CHAPTER-1 INTRODUCTION OF SUGAR INDUSTRY

OVERVIEW OF WORLD SUGAR INDUSTRY

1.1 World Current market situation

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 has 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.

Chart no1.1.1

![World sugar balance moves into surplus](chart.png)
- 2004, 2008 and 2009 world sugar balances were into 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.

1.2 Present Market trends and prospects

World sugar prices are projected to decline from historical highs, but prices will remain higher on an elevated plateau (There is no further change or Develop) 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/ton 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% of its enormous sugarcane harvest which should approach 1 billion tones by the close of the decade.
Stock has risen in 2007, in anticipation of production being less than consumption in coming year as it will be a cyclical years of downfall in production, which ultimately pushes the prices up. As production is low in year 2008 and 2009, the prices has increased, the stock has fallen.
Table No 1.2.1

Current world Sugar Market at a Glance

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<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>World Balance (In Million tonnes)</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production</td>
<td>151</td>
<td>156.6</td>
<td>165.7</td>
<td>5.8</td>
</tr>
<tr>
<td>Trade</td>
<td>47.5</td>
<td>53.2</td>
<td>51.3</td>
<td>-3.6</td>
</tr>
<tr>
<td>Utilisation</td>
<td>160.7</td>
<td>162.5</td>
<td>165.1</td>
<td>1.5</td>
</tr>
<tr>
<td>Ending stock</td>
<td>60.8</td>
<td>54.8</td>
<td>55.3</td>
<td>1.0</td>
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Supply and Demand indicators
Per capita food consumption:

<table>
<thead>
<tr>
<th></th>
<th>2008-09</th>
<th>2009-10</th>
<th>2010-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>World(kg/year)</td>
<td>23.8</td>
<td>23.8</td>
<td>23.9</td>
</tr>
<tr>
<td>LIFDC</td>
<td>16.2</td>
<td>16.3</td>
<td>16.1</td>
</tr>
<tr>
<td>World Stock to use ratio (%)</td>
<td>37.8</td>
<td>33.7</td>
<td>33.5</td>
</tr>
</tbody>
</table>

(Source: Food and Agriculture organization)

1.3 Global Production of sugar

Sugar crops in many parts of the world are projected to expand in response to rising demand for sugar and other uses and relatively high market prices. World sugar production is expected to increase by 50 MT to reach over 209 MT in 2020-21. The bulk of the additional sugar production will come from the developing countries and the main burden of growth will continue to fall on Brazil. Brazil has expanded production rapidly in the past two decades, but a slowdown in investment in new Industry occurred after the financial crisis of 2008, slowing overall growth in following years. The recent surge in sugar prices has improved profitability and should trigger additional investment to come on stream within the decade, with output rising by around 11 MT to nearly 50 MT by 2020-21.
India, the second largest global producer and the world’s leading consumer, is expected to boost production substantially to 32 MT of sugar per year, on average, in the coming decade, or some 50% higher than in 2008-10, when production fell sharply. Annual sugar output will continue to be subject to periodic large swings in response to the longstanding production cycle. Some other countries of Asia, such as China and Pakistan, are also expected to continue to experience milder forms of production cycles, which contribute to fluctuations in production and their import volumes. Outside this group, an expansion drive underway in Thailand is expected to continue as investment projects currently in the pipeline come on stream, lifting production to around 8.7 MT by 2020-21, and maintaining its position as the world’s third largest producer.

In contrast, to the expansion trends in the developing world, the traditional sugar industries in a number of developed countries are expected to witness static or lower production over the coming decade. For instance, in the European Union quota based sugar production has declined with policy reform and is expected to stabilize around 13.4 MT, with a continuation of existing production quotas, to equilibrate the domestic market in a context of stable consumption, a fixed volume of subsidized exports and projected higher imports. Some additional out-of-quota sugar beet production is expected to arise over the projection period for use in ethanol production and the chemical industry.

Production of sugar in the United States is expected to show little growth and to remain well below the 85% minimum allotment level of the 2008 FCE Act. US producers are expected to focus on improving their sugar margins by cutting costs and essentially leaving Mexico to fill the expanding gap between stable production and higher US consumption requirements.

Assured access to higher prices in the slowly growing US market is expected to encourage some further investment and growth in Mexico’s sugar production to 2020-21.

The sugar industry in Australia, although devastated by flooding and a cyclone in 2010, is expected to recover in coming years. However, with continuing pressure on land available for sugarcane production, sugar producers will likely focus on higher
productivity, based on farm consolidation and improved cane varieties and higher sugar yields, rather than cane area expansion, in lifting output to around 5 MT in 2020-21.

The sugar industry in the Russian Federation has undergone a transformation in recent years and is projected to continue to expand production, under the stimulus of high domestic support measures, to reach nearly 5 MT by 2020-21.

Global sugar consumption has continued to increase despite the continuing economic difficulties in many developed countries, compounded by the period of high sugar prices and increased volatility. This has slowed sugar use at the start of the Outlook period and slower consumption growth is expected to continue over the longer term as world sugar prices average higher in real terms. Global consumption is projected to grow at 2.2% p.a. to 2020-21, and down from 2.6% p.a. in the previous ten years.

The developing countries will continue to experience the strongest growth in sugar consumption, fuelled by rising incomes and populations, although with considerable variation between countries. The sugar deficit regions of Asia and the Far East as well as Africa, will be responsible for most of the expansion in use. In contrast, sugar consumption in many developed countries, with their mature sugar markets, are expected to show little or no growth. Total consumption in these countries is expected to increase from 48MT to nearly 52 MT over the projection period. This reflects, among other things, slowing population growth and dietary shifts that are underway as a result of increasing health awareness and concerns with obesity and related health issues.

1.4 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.

(Based on Organization of economic co-operation and development)

Brazil will be the global leader in Sugar export industry because of its huge investment in setting of new sugar Industry and low cost production. Brazil is expected to consolidate its position as the leading global exporter and will account for over 55% of global trade and over 63% of all additional sugar exports by the close of the projection period while the bulk of Brazil’s exports will continue to comprise high quality raw sugar, which will increase to 21 MT in 2020-21. The growing concentration of global sugar exports is not without risks for sugar users as world export supplies depend increasingly on the growing conditions of a single country. This may be another factor, in addition to production cycles in Asia, which
contributes to future market volatility. A possibility is that majority of Brazil’s sugar cane will continue to be used in ethanol production and many industries have the capacity to produce both sugar and ethanol. Brazil also remains the only exporter that can switch 5-10% of milling capacity between sugar and ethanol production within a year in response to changes in relative profitability between the two end uses. This flexibility should help assure sugar production and export availabilities, when relative prices periodically favor sugar over ethanol production.

In terms of other leading exporters, Thailand plays a unique role in Asia as the only consistent producer of a large sugar surplus and with a natural trade advantage, along with Australia, to service the large sugar deficit in that region. Exports from Thailand, which is ranked number two in the world, are projected to grow to around 5.8 MT by 2020-21, exceeding the 2003 record.

In Australia, increased production over the projection period should support exports of around 3.8 MT by 2020-21. Strong demand for Sugar in Mexico, which is expected to grow to 75% of total sweetener consumption and similar to the situation in the US, will substitute for sugar used in beverage manufactures, releasing surplus sugar for export to the US market. Mexican exporters prefer US market which is projected to exceed 1.8 MT by 2020-21. Sugar importers make up a broader, more diversified group of countries. A significant development in 2010-11 was that China exceeded for the first time the TRQ of 1.95 MT established on sugar imports at the time of its entry to the WTO in 1998. Rapid economic growth and urbanization trends are promoting the industrial use of sugar in food manufacture and preparations. Along with low per capita sugar consumption levels of only 11 kg per person in the population at large and tightening government controls on the production and use of artificial sweeteners, these are expected to lead collectively to strong growth in sugar use in China in coming years. Sugar disappearance is projected to grow by over 3% p.a., exceeding the growth of production which is increasingly limited by tightening water availability, and boosting sugar imports to over 5 MT by 2020-21. This will make China the largest importer exceeding that of the EU, US and the Russian Federation.
Brazil can switch only 5-10% milling capacity between sugar and ethanol production, with response to price volatility. This flexibility assures sugar’s producers and exporters of availability, when relative prices periodically favour sugar over ethanol production.

Chart no1.4.3

Sugar importers are more diversified
Comparison of import volumes between 2008-10 and 2020
• In China, tightening government controls on the production and use of artificial sweeteners, and limited water availability for cane irrigation, moreover increasing consumption demand along with fast urbanization the China is set to displace EU and US as largest importer by 2020.

• Increased focus on productivity in Russia and India will relieve them from imports.

1.5 World’s 15 largest sugar producing countries

Table No.1.5.1

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Production</th>
<th>Exports</th>
<th>Total Domestic Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brazil</td>
<td>31,850</td>
<td>21,550</td>
<td>11,650</td>
</tr>
<tr>
<td>2</td>
<td>India</td>
<td>15,960</td>
<td>176</td>
<td>24,250</td>
</tr>
<tr>
<td>3</td>
<td>EU-27</td>
<td>14,014</td>
<td>1,331</td>
<td>16,754</td>
</tr>
<tr>
<td>4</td>
<td>Chain</td>
<td>13,317</td>
<td>75</td>
<td>14,500</td>
</tr>
<tr>
<td>5</td>
<td>Thailand</td>
<td>7,200</td>
<td>5,295</td>
<td>2,000</td>
</tr>
<tr>
<td>6</td>
<td>United States</td>
<td>6,833</td>
<td>123</td>
<td>9,501</td>
</tr>
<tr>
<td>7</td>
<td>Mexico</td>
<td>5,260</td>
<td>1,367</td>
<td>5,065</td>
</tr>
<tr>
<td>8</td>
<td>Australia</td>
<td>4,814</td>
<td>3,522</td>
<td>1,250</td>
</tr>
<tr>
<td>9</td>
<td>Pakistan</td>
<td>3,512</td>
<td>75</td>
<td>4,175</td>
</tr>
<tr>
<td>10</td>
<td>Russia</td>
<td>3,200</td>
<td>200</td>
<td>5,990</td>
</tr>
<tr>
<td>11</td>
<td>Argentina</td>
<td>2,420</td>
<td>580</td>
<td>1,730</td>
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<tr>
<td>12</td>
<td>Guatemala</td>
<td>2,381</td>
<td>1,654</td>
<td>744</td>
</tr>
<tr>
<td>13</td>
<td>South Africa</td>
<td>2,350</td>
<td>1,185</td>
<td>1,525</td>
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<tr>
<td>14</td>
<td>Colombia</td>
<td>2,277</td>
<td>585</td>
<td>1,580</td>
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<tr>
<td>15</td>
<td>Turkey</td>
<td>2,100</td>
<td>5</td>
<td>2,000</td>
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<tr>
<td></td>
<td>Total</td>
<td>143,540</td>
<td>48,860</td>
<td>153,504</td>
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<table>
<thead>
<tr>
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<th>Top 15 As a % of world sugar Production</th>
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<tbody>
<tr>
<td></td>
<td>82%</td>
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(Source: Food and Agriculture organization)
Table No.1.5.2
World’s 15 Largest Sugar Importing Countries 2010

