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Department of Food and Public distribution

Government of India

Report of the Group of Experts on Sugar

Roadmap for Indian sugar sector

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April 2009

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Preface

A unique opportunity was provided to the expert group to look in to the reform requirements and the future roadmap of the sugar sector. The constitution of the EG with knowledgeable members and a willing Department Food and Public Distribution greatly helped in the proceedings of the group and its preparation of the report. The committee would like to thank Honourable Union Minister for Agriculture Shri Sharad Pawar for taking considerable interest in the EG's work and guiding the EG with his deep insights of sector's problems. Our sincere thanks are owed to Shri T.Nandakumar, Secretary, Department of Food and Public Distribution for his active interest. Many other sector watchers, practitioners had been very generous in their support through written submissions, oral presentations and informal dialogues. The visits made by the EG to Tamil Nadu, Uttar Pradesh, Maharashtra, Punjab and Haryana, VSI, were NSI were very informative and fruitful. The EG records in gratitude to the State Sugar Commissioners and government functionaries in the different states as also Director NSI and Director General VSI. The EG appreciates the support rendered by Shri R.P.Bhagria, Chief Director, Sugar and his dedicated band of staff in providing information and arranging logistics for the different meetings and visits. The EG places on record its appreciation of the invaluable support provided by Shri N.S.Sanyal, Joint Secretary, Food and Public Distribution (member-secretary of the EG) and Shri R.P.Bhagria, Chief Director, Sugar. The EG is extremely thankful to Shri Shivajirao Deshmukh, DG, VSI (and member of the EG) for providing the facilities and professional support for finalization of the report.

It has not been possible to individually acknowledge the contributions of several others for want of space. The EG would like to place on record its appreciation of the contributions made by all those who made an effort to bring relevant information and their point of view for consideration without which this report would have been much less rich.

Dr Vijay Kelkar (whose large shoes I had to fill in) through his initial briefing had eased my entry in to the EG's work. Shri U.C.Sarangi, Chairman, NABARD was a special invitee to the EG and had contributed significantly to the deliberations. On a personal note, as Chairman of the Expert Group, I had enjoyed working with the members whose deep understanding of the sector and pragmatic approach to problems made the task less complex. This report would not have been possible but for the active contributions of the erudite members. I would also like to thank the consultants Shri N.Srinivasan and Shri S.K.Gupta for their efforts in putting this report together.

The spirit that pervades the report is one of pragmatic reform calibrated to avoid transitory tensions normally associated with significant change initiatives. The report focuses more on macro aspects that hinder farm and mill profitability and proposes building a market based cyclical management capability in the sector, replacement of micro-controls with sector-regulation, investing in appropriate knowledge/technology dissemination and a push for expansion of the sector for increased exports and alternative energy products. Farm profitability and farmer comfort have been two non-negotiable aspects of the reform measures that have been proposed. I hope that the report which is the culmination of more than nine month of effort at different levels of the sector provides the roadmap for the future of the sector and make it vibrant.

Y.S.P.Thorat 23 April 2009

Executive summary

Sugar industry has been recognized as an important one for its contribution to food security, employment and contribution to exchequer. It full potential is however yet to be realized. The possibilities it offers for energy security in the form of fossil fuel supplements and electrical power are beginning to be recognized. While the farm and mill profitability have been affected by the recurring cycles, the emerging commercial potential of energy products provides the means of managing the cycles without significant loss of profitability.

The EGs recommendations address the interests of farmers, consumers and mills. Suggestions are also made regarding the role of government in determining policy.

Farmers' interests

Farmers' income should be targeted rather than the price of cane. This requires attention to productivity, varietal selection and sound cultivation and harvesting/transport practices. A comprehensive cane development programme should be adopted by the mills with support from the state governments to enable the farmers raise productivity and generate higher incomes per hectare.

Sugarcane price should be fixed on the basis of norms that ensure a positive net return to the farmer, enable farmer to attain a share of the high profits whenever sugar prices rule high, and take in to account the total earning potential of not only sugar but by-products also.

The SMP (which should continue as an interim arrangement) should include the value of bye-products based on normative values so that the initial cane payment fairly reflects the value of cane. SMP should be the only basis for cane price payments across the country.

