production during the next year i.e. 2008-09 recorded a decrease of 14.68 and 13.48 per cent respectively. Sugar Production: In 2001-02 seasons, the sugar production in the country had been 185 lakh tonnes. In 2002-03 seasons, India produced about 200 lakh tonnes of sugar and became the foremost among the sugar producing countries in the world, or equaled with Brazil, the country that remains as the foremost in the
world all through. The low sugar availability in the country during 2003-04 led to considerable increase of sugar prices to about Rs.2000 per quintal. The high sugar prices led the farmers to shift their fields for more cane production anticipating higher financial returns. Again the sugar production in the country increased to 192.62 lakh tonnes in the year 2005-06. This increase in production led to a fall in sugar prices to Rs.1290 per quintal, which is below the cost of production. The low sale price of sugar had very deleterious consequences on sugar factories and also on cane growers. Some factories could not pay the cane arrears to the farmers. Cane price arrears mounted up, causing unbearable difficulties to the cane growers. Some of the sugar factories underwent heavy financial losses and became sick. The farmers have switched over their fields from cane to wheat, paddy and oil seeds cultivation.
Table - 3.1
Sugarcane Production and area under Sugarcane Cultivation in India

<table>
<thead>
<tr>
<th>Year</th>
<th>Area*</th>
<th>Index</th>
<th>Production of Sugar cane**</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999 - 00</td>
<td>42.20</td>
<td>100.00</td>
<td>299.32</td>
<td>100.00</td>
</tr>
<tr>
<td>2000 - 01</td>
<td>43.20</td>
<td>102.37</td>
<td>295.96</td>
<td>98.88</td>
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<tr>
<td>2001 - 02</td>
<td>44.10</td>
<td>104.50</td>
<td>297.21</td>
<td>99.30</td>
</tr>
<tr>
<td>2002 - 03</td>
<td>45.20</td>
<td>107.11</td>
<td>287.38</td>
<td>96.01</td>
</tr>
<tr>
<td>2003 - 04</td>
<td>3930</td>
<td>93.13</td>
<td>233.86</td>
<td>78.13</td>
</tr>
<tr>
<td>2004 - 05</td>
<td>36.60</td>
<td>8673</td>
<td>237.08</td>
<td>79.21</td>
</tr>
<tr>
<td>2005 - 06</td>
<td>4200</td>
<td>9953</td>
<td>281.17</td>
<td>93.94</td>
</tr>
<tr>
<td>2006 - 07</td>
<td>51.50</td>
<td>12204</td>
<td>355.52</td>
<td>118.78</td>
</tr>
<tr>
<td>2007 - 08</td>
<td>50.40</td>
<td>119.43</td>
<td>340.56</td>
<td>113.78</td>
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<tr>
<td>2008 - 09#</td>
<td>43.00</td>
<td>101.90</td>
<td>294.66</td>
<td>98.44</td>
</tr>
</tbody>
</table>

Area in million hectares; ** Production in million tonnes; # Projection

3.15 Sugar Factories functioning in India

The cultivation of commercial crops depends upon the demand and marketability of that commodity. Sugar cane is the major commercial crop in the rural areas of India. The major customers of sugar cane are sugar mills. There are 423 sugar mills operating in India during the crushing season 1999-00. The cooperative sector represented 59.34 per cent of the total sugar mills. During the next crushing season, the sugar mills in India increased to 436 from 423 sugar mills. The sugar cane production in the country has increased and the usage of sugar cane for sugar production also increased from 59.63 per cent to 67.63 per cent during the crushing season 2002-03.
The total sugar mills in the crushing season stood at 453 mills. The excessive sugar production during the last two years resulted in a decrease of whole sale sugar price in the domestic retail and whole sale market. The old cooperative and government sugar mills were unable to recover even the cost of production. Many of the sugar mills under cooperative sector ran in to losses. As a result 34 sugar mills under cooperative sector closed their operation during the crushing season 2003-04. The total sugar mills in operation during the crushing season 2003-04 decreased from 453 mills to 422 mills.

The sugar cane cultivation also declined from 28.74 million tonnes to 23.39 million tonnes during this period. Because of non operation of 34 sugar mills the cane was diverted to traditional Gur and Khandsari. As a result the share of sugar cane used for Gur and Khandsari has increased from 20.70 per cent to 31.44 per cent during this crushing season. During the next crushing season i.e. 2004-05 the Indian sugar mills especially under cooperative sector faced many problems. The lower whole sale market price of sugar, the increased state advisory price of sugar cane and non release of grants / subsidy from respective state governments resulted in closure of another 32 sugar mills under co-operative sector.