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Imports</th>
<th>Rank</th>
<th>Country</th>
<th>Imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EU-27</td>
<td>3,173</td>
<td>9</td>
<td>Japan</td>
<td>1,452</td>
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<tr>
<td>2</td>
<td>Russia</td>
<td>3,100</td>
<td>10</td>
<td>Malaysia</td>
<td>1,430</td>
</tr>
<tr>
<td>3</td>
<td>United States</td>
<td>2,796</td>
<td>11</td>
<td>Egypt</td>
<td>1,382</td>
</tr>
<tr>
<td>4</td>
<td>India</td>
<td>2,786</td>
<td>12</td>
<td>Canada</td>
<td>1,350</td>
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<tr>
<td>5</td>
<td>Indonesia</td>
<td>2,196</td>
<td>13</td>
<td>Nigeria</td>
<td>1,250</td>
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<tr>
<td>6</td>
<td>UAE</td>
<td>1,930</td>
<td>14</td>
<td>Algeria</td>
<td>1,240</td>
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<tr>
<td>7</td>
<td>Saudi Arabia</td>
<td>1,575</td>
<td>15</td>
<td>Bangladesh</td>
<td>1,100</td>
</tr>
<tr>
<td>8</td>
<td>South Korea</td>
<td>1,550</td>
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Table No.1.5.3
World Sugar Production

<table>
<thead>
<tr>
<th>Country</th>
<th>2009-10</th>
<th>2010-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>(In Million tons)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asia</td>
<td>52.5</td>
<td>60.6</td>
</tr>
<tr>
<td>Africa</td>
<td>10.8</td>
<td>11.1</td>
</tr>
<tr>
<td>Central America</td>
<td>11.6</td>
<td>11.7</td>
</tr>
<tr>
<td>South America</td>
<td>45.4</td>
<td>47.2</td>
</tr>
<tr>
<td>North America</td>
<td>7.3</td>
<td>7.6</td>
</tr>
<tr>
<td>Europe</td>
<td>23.9</td>
<td>22.7</td>
</tr>
<tr>
<td>Oceania</td>
<td>4.9</td>
<td>4.6</td>
</tr>
<tr>
<td>World Production</td>
<td>156.6</td>
<td>165.7</td>
</tr>
<tr>
<td>Developing Countries</td>
<td>117.3</td>
<td>127.9</td>
</tr>
<tr>
<td>Developed Countries</td>
<td>39.3</td>
<td>37.7</td>
</tr>
</tbody>
</table>

(Source: Food and Agriculture organization)
1.6 Global emerging trends

- Global sugar demand will increase to 198 mn tonnes in 2021 compared with 168 mn tonnes in 2010.
- Asia will remain the biggest consumer of sugar, increasing its share of total consumption from around 45% in 2010, to 50% 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 China’s consumption will overtake EU consumption in around 2014.
- By 2030, it is forecasted that India and China will respectively constitute 17.6% and 14.7% of the total global consumption.
- 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% to 13% in 2030, with strong growth in several countries as a result of high rates of population and GDP growth.

Chart no1.6.1

Chart no1.6.2

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

1.7 World sugar consumption to increase, but still below long-term trend

The post-crisis recovery of the world economy is expected to sustain growth in sugar demand, mostly in emerging and developing countries. However, in 2010-11, world sugar consumption is forecast to expand by only 1.5 percent, barely in line with population, to 165.1 million tones, resulting in an average sugar per capita consumption virtually unchanged at 23.9 kg per annum. The 1.5 percent forecasted consumption growth is significantly slower than the long-term trend, rejecting the impact of high domestic and international sugar prices. The developing countries, which account for 71 percent of world total, are anticipated to increase sugar consumption by 1.4 percent, equivalent to about 1.6 million tones. In general more mature markets of the developed countries, consumption is to increase by 2%, or
0.9 million tones. Positive prospects for the global economy are expected to support sugar demand in 2011-12 and with a large production surplus expected for the next season, Consumption should return on trend.

**1.8 Brazil's Deregulation & Cost leadership**

Sugar price controls in Brazil were eliminated in 1999-2000, which encouraged higher sugar production. Private participation was encouraged for exports and the government mandated sugarcane prices were eliminated. Brazil is the cost leader in sugar production, due to high mill and farm scale. Brazil has also adopted a dynamic management of product mix between sugar and ethanol, which enables it to respond to global shifts in demand and supply. The rapid modernization of its ports and investments in transport infrastructure has also been key drivers for low cost.
Chart no1.8.2

CHINESE SUGAR SCENARIO

China’s imports to rise strongly

Evolution of China’s sugar production, consumption and imports to 2020

Source: OECD and FAO Secretariats.

Chart no1.8.3

Chinese Sugar Consumption

Projections

Source: UN Deptt. Of Economic & Social Affairs: Population Division
Table no.1.8.1
WORLD’S SUGAR BALANCE-2010-11 (In Million tons)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Beginning Stack</td>
<td>1,419</td>
</tr>
<tr>
<td>Production</td>
<td>12,815</td>
</tr>
<tr>
<td>Consumption</td>
<td>16,445</td>
</tr>
<tr>
<td>Change in Stock</td>
<td>0</td>
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<tr>
<td>Ending Stock</td>
<td>1,419</td>
</tr>
<tr>
<td>Imports</td>
<td>3,695</td>
</tr>
<tr>
<td>Exports</td>
<td>65</td>
</tr>
<tr>
<td>Total net imports</td>
<td>3,630</td>
</tr>
</tbody>
</table>

(Sources: Indian Sugar Organisation)

**Doubling of Consumption and increasing further**

- China is one of the 10 largest consuming countries of sugar in the world.
- During the past 10 years, Chinese sugar consumption has doubled, though Chinese per capita consumption levels are low at 12kg per person/year to western standards of around 40kg per person.

**Industrial Demand Growing**

- The biggest driver is the growth in industrial demand for sugar in processed foods which reflects the transformation of the economy and increasing urbanization.

**Artificial Sweetener Growth Falling**

- Though artificial sweeteners still account for a relatively large share of the market and China also has a large starch based sweetener industry.
- There has been a growing emphasis on the use of sugar as a natural alternative and artificial sweetener consumption has been falling (domestic sales amount to around 2.5m tonnes of white sugar equivalent in 2010.)
Incremental Supply Demand

- China’s domestic prices have risen by almost 50% since May 2010 to reach a record of over CNY 7,000/tonne or over USD 1,000/tonne in early November 2010.
- In 2010-11 the gap between consumption and production is expected to rise to 3mn tonnes, being the third season in the row where production is short of consumption by at least 1.5mn tonnes.

1.9 Current issues with Global Scenario

Supply Mismatch

- Over last 20 years sugar production has risen by 44% to 157mn tonnes.
- Global consumption expected to rise to about 260mn tonnes by 2030.
- Production gap of the additional 90mn tonnes requires to be met over the next 20 years.

Europe – A net importer from exporter

- Past decade has seen EU production reduce by around 15% due to reforms of sugar regime turning the region into a net importer from a net exporter.

Brazil Key to fill Demand

- World still dependent on Brazil, which currently accounts for 45% of global exports, to meet the remaining 45mn tonnes requirement.
- Improvement in productivity and regulatory changes in sugar producing regions outside Brazil expected to help meet the remaining 45mn tonnes requirement.

Weather – a key Determinant

- Asian sugar production is expected to increase by 23 percent in 2010-11, world sugar production still heavily dependent on weather and continued cyclical production patterns.

Supply Diversion to Ethanol

- High oil prices are another external risk to contend with as it makes on
- Acreage sugarcane for fuel ethanol more lucrative.
Introduction to Indian Sugar Industry

1.10 History Indian Sugar Industry

Sugar is one of the oldest commodities in the world and traces its origin in 4th century AD 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 18th century witnessed the development of new technology to manufacture sugar from sugar beet. However, India is presently dominant player in the global sugar industry along with Brazil in terms of production. Given the growing sugar production and the structural changes witnessed in Indian sugar industry, India is all set continue its domination at the global level.

1.11 Indian sugar industry

Indian sugar industry is highly fragmented with organized players. The Unorganized players mainly produce Gur and Khandsari, the less refined forms of sugar. Sugar industry, one of the major agro-based industrial in India, has been instrumental in resource mobilization, employment generation, income generation and creating social infrastructure in rural areas. Indeed, sugar industry has facilitated and accelerated pace of rural industrialization. The government had a controlling grip over the industry, which has slowly yet steadily given way to liberalization. The production of sugarcane is cyclical in nature. Hence the sugar production is also cyclical as it depends on the sugarcane production in India. As the industry is a fragmented one, even leading players do not control more than 4 percent market in India. However, the situation is changing and players off late are striving to increase their market share either by acquiring smaller Industry or by going for green field capacity additions. 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 khandsari. The latter is considered to be a rural industry and enjoys much greater freedom than sugar Industry. The production of traditional sweeteners gur and khandsari is quite substantial.

Though 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% of the country’s total sugar production and Maharashtra stands next with 20% contribution. The farmer’s 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.