Mechanisms should be evolved for avoidance of arrears in cane payments. Mills should be advised to create reserves during high profit years – with tax benefits – for meeting liquidity constraints that arise during periods of low sugar prices and high cane production. The penalties against delays in payments should be enforced through better regulation.

Over the long term, government should withdraw from fixing the price of sugar cane, after ensuring that a stable mechanism exists for fixing prices on the basis of well defined norms, acceptable to the farmers and mills.

Mill wise reservation of cane area may be scrapped as it introduces monopolistic tendencies and reduces choices for farmers. The mills should command loyalty of farmers through better services and efficient working**.**

The mills should source cane directly from farmers and any intermediary organisations that do not serve farmer's interest should be removed from intermediation through legislative action.

Appropriate structures and mechanisms which promote adherence to contracts by the mills as well as farmers, and a suitable dispute settlement mechanism should be immediately introduced. Standard contract documents have to be developed and circulated among the farmer's organizations and the sugar mills by the State Governments.

Mills need to undertake comprehensive cane development programmes and substantially raise the awareness and skills of farmers. The extension mechanism to take farm technologies and practices should be strengthened by the government in partnership with research institutes and mills.

Consumers' interests

The consumers belonging to the poorer sections should be protected through a targeted public distribution system in which sugar may be supplied at reasonable rates. The sugar required for PDS could be procured from the market without resorting to levy and similar other mechanisms.

Sugar should be removed from the list of essential commodities along with the phasing out of levy and market release mechanisms. The weight of sugar in the wholesale price index be reduced to reflect the reality of consumption patterns.

Millers' interests

To break the vicious cycles in sugar and cane production and prices, it is necessary that the entrepreneurs should (1) be made free to produce sugar, ethanol or other products from out of their plant and (2) be allowed to set up stand alone units producing only ethanol or other derivatives directly from sugarcane juice.

The mill sector should be completely free to expand and diversify so as to achieve maximum economies of scale and scope. The factories should be allowed to not only expand but also encouraged to diversify in to the different possible derivatives and products.

The states have to be persuaded to be reasonable in controlling the movement of molasses and also in taxing ethanol and its derivatives.

Ethanol should be given a strategic role in energy security of the country. Incentives for hybrid vehicles that could run on ethanol blends and increased levels of blending of ethanol are necessary.

The norms for power purchase by the power utilities should be codified and implemented uniformly across the country. SEBs should be mandated to purchase power to a specified extent from non-conventional sources. Easier norms and technical arrangements for purchase should be introduced in accordance with MNRE guidelines.

The levy and market release mechanism for sale of sugar may be completely done away with in a phased manner over a three year period.

The minimum distance between two sugar mills should be maintained at 25 KM with a provision for relaxation of the same for allowing new mills to enter when existing mills are not functioning well.

Banks should be free to determine their terms and criteria for finance. Banks should be encouraged to allocate resources and design fast track appraisal procedures for meeting the emerging requirements of cogeneration, modernisation and expansion.

The mills should recognize the cyclical nature of the industry and ensure that they create adequate reserves during the "high-profit" years for utilization during the down turn of the sugar cycle for managing cane payments and working capital shortfalls.

Policy issues

The sector should be decontrolled, with the decontrol measures being calibrated for completion of the process over five years. The Government should promote appropriate measures to reduce the cyclicality in sugar and cane production and their prices, by offering full flexibility to sugar mills in manufacturing any product from cane.

The desired policy response for stabilization of cane and sugar production and their prices comprises offering full flexibility to sugar mills in manufacturing of any product from cane, support to investment in new capacities for direct production of alcohol, ethanol and derivatives from cane, permission for setting up stand alone ethanol units, creation of cogeneration capacities and dismantling the market release mechanism for sugar.

The Exim policy with respect to sugar should be stable and provide a reasonable assurance of continuity to all stakeholders for a given period of time; this would provide the confidence to entrepreneurs for making investments in export manufacturing.

The sugar development fund loans should continue in their present form and promote energy conservation, pollution control, R & D, alternate raw material development, cane development, extension and mill process improvements.