The total sugar mills in operation during the crushing season 2004-05 were 400 only. The sugar cane growers have diverted their sugar cane to the profitable Gur and Khandsari in this year. 35.47 per cent of the sugar cane is used for the production of Gur and Khandsari and the sugar mills have crushed only 52.63 per cent of the sugar cane produced in India. The lower production of sugar from the last two years influenced the sugar price in whole sale domestic market. The sugar price is increased from Rs.11-12/kg to Rs.18-19/kg in Delhi whole sale market. The increased sugar price has boosted both sugar cane growers and sugar manufacturers. During the year 2005-06 the sugar cane production increased to 28.12 million tonnes from 23.71 million tonnes in 2004-05 The sugar mills in operation also increased from 400 sugar mills to 455 sugar mills. The sugarcane used for sugar production accounted for 67.10 per cent of the total sugarcane production.
During the next crushing season i.e. 2006-07 the sugar cane production in India increased 35.55 million tonnes. The sugar mills in operation also increased to 504 mills from 455 mills in the previous year. During this year the whole sugar price registered a decline due to excessive production during proceeding year. The farmers have supplied all their sugar cane to sugar mills instead of Gur and Khandsari. Only 9.54 per cent of the sugar cane is used for producing Gur and Khandsari and 78.56 per cent of sugar cane is used for production.

Due to excessive production during the past two years (i.e. 2005-06 and 2006-07) the government and co-operative sugar mills could not run at breakeven level. Three mills under co-operative sector have closed their operation. But in the private sector the number of operating mills is increased by 15. This is the first year where cooperative and government sugar mills represented below 50 per cent to the total sugar mills. The total sugar mills in operation increased by 12 during the crushing season 2007-08. During the crushing season 2008-09 the situation has changed. The sugar cane cultivation has decreased by 13.48 per cent. The sugar mills in operation also decreased from 516 to 489. Many of the sugar mills did not function for more than 100 days (i.e. 74% of the season - 100/135 days) during this crushing season.

3.16 Sugar Recovery

The profitability of the sugar mills and earnings of the sugarcane farmers are mainly dependent upon the sugar recovery from the sugarcane. The Government of India and the respective state Government announce the sugar price on the basis of sugar recovery. During the crushing season 1999-2000 the sugar recovery in India stood at 10.2 per cent where as in the cooperative sugar mills average sugar recovery rate stood at 10.67 per cent. During the year 2000-01 also the cooperative sugar mills recorded a much higher sugar recovery rate than the Indian average sugar recovery rate.
The sugar recovery rate in the cooperative sector during this year stood at 10.91 per cent. During the next year the sugar recovery rate both in cooperative and private sector sugar mills has slightly declined. For the next three years the sugar recovery rate declined from 10.36 per cent to 10.17 per cent. During the crushing season 2005-06 the sugar recovery in the cooperative sugar mills has increased from 10.58 per cent to 10.88 per cent and the overall sugar recovery in India has increased from 10.67 per cent to 10.2 per cent. In the next crushing season the sugar recovery both in cooperative sector and total sugar mills has declined.

In the year 2007-08 the sugar mills in India have shown an increase in the sugar recovery. The delayed monsoon and non availability of sufficient sugar cane during the crushing season 2008-09 badly affected the sugar industry and the sugar recovery rate declined from 11.2 per cent in 2007-08 to 10.5 per cent in the cooperative sector and from 10.55 per cent in 2007-08 to 9.73 per cent in the total industry.
Table – 3.2
Sugar Production in India (Lakh tones)

<table>
<thead>
<tr>
<th>Year</th>
<th>Co-operative</th>
<th>Index</th>
<th>Private</th>
<th>Index</th>
<th>Total</th>
<th>Index</th>
<th>%</th>
</tr>
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<tbody>
<tr>
<td>1999-00</td>
<td>103.69</td>
<td>100.00</td>
<td>78.31</td>
<td>100.00</td>
<td>182.00</td>
<td>100.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2000-01</td>
<td>104.99</td>
<td>101.25</td>
<td>80.12</td>
<td>102.31</td>
<td>185.11</td>
<td>101.71</td>
<td>1.71</td>
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<tr>
<td>2001-02</td>
<td>94.08</td>
<td>90.73</td>
<td>91.20</td>
<td>116.46</td>
<td>185.28</td>
<td>101.80</td>
<td>0.09</td>
</tr>
<tr>
<td>2002-03</td>
<td>101.64</td>
<td>98.02</td>
<td>99.81</td>
<td>127.45</td>
<td>201.45</td>
<td>110.69</td>
<td>8.73</td>
</tr>
<tr>
<td>2003-04</td>
<td>60.15</td>
<td>58.01</td>
<td>75.31</td>
<td>96.17</td>
<td>135.46</td>
<td>74.43</td>
<td>-32.76</td>
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<tr>
<td>2004-05</td>
<td>46.53</td>
<td>44.87</td>
<td>80.38</td>
<td>102.64</td>
<td>126.91</td>
<td>69.73</td>
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<tr>
<td>2005-06</td>
<td>82.71</td>
<td>79.77</td>
<td>109.96</td>
<td>140.42</td>
<td>192.67</td>
<td>105.86</td>
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<td>2007-08</td>
<td>121.37</td>
<td>117.05</td>
<td>142.20</td>
<td>181.59</td>
<td>263.57</td>
<td>144.82</td>
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<tr>
<td>2008-09#</td>
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<td>76.68</td>
<td>97.92</td>
<td>142.00</td>
<td>78.02</td>
<td>-46.12</td>
</tr>
</tbody>
</table>