At present, there are 553 registered sugar factories having capital investment of Rs. 50,000 crors and annual production capacity of 210 lakhs metric tonnes (ISMA Report, 2008). The annual turnover of industry is to the tune of Rs. 30,000 crores. The central and state governments receive annually Rs. 5000 crores as excise duty, purchase tax, and cess. The sugar industry in the country uses only sugarcane as input; hence sugar companies have been established in large sugarcane growing states like Uttar Pradesh, Maharashtra, Karnataka, Gujarat, Tamil Nadu, and Andhra Pradesh. These six states contribute more than 85% of total sugar production in the country; Uttar Pradesh and Maharashtra together contribute more than 57% of total production. Indian sugar industry has grown horizontally with large number of small sized sugar plants set up throughout the country as opposed to the consolidation of capacity in the rest of the important sugar producing countries, where greater emphasis has been laid on larger capacity of sugar plants. Sugar industry has brought socioeconomic changes in rural India by way of facilitating entrepreneurial activities such as dairies, poultries, fruits and vegetable processing, and providing educational, health and credit facilities.
Chart no.1.11.1

Sugar production in India

(Source: Food and Agriculture organization of India)

Table no.1.11.1

Domestic Demand Supply Scenario

<table>
<thead>
<tr>
<th>In Million tons</th>
<th>Sugar Year 2007</th>
<th>Sugar Year 2008</th>
<th>Sugar Year 2009</th>
<th>Sugar Year 2010</th>
<th>Sugar Year 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply/Total</td>
<td>32.2</td>
<td>34.8</td>
<td>22.5</td>
<td>21</td>
<td>28.5</td>
</tr>
<tr>
<td>Availability</td>
<td>3.9</td>
<td>8.5</td>
<td>7.8</td>
<td>2.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Opening Stock</td>
<td>28.3</td>
<td>26.3</td>
<td>14.7</td>
<td>18.5</td>
<td>25</td>
</tr>
<tr>
<td>Production</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demand</td>
<td>23.7</td>
<td>27</td>
<td>23.2</td>
<td>21.5</td>
<td>25.3</td>
</tr>
<tr>
<td>Domestic</td>
<td>22</td>
<td>22.5</td>
<td>22.5</td>
<td>23</td>
<td>23.8</td>
</tr>
<tr>
<td>Consumption</td>
<td>1.7</td>
<td>4.5</td>
<td>0.2</td>
<td>-</td>
<td>1.5</td>
</tr>
<tr>
<td>Exports</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imports</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5.5</td>
<td>-</td>
</tr>
<tr>
<td>Closing Stock</td>
<td>8.5</td>
<td>7.8</td>
<td>2.5</td>
<td>3.5</td>
<td>3.2</td>
</tr>
</tbody>
</table>

(Source: Indian Sugar Management Association)
Map of sugar production produced in India in different region in SY-2011-12

1.12 Sugar year 2010-11

In 2010-11, the sugar consumption reached about 22.5M MT, a similar level to that of the previous season. Production at around 24.5 MMT allowed end-of-season stocks to rise to about 15 days of consumption. Exports were at 2.5 MMT within the highly regulated policy structure of the Government of India. The OGL (Open general license) scheme benefitted the Industry to export at the time when world sugar prices were at a premium over domestic sugar prices. In 2010-11, the government had

(Source: Indian Sugar Management Association)
allowed 2.6M MT of sugar exports, of which 1.5 MMT were under OGL in three equal tranches. The GOI decisions on exports timings and quantities in future shall depend upon the likely domestic demand pattern and the crop assessment.

Table no.1.12.1
Sugar industry in India

<table>
<thead>
<tr>
<th>Particulars /Sugar Year</th>
<th>2010-11 (In MT)</th>
<th>2011-12 (In MT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opening Stock</td>
<td>4.9</td>
<td>3.9</td>
</tr>
<tr>
<td>Production During the season</td>
<td>24.5</td>
<td>25.8</td>
</tr>
<tr>
<td>Imports</td>
<td>0.3</td>
<td>0.05</td>
</tr>
<tr>
<td>Total Availability</td>
<td><strong>29.7</strong></td>
<td><strong>29.7</strong></td>
</tr>
<tr>
<td>Consumption</td>
<td>22.5</td>
<td>23</td>
</tr>
<tr>
<td>Exports</td>
<td>2.8</td>
<td>2</td>
</tr>
<tr>
<td>Closing Stock</td>
<td>3.9</td>
<td>4.6</td>
</tr>
<tr>
<td>%of Stock Usage</td>
<td>17</td>
<td>20</td>
</tr>
</tbody>
</table>

(Source: Indian Industry Association)

The sugar prices, M-30, have been in the range of Rs 2400 to Rs 3200 per qtl and is expected to be in the same range due to delayed crushing in Maharashtra and UP, expected export announcement, lower pipeline stocks, increase in acreage compared to last year. The cane crop should rise again in 2011-12 to reach to cross 25 MT due to both an increase in the cane areas and regular rainfall and satisfying agricultural cane yields similar to those of the previous season. In Maharashtra, sugar production forecasts are up and the area under cane has increased.

Sugar industry is the second-largest agro based industry after textile, employing 0.5 million people in the sugar Industry and 50 million farmers engaged in sugarcane cultivation. India is the largest consumer and the second largest producer of sugar across the globe. Sugar industry is largely driven by domestic consumption. Indian sugar industry is again entering the supply glut situation after witnessing a production shortfall in the previous two sugar season - SS2008-09 and SS2009-10. However, allowing exports would help maintain the sugar prices which peaked in SS2009-10. In SS2009-10, sugar production registered a growth of 31 per cent to reach 24.5 MT.
tones on YOY basis. However, the consumption declined in the SS2009-10. Sharp increase in production coupled with the decline in consumption led to increased levels of closing stock, thereby driving sugar prices downwards. The production of sugar is spread across the country. Maharashtra, Uttar Pradesh, Karnataka, Tamil Nadu, Gujarat and Andhra Pradesh are the major sugar producing states in the country. In SS2009-10, these six states together accounted for almost 94% of the total sugar produced in India. In SS2009-10, the State of Maharashtra produced the highest sugar at 7.0 MT tones followed by UP with 5.1 MT tones. These two states together account for almost 64.5% of the total sugar produced in India.

Sugarcane is the primary raw material for the sugar industry. It accounts for almost 80-85% of the total operating cost of the sugar industry. UP is the largest sugarcane-producing state in the country and accounted for about 36.2% of the total sugarcane output in SS 2010-11 followed by Maharashtra with 23.6%. Even though, UP is the largest sugarcane-producing state in the country it is the second largest sugar producer in India as recovery rates in UP are one of the lowest in India.

A cyclical decline in sugar production is shifting India, the world’s second largest producer, from net exporter to net importer during 2009-10 (October/September) and contributing to the current run up in global sugar prices. The downturn in production is primarily due to a policy-induced cycle that has become increasingly pronounced. India is forecast to shift from net sugar exports of 5.8 million tons in 2007-08 to net imports of 2.8 million tons in 2008-09 and a record 6.0 million tons in 2009-10.

Sugar production is poised to rebound in 2010-11, as higher government price supports and open-market prices are likely to stimulate plantings and improve incentives to deliver sugarcane to sugar Industry. In the longer term, India has the capacity to boost sugarcane output, and the government and the sugar industry are considering policy measures to moderate the increasingly sharp cycles in sugar production and trade.

1.13 Recent Supply and Demand Developments

Indian sugarcane and sugar production are historically cyclical, and the cycle appears to have become increasingly pronounced in the 2000s. After soaring to 30.8 million tons in 2006-07, 39% more than previous record set in 2002-03. Sugar production
dropped to an estimated 16.1 million tons in 2008-09 and is forecast at 17.3 million tons in the current 2009-10 year. All of India’s sugar is produced from sugarcane, and the swings in production have been driven primarily by similarly large swings in harvested area of sugarcane. Estimated area of 4.25 million hectares in 2009-10 is about 17 percent below the record amount in 2006-07. Although more than 90 percent of sugarcane area in India is irrigated, yields are affected by the share of area that is relatively high-yielding first-year growth and, to a lesser extent, by variation in rainfall. Relatively small shares of first-year growth in 2008-09 and 2009-10, as well as below-normal monsoon rainfall in 2009, likely contributed to reduced average sugarcane yields in 2008-09 and estimated yields for 2009-10.

In contrast to the volatility of production, Indian sugar consumption has continued to expand relatively steadily due to rising per capita incomes and government interventions to adjust stocks, facilitate trade, and assure adequate monthly availability. Despite the sharp drop in sugar production in 2008-09 and continued low output in 2009-10, sugar consumption has remained relatively stable and on trend due to monthly releases of “free-sale” sugar into the open market and allocations of subsidized “levy” sugar. However, despite net imports of 2.8 million tons in 2008-09 and an anticipated 6.0 million tons in 2009-10, Indian sugar stocks are forecast to fall to 3.5 million tons by October 2010, the lowest level since 1993-94.

Domestic open-market prices of Sugar and Gur, the primary substitute sweetener, remain under pressure. For the 2008-09 marketing year, wholesale sugar prices averaged 43 percent higher in real terms than prices a year earlier, while Gur prices averaged 53 percent higher.
Chart no.13.1

Supply and use of centrifugal sugar in India


Chart no.13.2

Sugarcane area and production in India

1.14 Policies Drive Sugarcane Production Cycles

India’s sugar area and production cycles are driven largely by policy interventions, including sugarcane support price policies set by the central and state governments as well as sugar storage and trade policies set by the central government. Biological factors also play a role, sugarcane remains in the field for 3 years once it is planted, and area and production adjust downward slowly as price incentives fall, thus prolonging periods of oversupply, weak market prices, and financial distress for sugar Industry. The key policy interventions are:

• Central and state government price support policies for sugarcane.
• Central government regulation of releases of levy and free-sale sugar and buffer stocks.
• Central government regulation of sugar trade.
• Other domestic marketing restrictions (e.g., private storage limits).

Chart no. 1.14.1

Domestic Cycle: turning Shorter & Viscous

Cycles turning viscous

The average period for a sugar cycle has been decreasing over the last 15 years. The primary reason for shorter sugar cycles emanates from the short term cropping pattern of farmers with respect to the widely fluctuating sugarcane prices vis-à-vis steadily rising prices for other crops.
1.15 Central and state government price support policies for sugarcane

In marketing year 2008-09, the Commission on Agricultural Costs and Prices (CACP) under the Ministry of Agriculture recommended annual Statutory Minimum Prices (SMP) based primarily on estimated costs of production. State governments in some of the major producing states then set higher State Advised Prices (SAP) that Industry in the state are required to pay sugarcane growers. The substantially higher SAPs set by some state governments account for regional variations in the productivity and profitability of sugarcane, as well as pressures from local sugarcane growers. The central government financed the cost of supporting the SMP, but sugar Industry was required to pay the difference between the SMP and the higher SAPs and incur any resulting financial losses.