The research and academic institutes (such as VSI and NSI) should be run autonomously by boards constituted with representation from industry, farmers' organisations and the government (without interference from the Government in the working of these institutes is envisaged. The funding of these institutions should be done out of the SDF. The government should invite the industry to come forward and design the governance and funding of the institutes in a PPP mode.

A Technology Mission on Sugarcane, which should address the issues relating to the sector from a techno-economic knowledge base, is required to guide the initial phase of productivity improvement. The mission could be designed on the lines of the other successful technology missions, with participation from farmers and industry.

Government should set up a Sugar Regulatory Authority (SRA) through an act of Parliament and confer upon it suitable powers for market conduct regulation and growth of the sector.

Report of the Group of Experts on Sugar

I Introduction

The Government of India appointed an Expert Group to examine the problems of the sugar industry and come out with suggestions to secure the future of this employment intensive sector that protects several rural livelihoods. The Expert Group (referred to as the "EG" or "the Group") was originally headed by Dr Vijay Kelkar. Subsequent to his appointment as Chairman of Finance Commission, Dr. Y.S.P.Thorat was appointed the Chairman of the reconstituted expert group. The group had ascertained the opinions of key stakeholders through a questionnaire survey, heard several industry bodies as well as farmers bodies, met sugar industrialists as well as experts, held discussions with academics and research institutes. A list of persons met and institutions visited in different parts of the country are enclosed in an annexure to the report. The EG was also helped by Indian embassies in China, Thailand and Australia which supplied information relating to practices obtaining in these countries.

The EG is thankful to Honourable Union Minister of Agriculture Shri Sharad Pawar for having been a continuing source of guidance and advice in its work.

Development of Sugar Industry

Sugar Industry in India started towards the end of 19th Century and early 20th Century. With protection from the Government, under Indian Sugar Industries (Protection) Act 1932, rapid development of sugar industry took place. A number of factories were put up in Bihar and U.P. During 1931-32, there were 32 sugar factories in India which

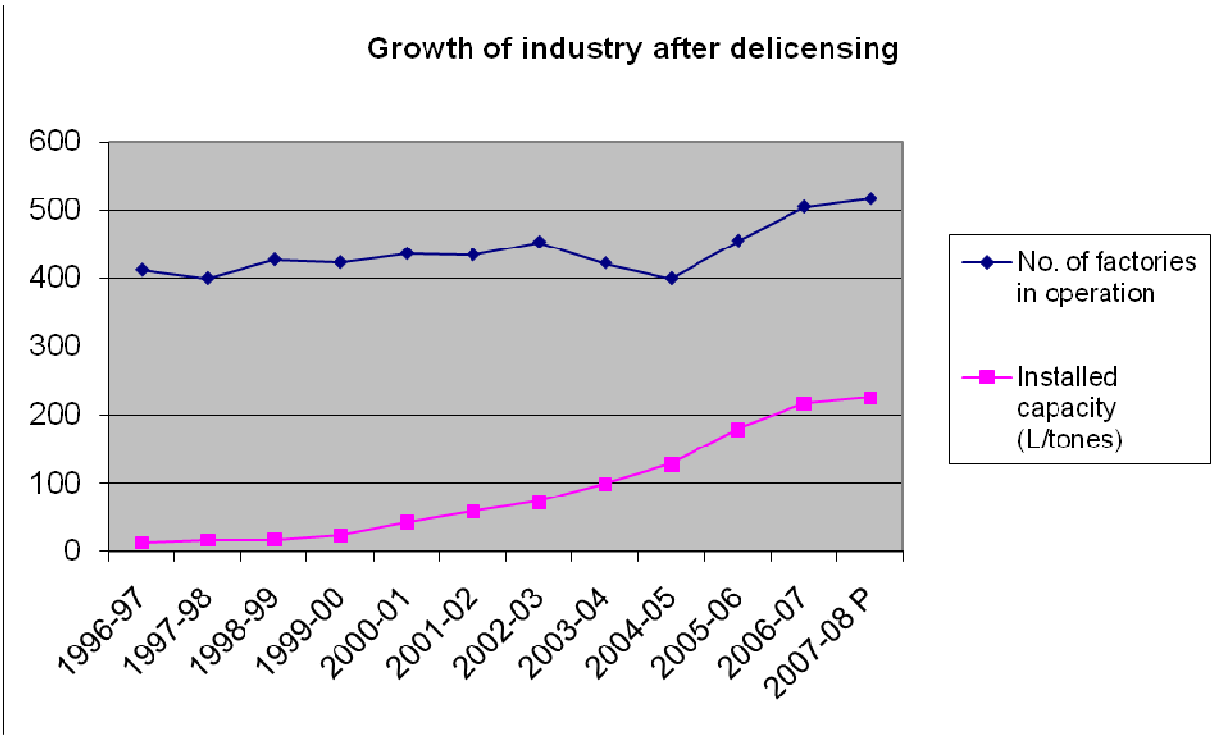
increased to 136 by 1935-36 with a production capacity of 9.47 lakh tons per annum. Subsequently, there was no appreciable development in sugar industry for a considerable period of time. The next phase of development began with the advent of Five year plans after the Industries (Development and Regulation) Act, 1951 came into force in May 1951. Under this Act, it became incumbent on each entrepreneur to take a license from Government of India both for establishing new factories and expansion of the existing sugar factories. In the initial years, the growth of the industry was in sub-tropical region comprising the States of UP, Bihar, Punjab and Haryana. However, under the five year plans, after 1950-51, large number of factories were set up in tropical region also which comprises the States of Gujarat, Maharashtra, Andhra Pradesh, Karnataka and Tamil Nadu.