# Provisional; * decrease over Previous Year

3.17 Government’s Remedial Measures

The Cabinet Committee on Economic Affairs has approved the Statutory Minimum Price of Rs.107.76 a quintal for 2009-10 crushing season. The hike in the statutory minimum price is at 33.33 per cent higher over the preceding year. The basic recovery rate is fixed at 9.5 per cent instead of nine per cent. The domestic sugar price is moving around Rs.30/kg. Sugar is also trading at 28 years high in the international market. The increase of statutory minimum price may discourage the sugar cane growers from diverting their cane to Gur and Khandisari units.

The non-remunerative and unfair statutory minimum price of sugar cane from the last three years directed the sugar cane growers to opt for other remunerative commercial crops. The increasing tendency of the prices of Jaggery caused for the diversification of sugarcane to Gur and Khandisari. During the crushing season 2008-09 the Maharashtra state government did not allow nine cooperative sugar mills in their state to start crushing the sugar cane due to inadequate availability of sugarcane in their respective hinter land.
The delayed monsoons and low rainfall in all the parts of the country resulted in the shortage of sugar cane in the country. The dire shortage of sugar cane has also delayed the crushing season, which began only towards November end instead of from the beginning of October. The private sector sugar mills and some cooperative sugar mills doubled the minimum statutory price of the sugar cane announced by the central government to boost the sugar cane production for the coming seasons.

For the crushing season 2009-10, the Statutory Minimum Price announced by the government of India would be inadequate. Sugarcane is a long duration crop, harvestable in 11-12 months. During this period, farmers have the option to grow two or more cereal or legume crops. In UP, cane farmers can grow paddy and wheat in lieu of sugarcane, while in Tamil Nadu, they can simply take two crops of paddy. In Maharashtra, cane faces competition from soyabean, maize, cotton and sunflower.

The increase of statutory minimum price is inadequate because even for 2008-09, mills in Uttar Pradesh paid Rs.1400 Rs.1450 a tonne, while these amounted to Rs.1260-1270 in Tamil Nadu and Rs.1650-1700 in Haryana. In Maharashtra some mills paid Rs.1900-1950 (inclusive of harvesting and transport charges of Rs.250).

The state governments are planning to announce a state advisory price of about Rs.170 to 175 per quintal of sugar cane for the crushing season 2009-10. The cost of sugar cane accounts for about 60 per cent of the cost of production of sugar. The sugar mills may afford for payment of State Advisory Price (SAP) if the whole sale domestic price ranges around Rs.30/kg of sugar. If the sugar price falls below Rs.25 / kg then the sugar mills will be unable to pay more than Rs.150-160 a quintal of sugar cane. But the sugar mills have to pay the SAP to their sugar cane suppliers. This increase of SAP may further destroy the functioning of sugar mills.

The Brazilian sugar mills have adopted the latest technology, which enables the sugar mills to shift their production from production of sugar to production of
ethanol directly from cane juice. If the government encourages this technology in India then the sugar mills will have the option to go for the most profitable product mix and they will pay a remunerative price for the sugar cane. The excessive government controls on sugar industry badly influenced the sugar mills. The politicians for their political purpose started increasing the SAP of sugar cane and they are controlling the prices of sugar by release mechanism. These bottle necks in regulations are the main causes for the poor functioning of sugar mills in India.

To boost the sugar industry in India, the central and state governments have to relax the controls on sugar industry and they have to fix a remunerative cane price to encourage the sugar cane cultivation. The government must make it compulsory to blend 10 per cent ethanol in petrol. The state governments have to lift the restriction: on the movement of molasses. All these steps make the sugar mills more viable and they can pay a fair and remunerative cane price to the farmers.