(Source: ISMA)
There is strong but lagged relationship between changes in the SAPs for sugarcane and changes in area harvested. Drops in area harvested in 2003-04 and 2004-05 were preceded by declines in real SAPs, and higher SAPs in 2004-05 and 2005-06 corresponded with increased area in 2005-06 and 2006-07. Most recently, the drop in area in 2008-09 was preceded by sharply lower real SAPs in 2007-08. The fall in sugarcane area in 2008-09 was likely also influenced by the unusually large increases in Minimum Support Prices (MSPs) for wheat and rice, which compete with sugarcane for irrigated land, in 2006-07 and 2007-08. Unlike the SMPs for sugarcane, the MSPs set by the central government for wheat and rice are good indicators of prices received by growers because a large share of the marketed surplus of wheat and rice is purchased at the MSPs. The SAP policy also affects the volatility of sugarcane area when it imposes financial losses on sugar Industry that prevent them from honouring the SAP. During periods of surplus, SAPs can continue to rise without any specific link to sugar market conditions. These price hikes catch the Industry between the fixed SAPs they are required to pay and weakening market prices they receive for their refined sugar. The resulting financial losses lead to deferral or default by...
Industry on payments to growers that undermine incentives and contribute to volatility in sugarcane planting and production.

With higher open-market sugar prices in 2009, as well as central and state government measures to assist the Industry, the financial health of the Industry has been largely restored and is not expected to affect processing or grower payments for the 2009-10 sugarcane crop. Government regulated releases of levy, free-sale, and buffer stock sugar. The central government regulates all releases of refined centrifugal mill sugar into the market by sugar Industry. Marketing of khandsari and Gur, which are produced by farmers and small-scale enterprises, is unregulated. Industry are now required to sell 10 percent of their production at a fixed, below-market levy price to the Public Distribution System for sale to consumers determined to have incomes below the poverty line. The remaining 90 percent of mill production is sold at market prices, but the amounts that can be sold are determined by quarterly quotas set by the central government.

1.16 Indian Sugar Demand Trends

In contrast to the volatility of sugar production and prices, sugar consumption in India has grown relatively steadily, increasing about 3.7 percent annually (2.0 percent per capita) since 1990-91. While Policies have been associated with considerable volatility in sugar production, trade, stocks, and prices, government distribution programs have led to relatively stable growth in per capita sugar availability. The stable growth in consumption is also reflective of both the robust growth in aggregate demand and the price inelasticity, or unresponsiveness to changes in prices, of sugar demand. These factors stem from sugar’s importance as an ingredient in tea, coffee, soft drinks, and traditional sweets that play a central role in Indian diets.

Refined centrifugal sugar from sugarcane is the dominant sweetener in India, with the two traditional sugarcane-based sweeteners, Gur and khandsari, accounting for smaller shares of overall use. Khandasari has been declining in terms of production and consumption, and it now accounts for only about 3 percent of the market, but gur maintains a significant, albeit variable, 25-percent share of the market. Gur production and consumption are unregulated and tend to rise in years when higher gur prices or payment arrears by sugar Industry create incentives for farmers to divert sugarcane to
production of gur. During 2008-09 and 2009-10, gur’s share of the market rose to about 35 percent when growers diverted sugarcane from the financially distressed Industry, magnifying the drop in centrifugal sugar production caused by reduced sugarcane plantings. Although India does have an ethanol-petrol blending program using ethanol produced from sugarcane, the program does not, so far, affect the supply of sugarcane for the production of sweeteners. Unlike Brazil, India produces all of its ethanol from molasses, which is a normal by product of India’s centrifugal Sugar Industry process. As a result, there is no trade off between sugar and ethanol production.

India’s current goal is to require a 10-percent blend of ethanol with petrol in 20 states and 4 union territories, subject to its commercial viability. The drop in sugar production in 2007-08 and 2008-09 has led to reduced supplies and higher prices for molasses and Industry have been unable to deliver ethanol at the currently negotiated price of Rs21.5/litre.

Chart no.1.16.1

(Source: Indian Sugar Management Association)
1.17 Sugar Export-Import of India

Like sugar production, sugar trade in India is cyclical, with exports of primarily refined sugar during periods of surplus and imports of mostly raw sugar during periods of deficit. Consistent with the increased volatility of sugar production since the early 2000s, swings in sugar trade have also become more volatile. Since 2000, India’s sugar trade has fluctuated between average net exports of 1.3 million tons during 2000-01 and 2002-03, net imports of 1.2 million tons during 2003-04 and 2004-05, net exports of 3.3 million tons during 2005-06 and 2007-08, and forecast net imports of 4.3 million tons during 2008-09 and 2009-10.

The shifts in India’s sugar trade are increasingly significant for world markets, contributing to periods of both under supply and over supply. India’s record 2007-08 exports accounted for about 11 percent of global exports, and record imports in 2009-10 are forecast to account for 12 percent of world imports. India’s current shift to large net importer is further tightening a world sugar market that continues to adjust to European Union (EU) sugar policy reforms begun in 2006. The EU reforms, including reduced price supports, are due to be completed in 2009-10 and have led to sharp declines in sugar production and exports by member nations.
During 2006-07 and 2007-08, the EU-25 averaged net sugar exports of 4.6 million tons, but by 2008-09, the EU-27 became a net importer of 2.1 million tons of sugar. The major sugar import markets affected by the instability of Indian supplies are mostly nearby countries in South and Southeast Asia and the Middle East, including Bangladesh, Sri Lanka, the United Arab Emirates, Pakistan, Malaysia, Indonesia, and Yemen. India is a small supplier of sugar to the U.S. market, with annual exports averaging 8,082 tons during 2000-01 to 2007-08. Brazil, the world’s largest sugar exporter, is India’s major supplier during years of deficit.

**Chart no.1.17.2**

**1.18 International trade opportunity**

International trade is of strategic importance to India as it can help maintain stability in the domestic market, despite the cyclicality in production. If there is a sugar surplus either due to excess production or due to greater economic attractiveness of cane for ethanol and cogen in the future, exports could be used if the surplus cannot be managed in the domestic market. Acceptability as a credible exporter will provide the
Indian sector an alternate set of markets for diverting surplus production. Similarly, in case of deficits, raw sugar imports could help bridge the supply gap.

India has the potential to export to major Indian Ocean markets, due to freight competitiveness with respect to key competitors, Brazil and Thailand. With EU exports reducing by 4.5 million MT, world prices per MT of sugar are expected to increase in the range of USD 50 to USD 100. This could potentially make exports more viable for India. However, due to the increasing emergence of destination refineries, key markets are importing greater share of raw sugar, and India's competitiveness for raw exports is relatively lower as of today. Currently, India's competitiveness is higher in markets, where share of white sugar imports as percentage of cumulative imports is higher. Going forward, India would need to build the capability to produce raw sugar and refined sugar of international quality standards, in order to leverage the export opportunity.

Chart no.1.18.1

International trade opportunity:

The target markets are estimated to import 10 million MT of sugar by 2017. India would be able to leverage this opportunity through productivity improvements and alignment of cane and sugar prices in the domestic market. India's competitiveness can also be increased by enhancing export infrastructure like loading rates and draft in Indian ports. Since the current cost structure of the Indian industry is uncompetitive for exports, in case of a large sugar surplus, the government could consider using WTO compliant subsidies to enable exports while creating stability in the domestic
market. The industry could also explore ways of collectively sharing losses due to exports, if any, since exports would enable lower stocks in the domestic market, thus benefiting both Industry and farmers through higher sugar realization.

1.19 Sugarcane Production Potential in India

India likely has significant potential to expand sugarcane production by increasing both planted area and yield. While India’s area planted to sugarcane, averaging about 4.5 million hectares per year of primarily irrigated land, is the second largest in the world after Brazil, it accounts for a relatively small Share of India’s cropped area (about 142 million hectares) and net irrigated area (about 60 million hectares). Sugarcane, however, is a year-round crop that typically remains in the field for 3 years, and returns to sugarcane production must be competitive for irrigated land on which two and in some areas three, crops are taken in one year.

Chart no.1.19.1

Above figure provides gross returns from sugarcane, wheat- paddy double crops common in irrigated areas of north India, and paddy-paddy double crops common in irrigated areas of south India over a 10-year period. A comparison shows generally higher returns to sugarcane, based on both average SAPs and the lower SMPs, although there has been a convergence in recent years due to the relatively large increases in wheat and paddy MSPs. However, cost of cultivation data indicate that labour costs for sugarcane are roughly double those for wheat and paddy, suggesting that labour availability and costs may be constraints to growth in sugarcane area.
India also appears to have the potential to improve sugarcane yields, and the average sugar content of harvested sugarcane, through a continued shift of planted area from northern states, where the climate is subtropical, to southern states, where the climate is tropical and conducive to higher sugarcane yields and sugar recovery rates. Sugarcane yields in India average about 68 tons per hectare, about the same as China but below other major producers, such as Australia, Brazil, and Mexico. But, an increasing share of India’s sugarcane is being planted in southern states, where yields average about 83 tons/hectare, rather than in north India, where yields average about 58 tons/hectare. Although the northern state of Uttar Pradesh the historical centre of the Indian sugar industry still accounted for about 46 percent of sugarcane area and 39 percent of output during 2005-06 and 2007-08, the southern state of Maharashtra, where both average yields and the sugar content of sugarcane are higher, is now the largest producer of sugar. Most Indian sugarcane is grown under irrigation in all major producing states, providing favourable conditions for improving average yields.

Chart no.1.19.2

Source: USDA, Economic Research Service using data from Government of India, Ministry of Agriculture and Cooperation, Directorate of Economics and Statistics; and USDA.
1.20 Domestic Sugar Policies

Sugar industry has two stages of policies

- Sugar cane price policy
- Sugar price policy

Sugar cane pricing policy

Sugar cane pricing is politically sensitive in India. Every year central government announces Statutory Minimum Price (SMP) for sugarcane. The sugar cane producing states also announce their own State Advised Price (SAP), which is many times much higher than SMP. The difference in SMP and SAP has resulted in market distortions and huge pile of arrears with sugar industry to be paid to farmers.