Under the first Five Year Plan, the target of sugar production was fixed at 15 lakh tons. The industry, however, exceeded expectations and achieved a record production of 18.9 lakh tons in this period. The industry also turned in an equally commendable performance during the Second Five Year Plan. By 1960-61, it established a record production of 30.29 lakh tons with an installed capacity of 24.47 lakh tons. In 1965-66 season, which was last year of the Third Five Year Plan, the industry achieved a production of 35.37 lakh tons, exceeding the target of 35 lakh tons.

In the Fourth Five Year Plan, the Government had initially targeted sugar production of 47 lakh tons and licensed capacity of 48.65 lakh tons, which was subsequently revised to 55 lakh tons. During the 5th Five Year Plan period 1974-79, the requirement was estimated at 57 lakh tons and licenses were issued to 64 new sugar factories and expansion in 69 existing factories involving additional capacity of 18.74 lakh tons. The total licensed capacity at the end of the 5th Five Year Plan

stood at 76.16 lakh tons. For the 6th Five Year Plan (1980-85) Government of India envisaged a sugar production target of 76.4 lakh tons and the target of installed and licensed capacity were fixed at 80.4 and 96.2 lakh tons respectively. During the 7th Plan period ending 1989-90 the installed and licensed capacity targets were put at 114.6 and 132.6 lakh tons respectively. The licensed capacity in the industry stood at 175.56 lakh tons as against the target of 180 lakh tons at the end of 1994-95. At the end of Eighth Five Year Plan, the installed and licensed capacities were 148 and 200 lakh tons respectively. The country's sugar production level reached an unprecedented high of 164 lakh tons in the 1995-96 sugar season surpassing the earlier record of 146 lakh tons. Lack of interest in cane cultivation and inadequate availability of inputs adversely affected cane yields causing steep decline in sugar output from 164 lakh tons of 1995-96 to 129 lakh tons in 1996-97. Production in 1997-98 declined further to 120 lakh tons. In 1998 the Government announced the delicensing of sugar industry and made the process of setting up new sugar mills simpler.

Chart I.1



A direct result of the delicensing was the increase in installed capacity which has been rising steadily from 1999 -2000 onwards.

Sugar Industry's Contribution to National Economy

Sugar production in the last two years was high at 28.3 million tons and 26.3 million tons respectively, recording the highest level ever in 2006-07 and 40% higher than the peak level of production achieved in 2002-03. Sugar is the largest agro processing rural industry in India with 2.76% weight in annual industrial production. 50 million farmers and their families are involved in sugar cane cultivation and harvesting. Over 5 lakh workmen are directly employed. Employment is also generated in various ancillary activities relating to transport, trade, machinery servicing and agricultural input supply. The industry, thus, caters to over 7% of our rural population. By way of sugarcane prices about Rs. 23,000 crores were disbursed amongst cane farmers last year. Besides, its annual contribution to the Central and State exchequers by

way of taxes is around Rs. 5750 crores. Cyclically it has the potential to earn the foreign exchange through exports in two years out of six years. The turnover of the sugar industry is presently estimated at over Rs. 30,000 crores.