3.18 Sugar Industry in Tamil Nadu

Sugar Industry in Tamil Nadu is an important agro-based industry. Tamil Nadu which accounts for nearly 10 per cent of the total output of sugar in India is also in forefront in the per hectare production of sugar cane a majority of sugar units in Tamil Nadu are with co-operative and private sector. There are 39 sugar mills in Tamil Nadu of which 16 are in co-operative sector, 20 in the private sector and 3 in public sector. It plays a vital role in the economic development of the State and particularly in rural areas. It provides large scale direct employment to several thousands and indirect employment to several lakhs of farmers and agricultural labourers in the rural areas who are involved in cultivation of sugarcane, harvesting, transport and other services. The total crushing capacity of the 39 factories in Tamil Nadu is 1,04,550 Tones Crushing per Day (TCD) and about 180 lakh tones per annum.
I. CO-OPERATIVE SECTOR
1. Ambur
2. Madurantakam
3. Amaravathi
4. Salem
5. Kallakurichi I
6. National
7. Dharmapuri
8. Vellore
9. Tirupattur
10. Chengalrayan
11. Tiruttani
12. N.P.K.R.R.
13. M.R.K.
14. Cheyyar
15. Subramaniya Siva
16. Gomuki (Kallakurichi-II)

II. PUBLIC SECTOR
17. Arignar Anna
18. Perambalur
19. Madura Sugars

III. PRIVATE SECTOR
20. E.I.D.Parry, Nellikuppam
22. EID Parry, Pugalur
23. Rajshree Unit - II
24. Ambika (Pennadam)
25. Sakthi-I (Sakthi Nagar)
26. Kothari
27. ThiruArooraniKollumangudi
28. Panni
29. Bannaraiamman
30. Dharani-I
31. Sakthi -II (Sivaganga)
32. Rajshree - Unit 1
33. ThiruArooran-II
34. S.V. Sugars
35. Dharani-II (Polur)
36. Ambika-II (Thugili)
37. EID Parry (Aranthangi)
38. Arunachalam Sugars
39. DhanalakshmiSrinivasan Sugars

3.19 EID Parry (India) Limited

The history of the Indian Sugar Industry has been closely linked with that of Parry’s. Parry set up the first Sugar Factory in 1842 at Bandipalayam and currently has one of its units established at Nellikuppam, Cuddalore District, Tamil Nadu. EID Parry (India) Limited, is a pioneer in the manufacture of plantation white sugar from sugarcane. EID Parry has been synonymous with dynamism since 1788. It became a part of the Murugappa Group in 1981 and its businesses now cover a wide range of products including sugar, micro-algal health supplements from Parry nutraceuticals and bio products from bio-products division. EID Parry set up India’s first sugar plant at Nellikuppam in 1842. The pioneering spirit has seen EID Parry setting up the first fully automated sugar plant at Pudukottai in 2000, a distillery, and more recently, zero waste integrated sugar complexes. Silkroad Sugar Private Limited is a joint venture with Cargill International where EID Parry holds 50 per cent stake. A sugar refinery with a capacity of 6,00,000 MT located in a Food Processing Special Economic Zone of Parry Infrastructure Company Private Limited at Kakinada is being set up. The company is one of the few to introduce branded sugar in the retail market in India under the Parry’s Pure and Parry’s White Label. The company produces a variety of sugars at its four fully automated plants in Tamil Nadu and a fifth one in Puducherry. These cater to the food, bakery, confectioneries and beverage manufacturing industries, and are also used in pharma applications.
EID Parry pioneered integrated sugar complexes that maximise the utility of sugarcane through the production of sugar and using its other components in more purposeful ways. The company also converts bagasse into electricity in its cogeneration units and processes, molasses into various types of alcohol, thus completing the value chain. In addition, EID Parry has a stand-alone distillery in Sivaganga in Tamil Nadu.

The cogeneration plants at these three locations are among the first in the country to use air cooled instead of water cooled condensers to conserve water. The Pettavaithalai plant uses submerged ultra-filtration with two reverse osmosis systems to save water and minimize usage of chemicals - the first of its kind in India for boiler feed water. The Pudukottai plant is amongst the first in South India to earn carbon credits and to be registered in UNFCCC under the Kyoto protocol for climate change. However, the biggest innovation spearheaded by EID Parry has nothing to do with manufacturing or marketing of sugar but with the difference it has made to the 1,00,000 sugarcane farmers associated with it. Parry has introduced complete IT enabled services for farmers such as Remote Sensing, Geographic Information System and Global Positioning System for mapping and monitoring sugarcane growing area. Village-wise soil nutrient analysis, detailed farm boundary mapping, integration with Cane Management System and soil maps ensure efficient cane management.

EID Parry has introduced Namadhu Parry Maiyam, a concept where a local entrepreneur (usually a sugarcane farmer) is trained to become a Namadhu Parry Maiyam operator. The company extends interest free loans to these operators for buying high end farm equipment, which can then be hired out to small farmers who are unable to afford such sophisticated equipment. This helps mechanise farm services, accelerate sugarcane harvesting and save costs as manual labour is becoming increasingly expensive.
EID Parry pioneered sugarcane research and probably runs the only private Research and Development Centre for sugarcane and tissue culture to develop new and improved cane varieties. It has also been aggressively promoting eco-friendly pest management systems. Today, EID Parry is one of the top five sugar producers in India and is on the path to sweetening more lives around the world.