As per Sugarcane (Control) Order, 1966, sugar Industry have to pay cane price to farmers within 14 days of delivery of sugarcane and any failure in this regard could attract penal interest rate of 15% per annum.

Government has been increasing SMP over the years except for 2008-09. Sugarcane production remained stable for three years after record output in 2006-07. Stable SMP from 2006 to 2008-09 and stagnant rainfall kept production lower. The sugar prices started rallying from 2008 followed by fall in output in 2008-09. It is observed that in 2009-10, production showed marginal rise, despite huge increase in SMP (32.7%), because of fall in rainfall (down by 20.5 percent from normal). The sugar cane output estimated to increase by over 15 percent in 2010-11, favoured by higher SMP and better rainfall. So, SMP and rainfall has direct impact on production, but rainfall seems to be more influential factor.
### Table no.1.20.1
Sugarcane production in MT and change in Percentage

<table>
<thead>
<tr>
<th>Sugar Year</th>
<th>Sugarcane SMP/QTL</th>
<th>Change (In %)</th>
<th>Sugarcane Production (In MT)</th>
<th>Change (in %)</th>
<th>Rainfall (In Semi)</th>
<th>Change (In %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001-02</td>
<td>65.05</td>
<td>-</td>
<td>2972</td>
<td>-</td>
<td>821.9</td>
<td>-</td>
</tr>
<tr>
<td>2002-03</td>
<td>69.5</td>
<td>12</td>
<td>2873.8</td>
<td>-3.3</td>
<td>737.3</td>
<td>-10.3</td>
</tr>
<tr>
<td>2003-04</td>
<td>73</td>
<td>5</td>
<td>2338.6</td>
<td>-18.6</td>
<td>919.5</td>
<td>24.7</td>
</tr>
<tr>
<td>2004-05</td>
<td>74.5</td>
<td>2.1</td>
<td>2370.8</td>
<td>1.4</td>
<td>774.2</td>
<td>-15.8</td>
</tr>
<tr>
<td>2005-06</td>
<td>79.5</td>
<td>6.7</td>
<td>2811.7</td>
<td>18.6</td>
<td>874.3</td>
<td>12.9</td>
</tr>
<tr>
<td>2006-07</td>
<td>80.25</td>
<td>0.9</td>
<td>3555.2</td>
<td>26.4</td>
<td>889.3</td>
<td>1.7</td>
</tr>
<tr>
<td>2007-08</td>
<td>81.18</td>
<td>1.2</td>
<td>3481.8</td>
<td>-2.1</td>
<td>943</td>
<td>6</td>
</tr>
<tr>
<td>2008-09</td>
<td>81.18</td>
<td>0</td>
<td>2850.3</td>
<td>-18.1</td>
<td>877.7</td>
<td>-6.9</td>
</tr>
<tr>
<td>2009-10</td>
<td>107.76</td>
<td>32.7</td>
<td>2923</td>
<td>2.6</td>
<td>698.2</td>
<td>-20.5</td>
</tr>
<tr>
<td>2010-11</td>
<td>139.12</td>
<td>29.1</td>
<td>3366.9</td>
<td>15.2</td>
<td>912.8</td>
<td>30.7</td>
</tr>
</tbody>
</table>

(Source: Directorate of Sugar Agriculture Department and Indian Methodological Dep.)

Apart from following price intervening policy in sugar cane, Government also has price policy on consumption side. Government has been following dual and partial sugar pricing system for decades. Despite efforts from various industry to do away with price intervention, Government continue to follow dual price model to balance this highly sensitive market.

- Levy sugar
- Non-levy (free sale)

Levy Sugar-Under this policy, certain percentage of sugar produced by Industry has to be given to government as compulsory levy at a price fixed by Government in every sugar season for distribution in Public Distribution System (PDS).

Non-levy sugar (free sale)- Under this policy, sugar is allowed to be sold in the market as per the quantity fixed by the government. The free sale quota is mostly fixed on monthly basis and also quarterly. In order to decontrol the sugar industry in phased manner, Government reduced levy obligation of sugar factories from 40% to 30%
from January 1, 2000. It further reduced compulsory levy sugar to 15 percent from February 1, 2000.

1.21 Sugar year 2012

Excessive availability of sugar this year is unlikely to deter Indian exporters to intensify supplies to global markets and increase realisation this year. Reeling under severe financial stress, Indian sugar companies are looking for opportunities for higher realisation from overseas markets with permission from the local government.

A report released by the Rabo Bank forecast the global sugar production to outpace demand for the second consecutive year by six to eight million tonnes for 2012-13. Another report by Barclays Bank also estimates global markets to remain in surplus to the tune of 5.4 MT, despite lower production in Brazil. Barclays estimates global 2011-12 sugar production will grow 4.2 per cent year-on-year, due to higher-than-expected output in Europe, as well as in key producing countries, like Australia, India and Thailand, as favourable weather and prices have led farmers to boost plantings and help offset the decline in Brazil. The global sugar output in 2011-12 is projected at a record 173 MT. This will surely restrict India’s opportunity to access global markets at high prices. But, much would depend on sugar output and quantum of direct conversion of ethanol from cane.

Brazil’s sugarcane production is expected to rise to 520 MT in 2012-13. The country crushed around 492 MT in 2011-12. Barclays forecast Brazilian sugar production to reach only 35.8 MT in 2011-12, a decline of 5.8 per cent presently, the price of sugar remains fairly well supported, largely owing to perceived shortage of export availability against the import demand. The total global cane production is estimated at 522 MT. According to India’s sugar companies, output is expected to be more than 26 MT and consumption 22 MT.

The government of India had allowed one MT of exports under open general licence so far. An increase in India’s exportable surplus and strong production prospects in key Northern Hemisphere producers will limit the upside on prices. The important questions for the sugar market in 2012 will be whether cane output in Brazil recovers
after a production setback, when and how much Brazilian cane will be converted into ethanol instead of sugar and the outlook for Indian sugar exports. According to Barclays, a key influence of the market outlook in 2012 will be the manner in which the price of ethanol will influence the decision of Brazilian Industry to allocate cane to produce sugar or ethanol. The end of US government subsidies and trade barriers to Brazilian ethanol bodes well for Brazilian ethanol producers in the long term and could prompt renewed investment. But exports are unlikely to increase in the near term due to Brazil struggling to meet its domestic demand.

ETHANOL AND ITS IMPLICATIONS

1.22 Introduction of Bio fuels
Bio fuels are going to play an extremely important role in meeting India’s energy needs. The Country’s energy demand is expected to grow at an annual rate of 4.8 per cent over the next Couple of decades. Most of the energy requirements are currently satisfied by fossil fuels – coal, petroleum-based products and natural gas. Domestic production of crude oil can only fulfil 25-30 per cent of national consumption. In fact, the crude oil imports are expected to total 147 million tons (MT) in 2006-2007. With the ever-escalating crude oil prices, if one assumes a price of $57/barrel ($420/ton), the estimated crude oil import bill for 2010-2011 would be $106 billion, about 12 per cent of the country's Gross Domestic Product.

Chart no.1.22.1
Import of Crude Oil and Value of Petroleum Products

Source: Petroleum Planning and Analysis Cell, Government of India (GOI)
The average consumption of petroleum products in India is estimated as (petroleum consumption):

- Transport (Petrol, Diesel, CNG, and Aviation Fuel): 51 percent
- Industry (Petrol, Diesel, Fuel Oil, Naphtha, Natural Gas): 14 percent
- Commercial and Others: 13 percent
- Domestic (LPG and Kerosene): 18 percent
- Agriculture (Diesel): 4 percent

Ethanol, currently produced in India by the fermentation of sugarcane molasses, is an excellent bio fuel and can be blended with petrol. Likewise, biodiesel which can be manufactured by the transistor fiction of vegetable oil can be blended with diesel to reduce the consumption of diesel from petroleum. Ethanol and biodiesel are gaining acceptance worldwide as good substitutes for oil in the transportation sector. Brazil uses pure ethanol in about 20 per cent of their vehicles and a 22 to 26 per cent ethanol-petrol blend in the rest of their vehicles. The United States and Australia use a 10 per cent ethanol blend. With a normal production rate of 1,900 million litres a year, India is the world’s fourth largest producer of ethanol after Brazil, the United States and China. Beginning 1 January 2003, the Government of India mandated the use of a 5 per cent ethanol blend in petrol sold in nine sugarcane producing states. The Government has expanded the 5 per cent ethanol mandate to the rest of country in a phased manner.

Biodiesel production is rapidly growing in Europe and the United States. Current estimates show production of 2.2 MT/year in Europe, with Germany (1.1MT/year), France (0.5MT/year) and Italy (0.4MT/year) being the leading producers. The European Union mandated that its members derive at least 2 per cent of their fuel consumption from bio fuels in 2005 and 5.75 per cent by 2010.