The industry does not depend on fossil fuel but generates its own renewable source of energy. It generates surplus power through cogeneration for supply to the grid. The installed exportable power capacity of sugar industry by 2006-07 was 1820 MW. It has the potential to generate 5000 M.W. of surplus clean power using bagasse as feedstock. The industry is in a position to meet the ethanol requirements of 5% blending with petrol with its existing capacities and improve energy security as well as promote ecological security of the country. Each sugar mill is a hub of local economic activity in the rural areas. With such large expanse and wide horizon of associated economic activities which can transform rural India, the sugar industry has indeed carved for itself a very important place in the Indian economy. But the sector has significant problems of farm profitability, mill profitability with cyclical fluctuations in cane supply and sugar prices. The future, with a demand surge both in domestic and global markets looks positive, but securing a sound future would depend on the policy response.

II The Sugarcane economy

2.1 Sugar cane is cultivation impacts about 50 million people in farm households directly or indirectly in the country. Uttar Pradesh, Maharashtra, Tamil Nadu, Karnataka, Andhra Pradesh, Gujarat, Haryana and Punjab are some of the leading states in sugar cane production. Sugar cane is a long term crop, taking between 10 to 18 months to mature. The soil conditions, irrigation and the varieties chosen determine the period of maturation. Planting is done in such a manner as to meet the time specific demands of the mills for crushing. With an average crushing season of 160 days, planting of cane has to be coordinated across hundreds of farms to ensure that cane matures throughout the season for crushing from October up to May.

2.2 A significant feature of sugarcane production is that productivity in states with large acreage is low.

Table II. 1

Area, Production, yield of cane - major states

State	Area ha	Production mill tons	Yield tons/ha
Uttar Pradesh	225.00	133.95	60
Maharashtra	105.00	78.57	75
Tamil Nadu	39.00	41.12	105
Karnataka	33.00	28.67	88
Andhra Pradesh	36.00	21.69	82
Gujarat	21.00	15.63	73
Haryana	14.00	9.58	68

Chart II.1

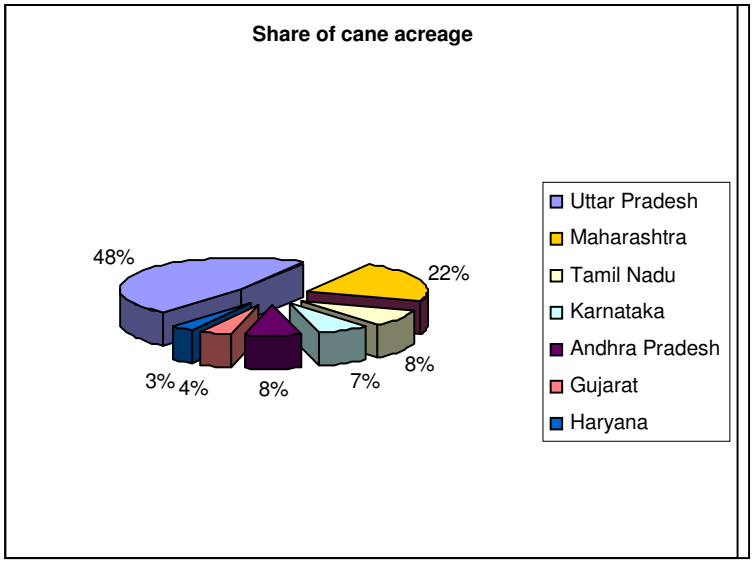
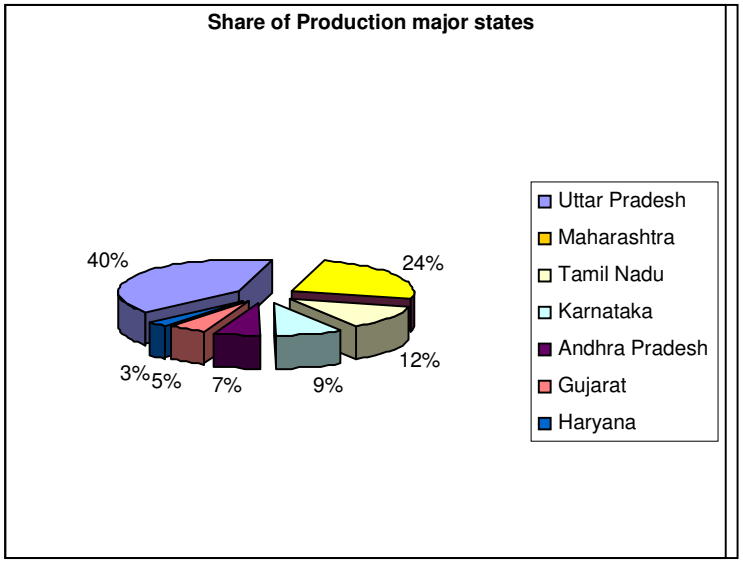