EID Parry (India) Limited, is a pioneer in the manufacture of plantation white sugar from sugarcane. Parry set up the first Sugar Factory in 1842 at Bandipalayam, now at Nellikuppam. With the course of time, three other plants at Pugalur, Pudukottai and Pettavaithallai were established to manufacture sugar. Today, the integrated sugar complex, situated in Nellikuppam has a crushing capacity of 5,000 Metric Tons of cane per day (TCD). The Nellikuppam plant holds the distinction of being one of the largest sugar plants in India. EID Parry has five plants in the country situated at Nellikuppam in Cuddalore district, Pugalur in Karur district, Pudukottai in Pudukottai district, Pettavaithallai in Tiruchirappalli district and Puducherry. The combined crushing capacity of all the five plants is 15800 (TCD) Metric Tonnes of cane per day.

Many Firsts

- The Nellikuppam factory is the first sugar factory in India.
- EID Parry is the first private sector company to start an in-house Research and Development.
- EID Parry is the first company in India to breed an indigenous cane hybrid variety.
- Only sugar company to network with the rural community through services provided by indiaagriline.com.
- The Nellikuppam plant is the first Integrated Sugar Complex in this part of the country.
The Pudukottai plant has the rare distinction of employing women on the shop floor, which is a unique feature in the industry.

The first company to set up a full-fledged Tissue Culture lab in order to produce 3.5 million plantlets.

The first company to set up a 23.4 MW state-of-the-art co-generation plant.

The first to be involved in the manufacture of pelletised organic manure.

The fully automated plant at Pudukkottai, a Greenfield venture, was completed in a record time of 270 days.

ISO 9001:2000 accreditations obtained for corporate office at Chennai as well as two units at Nellikuppam and Pettavaithallai.

Nellikuppam plant has the distinction of being the first integrated sugar complex in India to have received ISO 9001:2000 accreditation.

EID Parry won the top exporter award during 2002-2003.

The company is the first to venture into the arena of branded sugar.

The Oonaiyur ponds are the first in the world to develop a unique production model for producing Astaxanthin from Haematococcus, a potent fat soluble nutrient, rich in anti-oxidants, used to protect the immune system against various types of cancers.

**EID Parry Launches Branded Sugar**

18th November 2004 marks yet another milestone in the 216 year old history of E.I.D Parry. The day marks the first-ever launch of branded refined sugar by a South Indian Company. The day marks the launch of Parry’s pure refined sugar. Sugar making in E.I.D Parry’s history dates back to 1842. It was then that the company pioneered the production of sugar by establishing the country’s first sugar factory at Nellikuppam. This factory also holds the distinction of being the first ever
integrated sugar complex in India. Today, like in the past, the company continues to set standards in the sugar industry. Parry’s sugar has been initially launched in Tamil Nadu in one-kg refill packs and pet bottles. Every grain of Parry’s pure refined sugar is a product of a superior refining process and is processed hygienically from first grade cane. In addition, Parry’s pure refined sugar has a longer shelf life of over 18 months and is absolutely pure and free of all impurities.

Over the last two months since its launch, the brand has received good response. Not just from consumers but also from the channel members. Over the next few months the company also plans to expand its availability across the country. The success of Parry’s pure refined sugar marks just the first step in E.I.D Parry’s foray into this business. The company’s ambitious plans for the future include sugar variants such as, brown sugar, a range of flavoured sugar apart from sachets, cubes, etc.

The Pudukkottai unit of EID Parry bears testimony to the phenomenal instinct, the company has, of honing onto potential possibilities and turning them into resounding successes. The Pudukkottai site had continuously been rejected as a prospective site for building a factory. After several futile attempts to lure companies into building their units, the Government of India approached Parrys requesting them to start a venture at Pudukkottai. Although there was a lot of speculation and scepticism about the venture, Parry’s took on the project with their usual indomitable will and enthusiasm determined to achieve at least a modicum of success. Currently, the Pudukkottai factory is one of the largest revenue generators of the organization clearly accentuating the determination and hard work invested in it by the employees and management of Parry’s.
Currently, E. I. D. Parry has evolved into one of the largest business groups in the country. It is engaged in the manufacture and marketing of a wide-range of products that can be broadly divided into the following groups:

- **Sugar** - comprising of sugar, alcohol, co-generation etc
- **Bio-pesticides**
- **Neutraceuticals**

A strong sense of commitment and adherence to business ethics has helped EID Parry succeed in bringing to life the larger picture and to ‘Go Beyond’ in all their activities.

**By-Product Utilization**

There are several by-products of sugar that add value to the industry.

**Molasses** is used for production of rectified spirit, which is used as a feedstock for production of chemicals as well as potable liquor. The country has been producing about 1.7 billion litres of alcohol utilizing 75-80 per cent molasses production in the country. The surplus molasses is either exported or carried forward to the next sugar season resulting in quality deterioration.