1.23 ETHANOL POLICY of GOI

Ethanol is produced in India from sugarcane molasses for blending with petrol. Beginning January, 2003, GOI mandated the use of 5 percent ethanol blend in petrol through its ambitious Ethanol Blending Program (EBP).
## Developments in EBP Ethanol Blending Program (EBP)

<table>
<thead>
<tr>
<th>Date</th>
<th>Action</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Janu.-2003</td>
<td>Ministry of Petroleum and natural Gas made 5% Ethanol Blending (Gazette on EBP) in petrol mandatory across 9 State and 5 Union Territories</td>
<td>Partially implemented Due to the Unavailability of ethanol (due to low sugarcane production in 2003-04 and 2004-05)</td>
</tr>
<tr>
<td>Sep.-2006</td>
<td>Resurgence in sugarcane production in 2005-06 and 2006-07 led the GOI to Mandate 5% Ethanol Blending in gasoline across 20 States and 8 Union Territories subject to commercial viability.</td>
<td>Oil Marketing Companies (OMC) Contracted for 1.4 billion liters of ethanol for EBP At Rs.21.50/Litre. From Nov.2006 to Nov.2009 Only 540 million liters of ethanol supplied till April-2009 Due short supply of sugar molasses. The GOI Differed implementation due to a short supply of sugarcane in 2007/08</td>
</tr>
<tr>
<td>Sep.-2008</td>
<td>The Union Cabinet approved the National bio-fuel policy Five percent Blending became mandatory across all States in the country. The third phase of implementing EBP envisaged the blending ratio to be increased to 10 percentages.</td>
<td>GOI Differed the plane again Due to Short Supply of Sugarcane and sugar molasses in 2008-09. Blending target of 10% Under Present circumstances seems to be distant reality.</td>
</tr>
</tbody>
</table>

The Government of India has developed an ambitious National Biodiesel Mission to meet 20 per cent of the country’s diesel requirements by 2011-2012. Since the demand for edible vegetable oil exceeds supply, the Government decided to use non-edible oil from Jatropha Curcas oilseeds as biodiesel feedstock.
Extensive research has shown that Jatropha Curcas offers the following advantages: it requires low water and fertilizer for cultivation, not browsed by cattle or sheep, pest resistant, easy propagation, high seed yield and ability to produce high protein manure. The National Biodiesel Mission will be implemented in two stages:

1) A demonstration project carried out between 2003-2007 which has cultivated 400,000 hectares of land and yielded about 3.75 tons oilseed per hectare annually. The expected annual biodiesel production from the project is 1.2 t/ha/year for a total of 480,000 tons per annum. The Government will build a transistor certification plant with a biodiesel production capacity of 80,000 t/year as part of the demonstration project.

2) A commercialization period from 2007-2012 has continued Jatropha cultivation and installed more transistor certification plants which has positioned India to meet 20 per cent of its diesel needs through biodiesel.

1.24 Expanding ethanol supply

Currently, the government does not allow the use of imported ethanol for the EBP program, as the focus is on developing domestic capacities. Ethanol is manufactured directly from sugar molasses but given the projection for higher sugarcane production in India for 2011-12 (upswing in production cycle), the use of sugarcane juice for ethanol production seems to be a viable option especially under conditions of sugarcane glut in the country.

The GOI is offering subsidized loans (through sugarcane development funds) to sugar Industry for the creation of an ethanol production unit. The loan would cover a maximum of 40 percent of the project cost.

Given the limited scope of bringing additional area under water intensive sugarcane cultivation, fluctuations in supply and pricing of ethanol could be stabilized through the use of alternate crops. Public and private institutions can promote the use of alternate crops such as sweet sorghum, sugar beets or sweet potatoes, to supplement domestic ethanol production, though the efforts to produce ethanol from these feed stocks are at experimental stage.

India has 330 distilleries which produce over 4 billion litres of rectified spirit (alcohol) per year. Of the total distilleries, about 120 distilleries have the capacity to distillate...
1.8 billion litres (an additional annual ethanol production capacity of 365 million litres was built up in last three years after government provided funds to sugar Industry) of conventional ethanol per year and meet the demand for 5 percent blending with petrol. Currently, India produces conventional bio-ethanol from sugar molasses and production of advanced bio-ethanol is in its nascent phase (research and development).

Table no 1.24.1

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<th>Year</th>
<th>2006</th>
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<th>2009</th>
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<td>1673</td>
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<td>70</td>
<td>320</td>
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<td>3616</td>
<td>3066</td>
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<td>3069</td>
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<td>3</td>
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Consumption

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<td>Potable Liquor</td>
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<td>850</td>
<td>880</td>
<td>900</td>
<td>950</td>
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<td>Blended Petrol</td>
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<td>280</td>
<td>100</td>
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<td>Other Use</td>
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<td>110</td>
<td>100</td>
<td>110</td>
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<td>1940</td>
<td>1780</td>
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<td>3616</td>
<td>3066</td>
<td>2868</td>
<td>3069</td>
<td>3279</td>
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Production Capacity (Conventional Fuel)

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<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
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<tbody>
<tr>
<td>Number of refineries</td>
<td>115</td>
<td>115</td>
<td>115</td>
<td>115</td>
<td>115</td>
<td>115</td>
<td>115</td>
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<tr>
<td>Capacity (Billion Littre)</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.8</td>
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</table>

Feed Stock Use (1000 MT)

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<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Feed Stock (1000 tons)</td>
<td>7910</td>
<td>9992</td>
<td>8958</td>
<td>4469</td>
<td>5981</td>
<td>8060</td>
<td>8875</td>
</tr>
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</table>

(Source: Indian Co-Op. Sugar Factory Association)
Production
With an outlook of bumper sugarcane and sugar production in 2011-12, the government is likely to renew its focus and strongly implement the mandatory 5 percent ethanol blending in petrol provided the Union Cabinet takes a decision on the purchase price of ethanol for EBP. Further, sugar Industry may divert their stocks for ethanol production to offset falling prices of sweetener, which in turn would provide supplementary income to the distilleries and would ensure farmers a better price for sugarcane.

Short supplies of sugar molasses in preceding years constrained ethanol production and consequent higher prices made it unviable to supply ethanol to petroleum companies at the negotiated prices. Higher sugarcane and sugar production in 2010-11 has raised ethanol production and improved total ethanol supply to offset short (opening) stocks.

Consumption
The strong growth in consumption of ethanol across the chemical industry, the potable liquor industry and EBP is expected to raise the total ethanol consumption over 2 billion liters in 2011-12. Ethanol supply for EBP is unlikely to be constrained given the improved supply situation. According to industry and trade sources, ethanol availability during 2011-12 is forecast at 300 million liters, against the target of 1 billion liters set by the industry. Ethanol consumption for EBP in 2010-11 has been raised by 200 million liters from 50 million liters in 2009-10 mostly due to improved supply of molasses and steady demand of ethanol from competing industries. During 2009-10, higher market prices of ethanol were attractive for the suppliers to divert their supplies from EBP.

1.25 Trade of ethanol
India imports ethanol only to meet shortfalls in demand during years of low sugar production. The demand is mostly for consumption across potable liquor and chemical industries and not for fuel purpose. Exports of ethanol are negligible, however, a small volume of ethanol exports (approx 41,000 liters during first three quarters of Calendar Year 2010) were noted for Ghana, Netherland, Tanzania, Saudi Arabia, Nepal, Liberia, Sri Lanka, U.A.E, Bhutan, Malaysia and other African countries.
Although there are no quantitative restrictions on the import of bio fuels, high duties on tariff lines make imports economically unviable. The GOI does not provide any financial assistance for exports of bio fuels (biodiesel and ethanol). However, current trade regulations allow duty free imports of feed stocks for re-export by certified export oriented units.

Bio fuels offer a number of environmental, social, and economic advantages, including lower emissions of harmful pollutants; decreased greenhouse gas emissions; increased employment; increased energy security, especially in rural areas; decreased dependence on oil imports; and good fuel properties for vehicles. Various analyses indicates that while India has an ethanol distillation capacity of 2,900 million litres/year, sufficient to meet 5 per cent ethanol blending requirements, domestic sugarcane molasses might not represent a reliable feedstock, given the vagaries of the sugar industry and the dependence of sugarcane cultivation on monsoons. For instance in 2003-2004, the sugar output dropped to 15 MT molasses production sunk to 6.75 MT and the ethanol manufacturing level decreased to 1,518 million litres.

This caused India to import ethanol and molasses in 2003-2004. In addition to more efficient agricultural practices for improved sugarcane yield, crops like sweet sorghum and tropical sugar beet represent attractive alternate feedstock for ethanol. New exciting technologies like enzymatic fermentation of cellulose will, in the near future, enable ethanol to be manufactured at competitive prices from cheap, easily available material like wood and crop residue. In the meantime, ethanol imports can be used to satisfy some of India’s ethanol demand, especially for 10 and 20 per cent ethanol blending. Brazil exported about 2 billion litres in 2004-2005, and other countries like Thailand, Mexico and Cuba are increasing production. Molasses imports from agro-industries in Asia can also augment India’s ethanol production.
1.26 Benefits from the use of bio fuels in India

- **Reduced emission of harmful pollutants**

  Ethanol and biodiesel are both oxygenated compounds containing no sulphur. These fuels do not produce sulphur oxides, which lead to acid rain formation. Sulphur is removed from petrol and diesel by a process called hydro-desulphurisation. The hydro-desulphurisation of diesel causes a loss in lubricate, which has to be rectified by introducing an additive. Biodiesel has natural lubricate, and thus no lubricate-enhancing additive is required.

  Since ethanol and biodiesel contain oxygen, the amount of carbon monoxide (CO) and un burnt hydrocarbons in the exhaust is reduced. With the introduction of ethanol in Brazil, CO emission from automobiles decreased from 50 g/km in 1980 to 5.8 g/km in 1995. The emission of Nitrogen Oxides (NO) from bio fuels is slightly greater when compared to petroleum, but this problem can be ameliorated by using de-Nox catalysts which work well with bio fuels due to the absence of sulphur.

  One of the disadvantages in using pure ethanol is that aldehyde emissions are higher than those of gasoline, but it must be observed that these aldehyde emissions are predominantly acetaldehydes. Acetaldehydes emissions generate less adverse health effects when compared to formaldehydes emitted from gasoline engines.

- **Increase in nutrients to soil, decrease in soil erosion and land degradation**

  In ethanol production from sugarcane, the by-products like vines (solid residue left after distillation) and filter cake contain valuable nutrients. Using these organic fertilizers instead of chemical fertilizers reduces the need for chemicals, which could be hazardous and avoids pollution of ground water and rivers. International Crop Research Institute for Semi-Arid Tropics (ICRISAT) has compared the nutrient content of filter cake obtained from various oilseeds in biodiesel manufacture with that of commonly used fertilizers like Di-Ammonium Phosphate (DAP) and Urea. Also the cultivation of land for sugarcane and oilseed-bearing crops contributes to a decrease in soil erosion and land degradation

1.27 Current ethanol industry in India

Ethanol is produced in India by the fermentation of molasses, a by-product in sugar manufacture. The yield of sugarcane in India varies from an average of 77 tons/ha in
tropical states to about 52 tons /ha in subtropical states. The yield of sugar on average is approximately 105 kg per ton of cane. About 40 kg of molasses is produced per ton of cane from which about 10 litres of ethanol can be obtained. If the sugarcane is directly and fully used in ethanol manufacture, the yield of ethanol is 70 litres per ton. Table below shows the projected demand and supply of ethanol for blending in petrol (5 per cent ethanol – 95 per cent petrol).