Chart II.2

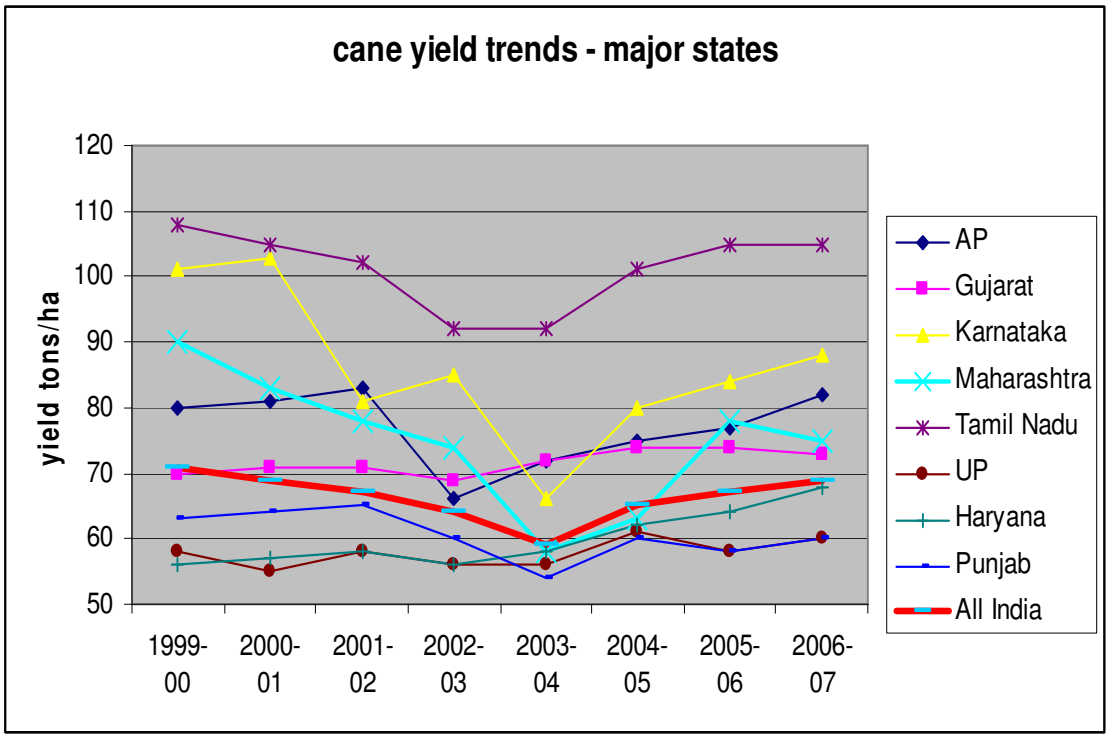


UP and Maharashtra have considerable land area under cane with attendant input use including that of scarce water in Maharashtra. If the land and water do not yield optimal cane output, the continued cultivation of cane cannot be justified and the farmers would suffer from lower incomes. While UP contributes 40% share of cane grown in the major states, it is cultivated over 48% of the land area under cane in these states. If productivity in UP is raised to the level of Tamil Nadu its

cane output could be raised in 12.8 lakh hectares, i.e., just 57% of the land presently used for cane cultivation. While the entire potential for productivity improvements possible in tropical conditions might not be realizable in sub-tropical regions, significant yield improvements are possible.