**Ethanol** is used as a blend fuel with gasoline in the transport sector. The ethanol programme is bound to bring an assured market at a better price than what they get from alcohol. It is widely anticipated that the Government will move in line with happenings in markets like Brazil. It is quite possible that it may increase the quantum of ethanol mix in petrol from the current five per cent to 10 per cent.

**Bagasse**, another by-product of the sugar industry, which constitutes about 30 per cent of cane processed for production of sugar, is used as a fuel for generation of steam and power to meet the process requirements. Co-generated power apart from being a renewable source of energy is also most eco-friendly. The Government of India has a vision plan to increase the share of renewable energy to 10 per cent by the
year 2010. With a view to developing a strong environment management system, the Pudukkottai unit has obtained the ISO 14001 certification and is now on the journey to obtain the ISO 18001 certification.

The Pudukkottai unit is a fully automated plant and has a 2500 TCD capacity with only 65 people working in Autonomous Work Teams. There is an ongoing Greenfield project commissioned as recently as 2000. The other two plants located at Pugulur and Pettavaithallai with TCD capacity of 4000 and 2500 respectively complete the picture.

Investment in R&D is another off the beaten track route taken by EID. The R&D centre located at Bangalore has its units at all the plant locations. Its activities cover:

- Production of tissue culture seedling (3.5 million seedlings);
- Soil analysis, pest & disease management

Breeding of cane varieties to produce Hybrid canes, after the rollout of its refined sugar brand, Parry’s Pure, which targets the higher end of the market, E.I.D Parry is also planning to brand its regular non-refined sugar. The company, which sells 50 tonnes of refined sugar in the retail market, hopes to sell around 15,000 tonnes to 20,000 tonnes by the end of this year.

**Pollution Control**

The organization follows strict procedures in order to prevent pollution. Imported technology has been installed in the factories to prevent leakage of dangerous by-products. Some of the effective steps that have been undertaken to prevent pollution are:

- The effluent water is treated and recycled to immediate rural areas for irrigation purposes.
- A unique attempt named ‘Cogen’ has been initiated, whereby power is produced using the by-product bagasse from sugar manufacturing.
➢ Sewage systems have been revamped in such a manner that harmful water does not overflow into the surrounding areas.

➢ Highly expensive equipment has been installed in order to reduce air pollution.

➢ On-line stack monitoring and ambient air quality survey to effectively control emission levels.

➢ Auto combustion system in boilers for complete combustion of fuel by regulating air flow.

➢ Usage of biomass fuel like Bagasse, Cane Trash etc. As part of Clean Development Mechanism (CDM).

➢ Bio-methanisation plant to produce methane and used as fuel in distillery boiler in place of fossil fuels.

➢ Segregation and disposal system for solid waste.

**New Technologies**

In continuation with its commitment for supporting farmers to produce profitable crop through safe and sustainable agricultural inputs, the Research and Development Centre located at Bangalore covers production of tissue culture seedling; soil analysis, pest & disease management, and breeding of cane varieties to produce Hybrid canes. This unit has been involved in extensive research for the past ten years towards developing innovative, high quality, proprietary neem products to meet diverse consumer needs around the world. Accredited by ISO 9000:2001, this unit has a laboratory space of 20,000 square feet with highly advanced equipment for process and analytical chemistry, microbiology and tissue culture. The facility is now expanding its horizons for the development of natural products for agriculture, veterinary and health care segments.
**3.20 Kothari Sugars and Chemicals Ltd**

Kothari Sugars and Chemicals Ltd is one of the pioneers in manufacturing of sugar in India. In addition to sugar manufacturing, we are also engaged in cogeneration of power, production of industrial alcohol from molasses and bio-compost from press mud and distillery effluents.

Kothari Sugars, the flagship co of HC Kothari Group, was established in the year 1961 with a crushing capacity of 1250 TCD. Over the years, with the strong support of our stakeholders, the business has grown and reached a total capacity of 10000 TCD with two sugar units in Tamil Nadu and one leased unit in Karnataka. Other group companies are Kothari Petrochemicals Ltd, the largest Polyisobutene manufacturer in India and Kothari Safe Deposits Ltd one of the oldest public limited companies in India engaged in the business of giving on hire safe deposit lockers. Today it operates a total capacity of 10000 TCD across 3 manufacturing units.

**History of Kothari Sugars and Chemicals**

1960  - The Company was incorporated on 7th November 1960 at Chennai.
1961  - 4,00,000 shares subscribed for by directors, their friends, etc. 4,00,000 shares offered for public subscription in December 1960.
1971  - A new sugar factory with a daily crushing capacity of 1,500 tonnes of cane was set up at Siruguppa in Karnataka State. The total investment on this project was around Rs 3.75 crores.
       - 8,00,000 rights shares issued at par (prop. 1:1) in 1971-72.
1973  - This factory commenced crushing operations on 24th December.
1983  - The assets and liabilities of the Siruguppa unit were transferred with effect from 1st October as a going concern to a wholly owned subsidiary.
1986  - The Company received a letter of intent for the manufacture of polybutenes. Also, Government approval was awaited for the manufacture of nitroaromatics, a product which has good demand in the pharmaceutical industry.
1987 - The Company undertook to further modernise the sugar plant at Kattur involving a capital expenditure of Rs.2.25 crores.