<table>
<thead>
<tr>
<th>Year</th>
<th>Petrol Demand (MT)</th>
<th>Ethanol Demand (ML)</th>
<th>Molasses Production (MT)</th>
<th>Ethanol Production (ML)</th>
<th>Ethanol Utilisation (ML)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Molasses</td>
<td>Cane</td>
</tr>
<tr>
<td>2001-02</td>
<td>7.07</td>
<td>416.14</td>
<td>8.776.36</td>
<td>1775</td>
<td>0</td>
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<tr>
<td>2006-07</td>
<td>10.07</td>
<td>592.72</td>
<td>11.36</td>
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<td>2011-12</td>
<td>12.85</td>
<td>756.36</td>
<td>11.36</td>
<td>2300</td>
<td>1485</td>
</tr>
<tr>
<td>2016-17</td>
<td>16.4</td>
<td>965.30</td>
<td>11.36</td>
<td>2300</td>
<td>1485</td>
</tr>
</tbody>
</table>

(Source: planning commission-2003)

1.28 Economics of ethanol production from sugarcane

The present price of sugarcane, as fixed by the central government under the minimum statutory price, is Rs. 695/ton ($15.45/ton) based on a sugar recovery of 8.5 per cent. At a 10.5 per cent recovery rate, the price of sugarcane, after state excise taxes, is Rs 900/ton ($20/ton). Assuming an ethanol yield of 70 litres/ton of cane, the raw material cost of ethanol is Rs 900/70 = Rs. 13/litre ($0.29/litre). After adding salary and wages of operational staff, capital related charges of investment, energy cost of producing anhydrous alcohol, cost of transport and marketing, the cost of producing ethanol directly from sugarcane is Rs 20/litre ($0.45/litre). This compares favourably with the current world price of petrol, $1.75/gallon ($0.46/litre).

The ethanol cost price can be brought down further through the following options:
• Allowing a market-based sugarcane price.
• Combining ethanol manufacture with sugar manufacture, which would permit a major part of the cane cost to be off-loaded to sugar. For instance, a ton of sugarcane produces 105 kg sugar, and even if the sugar is sold at Rs 10/kg, this will be sufficient to pay for the cost of the sugarcane.
• Using the bagasse by-product and spent wash more efficiently. The spent wash, which is produced in large quantity (about 15 litres per litre of ethanol produced), can be subjected to anaerobic digestion that not only removes its BOD and COD but also provides valuable biogas (60 per cent methane). This biogas can be used to offset 67 per cent of the energy cost of making anhydrous alcohol through distillation. Plants can further use bagasse which is left after crushing the cane, as boiler fuel for electricity generation at 97kWh/ton of cane crushed.

1.29 Policy towards Ethanol Blending

The Indian approach to bio fuels is based on non-food feedstock to deliberately avoid a possible conflict between food and fuel. The National Bio fuel Coordination Committee (NBCC), headed by the prime minister was set up in 2010. The policy also proposed that the minimum purchase price (MPP) for bio ethanol should be based on the actual cost of production and import price of bio ethanol. The price of ethanol would be determined by the Bio fuel Steering Committee and decided by the NBCC, and in the event of diesel or petrol prices falling below, the MPP for biodiesel and bio ethanol, OMCs would be duly compensated by the government. Bio fuel imports would be permitted to the Extent necessary and decided by the NBCC under the policy. Additionally, it was mentioned that commentary bio ethanol already enjoys a concessional excise duty of 16% and biodiesel is exempt from excise duty.

Duties and taxes would be levied on imports to ensure that indigenously produced bio fuels are not more expensive than the imported bio fuels. Thus, the objective of the National Policy on Bio fuels has been to encourage domestic production of ethanol and further the ethanol blending programme (EBP) in the country. Demand and Supply In India, ethanol production is mainly done using sugar cane as feedstock. For successful implementation of EBP in India, a steady supply of sugar cane (or sugar
cane juice) is required as a feedstock. The sugar cane production in 2008-09 was 271.2 million tonnes as per the statistics of Indian Sugar Industry Association (ISMA). In India’s case, industry sources reveal that ethanol production in India has been taking place almost entirely through the final “C” grade molasses (i.e., a litre ethanol can be extracted from 0.004 tonnes of molasses). The ethanol production in 2008-09 as reported by ISMA is 1,560 million tonnes. However, considering the different uses of ethanol in India (potable, alcohol based chemical industry) and making assumptions about industry growth rates, a grand total of approximately 545 million tonnes sugar cane would be required for consumption in India with the mandated 5% blending for transport by 2011-12. This is much more than the total sugar cane production of approximately 355 and 340 million tonnes during the 2006-07 and 2007-08, which were bumper crop years. The per capita consumption of sugar in 2010 stood at 23-24 kg a year, implying that sugar production is around 24.3 million tonnes. To achieve this level of production, sugar cane needs to be cultivated on an area of about 5.5 million hectares with an average Yield of 65 tonnes per hectare to yield 357.5 million tonnes. Three factors determine sugar cane production in India: the Area under sugar cane production, the sugar cane yield per hectare and the proportion of sugar cane output that is crushed by sugar factories. Thus, to meet the expected increase in demand for ethanol, the area under sugar cane cultivation has to be increased or the yield per hectare has to be increased or ethanol has to be produced from alternative feedstock such as sweet sorghum, sugar beet or cellulosic raw materials. However, cost-effective saccharine fiction, fermentation and commercialisation of the readily available cellulosic material are currently very costly.

The area under sugar cane production in India has increased nearly 2.5 times since 1950-51 touching about 5.04 million hectares in 2007-08. However, it has tended to stagnate in the recent past. The area under sugar cane production is subject to yearly variation, partly because the crop tends to follow a cyclical pattern in terms of output (with three-four years of bumper harvests followed by relatively poor crops over a similar period) and also competition from other crops that can be grown more
profitably or within a shorter time than sugar cane. It is also important to note that India has limited arable land and sugar cane production requires a long time and large amounts of water and fertilisers. Hence increasing the area under cultivation may not be possible and alternative crops may not suit the climatic and other conditions. Sugar production in India is also characterised by a low average sugar recovery rate of about 9-10% compared to a much higher 12-13% in some other sugar exporting countries such as Brazil. A substantial part of the sugar cane produce (at least 20%) is used for manufacturing traditional sweeteners (like gur) and other uses, leaving only the remaining for making sugar (and molasses).

A major problem is that in India, sugar production in general follows a five to seven year cycle, i.e. production increases over a three to four-year period, reaches a high, which in turn, results in lower sugar prices. As a result of lower sugar price realisations of sugar Industry, the sugar cane arrears to farmers increase. This results in lower sugar cane production for the next Two to three years. Due to lower sugar production, the prices shoot up resulting in increased area under sugar cane cultivation during the next season, following which there is usually a glut again. It is a systemic problem which needs to be resolved through targeted policy regulations. Some argue that given so many constraints, India can only meet its needs through imports from surplus countries such as Brazil as has been done in the past by the industrial sector in times of shortage of ethanol. This is a viable way out as long as it remains cost effective to do so.

Pricing of Ethanol- The cost of producing ethanol varies with molasses prices and hence cyclical variations in sugar cane production largely determine the cost of ethanol production. At present, the government controls the price of cane but directs the sugar Industry to sell up to 20% of output under the Public Distribution System (PDS). Sugar cane prices are fixed on the basis of the statutory minimum price (SMP), in lieu of the Minimum Support Price announced by the central government, and the state advised price (SAP), which is usually fixed by state governments above the SMP. However, sugar prices are determined on the basis of market prices. In October
2009, the Ministry of Consumer Affairs, Food and Public Distribution issued an ordinance in which the Sugarcane (Control) Amendment Order, 2009 changed the pricing regime for sugar cane dictated by the Sugarcane (Control) Order, 1966. Under the new order, the support price for sugar cane is now called the fair and remunerative price (FRP), instead of the earlier SMP, to be fixed by the central government from time to time.

Sugar prices, on the other hand, do not increase in the same proportion every year. The empowered group of ministers (EGOM) has fixed the interim refinery gate price of ethanol at Rs 27 per litre. Working backwards, a price of Rs 27 per litre implies that the cost of molasses to the distillery is around Rs 4,800 per tonne. The price of molasses in recent times has increased to Rs 5,000 per tonne in some parts of the country. The pricing issue is also complicated by the decontrol of petrol prices and administered pricing of sugar cane. The price of crude petroleum forms an upper-limit to the cost of ethanol that the OMCs can profitably use. At the 2008 level of crude oil prices, OMCs were making a profit with the blending of 5% ethanol with petrol. The situation may, however, change with a possible fall in crude prices. A comparison of the value of petrol (assuming that blending occurs at the storage point), i.e., Rs 33-34 per litre as against the ethanol cost of Rs 26-37 per litre (assuming different distillery gate prices) – shows that of the three prices Rs 18 (from the earlier estimates of the Planning Commission (2003) and Gonzales (2006), Rs 21.5 (from the earlier determined contract price of ethanol supply to OMCs), and Rs 27 (interim price fixed by the EGOM), ethanol blending will result in losses for OMCs at the ethanol price of Rs 27 per litre.

It should be noted that the comparison of the costs of ethanol-blended petrol and fossil fuel-based petrol has been done at the crude oil prices prevailing in April 2009. Changes in crude oil prices would result in a change in the financial aspects of the issue. With the hardening of crude prices in recent times (since late 2010) it can be expected that ethanol blending would again be a profitable proposition. Conclusions since the availability of ethanol becomes critical in the implementation of the BP ways
to augment the supply are important. In May 2009, the Planning Commission advised the government to consider providing incentives to encourage companies to acquire sugar cane plantations abroad, especially in countries such as Brazil, to bring ethanol into the country. Other options include collaboration with Brazil and other prospective international suppliers of ethanol in areas of research and development and cross-border investment. These measures along with other steps to augment the domestic availability of ethanol, like the integration of the production and milling of sugar cane to the ethanol production stage can alleviate some bottlenecks.

On the issue of pricing, since sugar cane supply follows a cyclical pattern, ethanol prices would need to be revised periodically to reflect market conditions. Additionally, changes in crude oil prices would have a direct bearing on the financial viability of the EBP. There should, therefore, be some thought given to the distributive shares in the situation of High crude prices, and therefore, greater profitability of the programme, i.e., what part should be given to OMCs, consumers and through higher MSP to sugar cane farmers. On the flip side, in the situation of losses, the government needs to set targets for the subsidy burden that it is willing to shoulder for an environmental cause.