- Necessary steps were taken for the implementation of the polybutene project. The Company entered into a technical collaboration agreement with M/s.Cosden Technology Inc., U.S.A. for technical know-how. Further, it also entered into a technical tie up with M/s. Humphreys & Glasgow Consultants, Mumbai, for the detailed engineering for setting up the project. The estimated cost of the project was Rs.18.45 crores.

- The Company’s investments in the subsidiary were disposed off in November.

1988 - 24,00,000 equity shares issued at par as rights in proportion 3:3. Only 22,04,832 shares taken up. 5,55,168 shares allotted privately (including permitted retention). Another 1,20,000 shares offered at part to employees (only 9,700 shares taken up). The balance 1,10,300 shares allowed to lapse.

1989 - The Company implemented a project at Manali near Chennai for manufacture of 5,000 TPA of polybutene, a petrochemical product.

- The Company undertook to set up a PNCB/ONCB project at Karaikal, Union territory of Pondicherry. The product finds application in pharmaceutical and other varied uses. Foreign collaboration agreement was entered into with M/s.Biazzii, Switzerland and M/s.Krebskosmo, W.Germany. Detailed engineering work was assigned to M/s. Humphreys & Glasgow Consultants Pvt. Ltd., Mumbai.

- 2,173 tonnes and 3,626 tonnes of polybutenes were produced respectively. Very special grades of PIB such as K-VIS 90 and K-VIS 200, introduced, were well received in the market.

1990 - The manufacture of 5,000 TPA of polybutene, a petrochemical production plant was commissioned on 21st March, and commercial production commenced in April 1990.

1991 - The Company undertook to set up a distillery unit at Kattur with an installed annual capacity of 90 lakh litres of industrial alcohol. This project was completed in 1992.
- The Company offered 1,85,000-16% secured redeemable partly convertible debentures of Rs.700 each to the shareholders on rights basis in the proportion of 1 debenture : 25 equity shares were held. All were taken up. Additional 27,750 debentures were allotted to retain oversubscription.

1992
- Production improved to 4,442 tonnes despite unplanned shut down of the MRL for 90 days. In addition, to KVIS 10 grade, the plant also manufactures various grades for application in cable jellies, 2-T oils, adhesives etc. Exports commenced and 147 tonnes of polybutene was exported mainly to Singapore apart from other countries.
- 54,21,250 equity shares allotted (premium Rs.14 per share) in part conversion of 16 per cent debentures on 1st July.
- 3107 tonnes of PNCB/ONCB were produced 2543 tonnes were sold and 144 tonnes were exported.
- As per the terms of issue Rs.700 out of Rs.600 per debenture will be converted into 25 equity shares of Rs.10 each at a premium of Rs.14 per share at the end of one year from the date of allotment of debentures. Accordingly 54,21,250 shares were allotted in 1st of July. The balance of non-convertible portion of Rs.100 will be redeemed in three instalments at the end of 6th, 7th and 8th year from the date of allotment.

1993
- Production declined to 3,735 tonnes due to unplanned shutdown in MRL during the earlier part of the year and also shifting of the pattern of production towards higher molecular weight polybutenes. Production of cable jelly compounds and leather chemicals was also undertaken in small quantities.
- 48,95,475 equity shares were issued as rights (premium Rs.35 per share; proportion 1:2). Only 47,11,204 shares taken up. 1,84,271 shares allotted privately. Another 2,44,774 shares were offered (premium Rs.35 per share) to employees. Only 32,500 shares taken up. The balance 2,12,274 shares allowed to lapse.
1994
- Polybutene unit’s production amounted to 4,645 tonnes and 134 tonnes of cable jelly compounds. The nitroaromatics division produced 6551 tonnes and 7049 tonnes of PNCB and ONCB respectively. Production of nitric acid from the newly amalgamated plant led to a production 2278 tonnes.
- Till 31st March, 42.95 lakh litres of industrial alcohol was produced.
- Production of industrial alcohol amounted to 47 lakhs litres due to modification of effluent treatment plant.
- The capacity at the Kattur factory was expanded to 2900 tonnes capacity per day and it was proposed to be further expanded to 4000 TCD. Also, Karikkal unit capacity was to be expanded. During the year, the Company undertook to set up a plant for co-generation of power using high pressure boilers at Kattur and this was expected to be commissioned by 1st January 1996. When commenced the unit would produce 12 MW of power.
- In-organics India Ltd. (IIL) was amalgamated with the Company effective 1st April. As per this amalgamation, 1,95,279 equity shares of Rs.10 each of the Company were to be issued to the erstwhile shareholders of the amalgamation Company in the ratio 1:25 shares held.

1995
- The capacity of the Sugar Unit at Kattur was being expanded to 4,000 TCD. During the year the Company introduced an improved sugarcane milling technology with the know-how provided by Amcane of USA to improve the quality of sugar and to reduce the input cost.
- Polybutene units production declined to 3,869 tonnes due to the long shut down at MRL which hampered the production ability of the plant. During the year nitro aromatics division achieved a production of 8,628 tonnes of NCB. Production of nitric acid improved to 9,085 tonnes.
- Production of industrial alcohol improved to 56 lakh litres. During the year the unit successfully conducted a novel study in collaboration with the Tamil Nadu Agricultural University to make use of distillery effluent for irrigation purposes.
- The co-generation of power plant capacity of nitro aromatics was expanded to 15,000 tonnes per annum. The Company also proposed to enhance nitric acid production capacity to 24 tonnes per day. The Company also setting up
new plants such as cogeneration plant at Kattur amination and hydrogenation facilities at Karaikal and concentrated nitric acid plant at Hyderabad.

- 195,279 equity shares allotted to the shareholders of In-organics India Ltd. on amalgamation with the Company. Preference shares issued during the year.

1996
- Of the two numbers of 6 MW turbines of co-generation plant, one turbine was commissioned in December and started exporting power. Polybutenyes unit achieved a record production of 5,401 tonnes. Production would have been still higher but for the constraints in the availability of C4 feed stock. Nitro aromatics division achieved a production of 11,434 tonnes of NCB. The company commissioned downstream products namely amination and hydrogenation for bringing out value added products. The nitric acid unit achieved a record production of 12,858 tonnes.
- Production further increased to 68 lakh litres of Industrial alcohol.
- Nitro aromatics plant capacity was expanded to 18 tonnes per day. Steps were being taken to improve the feed stock availability at Manali Polybutenea plant. Installation of third condensing turbine at Kattur sugar factory would further enhance generation potential to 18 MW of power.

1997
- The two numbers mega watts co-generation turbines were commissioned.

**Kattur Unit**

Kattur unit, located in Kattur village of Tiruchirappalli district, is about 30 km from Tiruchirappalli and 6 km from Lalguni railway station. In addition to sugar production, this unit also has facilities for co-generation of power, distillery and bio-compost. This unit was established in 1961 and is one of the earliest sugar factories to be set up in the state of Tamil Nadu. The sugar factory was initially commissioned with a crushing capacity of 1250 TCD. Subsequently the capacity was raised to 1500 TCD during 1968-69. In 1974-75 the capacity was increased to 2000 TCD and by 1985-86 it achieved 2500 TCD. It was expanded to its current capacity of 2900 TCD during 1994-95, which demonstrates our commitment to continuous improvement.
To strengthen the business model and values, a co-generation unit with 11 mega watts was commissioned in 1996 and a distillery plant with a production capacity of 45 KLPD rectified spirit which is inclusive of 10 KLPD extra neutral alcohol was commissioned in 1993. When the ethanol policy was implemented by the government of India, an anhydrous alcohol plant with a production capacity of 30 KLPD was installed in 2003. The distillery plant capacity was increased from 45 KLPD to 60 KLPD in 2008.

Cane for this factory is being supplied from Lalgudi, Manachanallur and part of Manaparai, Thuraiyur and Musiri Taluks. This unit also equipped with a unique facility of producing white sugar by processing raw sugar along with cane. In the Distillery Unit, as part of the effluent treatment system, Bio-Compost is manufactured as a value added product with press mud and distillery effluent. For this, we have a Bio-yard of 16.50 acres with specific machines (Aerotiller). The Bio-compost is manufactured scientifically in the bio-yard and is constructed with RCC underlined with HDPE sheets.

As part of our commitment to ‘Kissan Vikas’, we are running a primary school in our factory premises for imparting education to the rural children from the inception of the factory. As a corporate social responsible citizen, we are conducting camps for blood donation and polio plus along with the Rotary Club of Kattur. Kattur unit is certified with ISO 9001-2000 and ISO 14001-2004 which is an endorsement for our commitment to Quality and Care for the environment. In addition to ISO, we also have Quality Management Systems like formation of Quality Circles, 5S implementation, etc.

The 5S pillars, Sort (Seiri), Set in Order (Seiton), Shine (Seiso), Standardize (Seiketsu), and Sustain (Shitsuke), provide a methodology for organizing, cleaning, developing, and sustaining a productive work environment. In the daily work of a company, routines that maintain organization and orderliness are essential to a smooth and efficient flow of activities. This lean method encourages workers to improve their working conditions and helps them to learn to reduce waste, unplanned downtime, and in-process inventory.