The vehicular fleet of the country is mostly compatible with 5% ethanol blended petrol. With the implementation of the lending programme from the current 5% to the higher levels of EBP (as envisaged in the National Policy for Biofuels, sufficient lead time would be needed for the automobile industry to make the suitable change to the engine.

1.30 POLICIES ON SUGAR ECONOMY

The government policies regarding sugar economy during the past 30 years have been directed towards the defectives which include the following broad features:

(a) Fixation of minimum sugarcane price to be paid by sugar factories to the grower.

(b) Fixation of licensing capacity so as to regulate expansion of existing sugar factories and establishment of new ones.
(c) Fixation of ex-factory prices of sugar, delimitation of zones and incentives for increasing sugar production.
(d) Regulating production, prices, movement, etc. in respect of Gur and Khandsari.
(e) Distribution of sugar for domestic consumption and export.
(f) Decontrol of sugar.
(g) Ordinance for taking over the management of the sugar factories by the government.
(h) Sugar Research Development.

1.31 SUGAR CONTROL

Statutory Control on sugar was first imposed in April 1942, under the sugar-products control order. The sugar controller to the government of India regulated production, distribution, and prices of sugar with effect from May 1, 1942, no sugar factory was permitted to effect sales of sugar to persons other than authorized by the sugar controller.

Control on sugar was removed with effect from December 8, 1947, after which was the Indian Sugar Syndicate again became the selling organization for factories in U.P. and Bihar statutory control was re-imposed with effect from 2nd December 1949 and an ex-factory price of Rs. 76.35 per qtl. For D-24 grade and corresponding prices for other grades fixed by the sugar syndicate were declared statutory prices under the Essential Supplies (Temporary Powers) Act, 1949. In April, 1955, Government requisitioned 25 percent of the production of all factories for distribution on a tender basis. During the seasons 1954-55, 1955-56 and 1956-57, Government did not fix ex-factory prices for sugar.

Control on price of sugar was re-imposed on 30th July, 1958. Other measures adopted by the Government were

(i.) Tightening of bank advances
(ii.) Licensing of wholesale dealers in sugar by State Government
(iii.) Banning of movement of sugar from Delhi and Greater Bombay
(iv.) Assignment of specific quota to individual states and
(v.) Banning inter-state movement of sugar.
Finally with effect from July 1, 1959, government took over the entire production of sugar for direct allocation.

The policy of full control was continued till 1966-67, when the production declined to 21.3 lakh tons. It was feared that if the policy of control continued during 1967-68, the production was estimated to decline further to 15 lakh tons, which would be hardly sufficient for the government to meet the internal demand. It was under these circumstances that the Union Minister for Food and Agriculture made a statement in parliament on 16th August 1967 and announced partial decontrol of sugar. Under this policy a quantity equal to 60% of the production achievement from 1st October, 1966 to 30th September 1968 at a fixed levy price and factories will be free to sell the balance production anywhere in India at the free market price subject to release from factories sanctioned by the government of India. Subsequently by a further order the government allowed levy and free sale in the ratio of 60:40 on the production of 1967-68 seasons. The policy of partial decontrol was continued during the subsequent two seasons 1968-69 and 1969-70. However, the ratio of levy sugar to free sale sugar was raised to 70:30. It was under these circumstances that government decontrolled sugar from 25th May 1971. However, Government regulated the monthly released of sugar during this period.

The policy of decontrol did not continue for a long time. The prices had showed an increasing trend towards the end of the season on account of sharp fall in sugar production during 1971-72 caused by floods in some important sugar producing areas and also due to diversion of cane area to other crops. It was under these circumstances that the industry voluntarily offered 60% of the monthly released quotas for distribution to the domestic consumers at a fixed price of Rs. 150 per qtl. Exclusive of excise duty

The government of India has extended the policy of partial decontrol for the season 1974-75 and the proportion of levy and It may be stated here that in computation of
final levy sugar prices. Government had taken into account the actual cane prices paid by the factories in different regions, the ex-factory realization of free sugar, etc.

Since 1982-83 a policy of larger release of free sugar has been continuously followed. The ratio of release of levy and free sugar which was 58:42 in 1981-82 deteriorated to 55:45 in 1982-83. In 1983-84, it was allowed to decline further to 49:51 and for the first time since the adoption of the partial decontrol policy, the free sugar released exceeded those of levy sugar. In the view of the industrialist this undesirable trend has been continued unabated during the sugar year 1984-85 and the ratio of levy and free sale sugar released till the end of May, 1985 had further deteriorated to 45:55. The government has now changed the ratio of levy to free sale sugar from 65:35 to 55:45 in 1986 session. Under the new policy the government has fixed the statutory minimum price at Rs. 16.50 per quintal for a basis recovery of 8.5 percent with proportionate premium every 0.1 per cent increase in recovery above the basis level.

1.32 POLICY TO LICENSING OF CAPACITY IN SUGAR INDUSTRY

Under the Industries (Development and Regulation Act), 1950, the licensing capacity in sugar industry is being regulated by the Central Government. The installed capacity of the sugar industry at the beginning of the first five year plan was 15.2 lakh tons which was later reassessed at 16.68 lakh tons. In 1954, the government reviewed the position and revised the capacity target for the first plan to 20.3 lakh tons for the second five year plan. The planning commission fixed the targets of capacity and production to be achieved up to 1960-61 at 25.4 lakh and 22.9 lakh tons respectively. In pursuance of the above decision, licensing committee was set up which examined the application for grant of additional capacity. In the light of the recommendations of this committee Government issued licenses for the establishment of 52 new units and for expansion of 71 existing units covering additional capacity of 12.12 lakh tons. Of the total 12.12 lakh tons additional capacity licensed, 7.37 lakh tons way by way of establishment of new units and the remaining 4.75 lakh tons by the way of expansion in the existing units. The total capacity licensed thus came to 28.79 lakh tons which somewhat exceeded the targeted capacity of 25.4 lakh tons fixed for the second five
year plan. But the total effective capacity of the sugar industry by the end of the second five year plan was 24.4 lakh tons and the remaining licensed capacity of 4.34 lakh tons was carried forward to the third five year plan. Up to the end of the third five year plan, the total capacity licensed in the sugar industry was 33.78 lakh tons including capacity of 16.68 lakh tons existing in the beginning of the Five Year Plan and 17.1 lakh tons additional capacity licensed over the first, second, and third five year plans. A total additional annual sugar production capacity of 28.14 lakh tons had been licensed since 1954.

In November, 1969, the government of India further reassessed the installed annual capacity in the sugar industry on the basis of sugar recovery and duration of the seasons for the last 10 years i.e. 1958, 59 to 1967-68. The Prospective Planning Division of the Planning Commission had envisaged a target not exceeding 40 lakh tons preferably 39 lakh tons for domestic consumption and 5 lakh tons for buffer stock, export, etc. for the fourth plan period (1969-74)

1.33 GENERAL LICENSING POLICY

The ministry of Industrial Development Vide their press note dated 1st January, 1972 announced certain relaxation in the licensing procedures. Under the revised licensing procedures, all the industrial units including sugar have been permitted to increase production.

(a) By increasing the number of shifts
(b) In other cases, the present relax
(c) action up to 25% of the licensed capacity has been enhanced to 100%

The above concessions are being allowed to all industries. The Working Group had recommended licensing the additional capacity by way of licenses for establishment of new sugar factories as well as expansion in the existing units in the ratio of 40:60. However, later the Agriculture Ministry which finalized the plan document reversed the ratio to 60% for new units and 40% for expansion projects. The Ministry of Industry (Department of Industrial Development) issued a Press Note dated 4th July 1980 indicating the guidelines to be adopted for licensing of new sugar production capacity during the sixth plan period. The guidelines are as follows:
(i.) The present policy of granting licenses for the establishment of new sugar factories in the cooperative sector and public sector will continue in sixth plan, however, in areas where proposals from the cooperative/public sector are not received, proposals from the private sector would be considered.

(ii.) A new sugar factory can be installed in an area where there is abundant sugarcane already existing or good potential for the development of sugarcane exists in a compact area, around the site of the proposed factory.

(iii.) To ensure the supply of adequate quantity of sugarcane in the existing units as well as further expansion, no license should normally be granted for the establishment of new sugar factories within a distance of 30 km. of the existing units.

(iv.) Where there are a large number of sugar factories located in one district, state government should make proper zoning of sugarcane area for each existing sugar factory before a request for expanding the capacity of any existing factory or installation of new sugar factories in that district considered.

GUJARAT SUGAR INDUSTRY

1.34 Significant of Gujarat Sugar Industry

Gujarat Sugar Industry has grown in the last few years due to the efforts taken by the state government. The Sugar Industry in Gujarat contributes a great deal to the total sugar production of the country and thus helps the country to meet its demand for sugar.

Gujarat Sugar Industry has witnessed significant growth in its production level over the last few years. This was being possible for the sugar Industry of the sugar industry in Gujarat has modernized its plants by setting up the latest technologically, advanced systems such as Anaerobic Digester System, Molecular Sieve Dehydration System, Cane Trash System, and RCC Bio Compost System. As a result of the modernization of the sugar Industry of Gujarat Sugar Industry, the quality of sugar that is being manufactured has also improved. The production level of sugar has also
increased in the sugar industry in Gujarat due to the fact that the total production of sugarcane has increased in the state.

The Gujarat Sugar Industry for the state it has helped in the development of the village areas by mobilizing the village resources and also it has helped in generating communication, employment, and transport facilities. The locations of the sugar Industry of Gujarat Sugar Industry are Vadodara, Bharuch, Surat, Valsad, Navsari, Tapi, Narmada and Junagadh District.

Table 1.34.1
Gujarat Sugar Industry

<table>
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<tr>
<th>Year</th>
<th>No. of working Industry</th>
<th>Daily Crushing Capacity (T.C.D)</th>
<th>Crushing of Sugarcane (lakh MTs)</th>
<th>Production of Sugar (lakh MTs)</th>
<th>Recovery in( %)</th>
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(Source: United States Development Authority)