2.3 India's yield has steadily increased over the last five decades till the late nineties. While yield has consistently increased by more than 10% every decade from the fifties, in the last decade, yield has dropped partly due to climatic conditions like droughts etc. In fact the all India yield was the highest in 1994-95 at 71.3 tons per Hectare. This yield level has not been achieved in the following 13 years. The last season's yield was 2.3 kg less than that of 1994-95. At the state level, Tamil Nadu has increased its yield by more than 10% during the last seven years. However, yield in other states have not seen similar improvements.

Chart II.3



2.4 The recovery of sugar in India is lowest amongst key geographies. Recovery is a function of cane sucrose content as well as mill efficiency. India has the lowest recovery of sugar amongst the major sugar producers. The adoption of better seed varieties and farm protection can improve sucrose content leading to an increased recovery besides minimization of mill losses can improve mill efficiency thereby increasing the overall sugar recovery.

Farm Productivity

2.5 The farm productivity improvements should be enabled through increased yields as well as increased sucrose content of cane. Both of these would be driven by research and development which will focus on developing seed varieties, advanced farm practices and improved infrastructure for cultivation, harvesting and transportation. The details of the same are discussed in following paragraphs.

The low yield in subtropical areas is attributed to the following factors:

- Normal growth period is restricted to only 4-5 months as farmers plant sugarcane after harvesting wheat
- Extreme climate conditions
- Poor quality of sugarcane seed, which results in poor germination and tillering
- Frequent flood and drought conditions
- Presence of more pests and diseases
- Poor management of ratoon crop

2.6 At the farm level, income from sugar cane is dependent on price offered and the production level from unit land. The price offered depends on the recovery efficiency of the factory which again is a function of the cane varieties cultivated and the technical and managerial efficiencies in the mills. Even if the farmer supplies cane

with high sucrose content, his payment would be decided by the overall sugar recovery achieved by the mill. Farmer specific sucrose content analysis is not carried out at the time of buying cane and at present this does not seem to be a feasible proposition on account of the large number of supplier farmers involved. However it is necessary to develop a model of measuring sucrose content of cane in the farmer's field/mill gate so that options of determining cane payments on the basis of sugar content are available in future. This is possible with funding of a research institute and implementation in collaboration with a sugar mill as a pilot.

The CACP has observed that the cost of cultivation of cane differs widely from state to state. While the SMP is fixed on the basis of average cost of cultivation and sugar recovery, the varieties with higher sugar content do not command appreciably high prices and no disincentives are applied on farmers supplying varieties with low sucrose content and unregistered varieties. It has been observed that a large number of varieties have been rejected on account of their being unsuitable for cultivation and sugar milling. But their cultivation is continuing on a large scale. The State Governments instead of discouraging planting of rejected varieties fix a price for the rejected varieties also. For instance in UP against the SAP of Rs. 125 per quintal for normal varieties, the price fixed for the rejected varieties is Rs. 122.50 per quintal in the 2007-08 season. This actually encourages the farmers to be oblivious to the quality and the nature of the variety taken up for cultivation. It is necessary that once a particular variety has been declared as rejected, it must not be allowed to be planted by the farmers; its area must not be included in the survey and there should not be any fixation of cane price for the rejected varieties. The payment for the cane of rejected varieties must be governed on the basis of its recovery for which there is a provision in the Sugarcane (Control) Order.

2.7 Pricing of cane

The Statutory Minimum Price of cane is announced by the government of India based on the recommendations of the Commission on Agricultural Costs and Prices. The commission takes in to account cost of cultivation, reasonable returns to the farmer, profits available in sugar milling and sale in the light of market conditions for sugar and other relevant factors while recommending SMP. The SMP is a base price at a particular level of recovery and indexed to improvements in recovery in such a way that farmers gain higher prices with increased sugar recovery rates. Though the SMP is logical and determined after due study, different States have been announcing State Advised Price for sugar cane which becomes binding on the mills in the state concerned. At times these arbitrary prices tend to erode profitability of the mills and they seek to reduce crushing of cane in a bid to reduce the losses. The state's powers to fix high SAP has been the subject of considerable litigation; but in a recent judgment the Supreme Court has upheld the states' powers to fix SAP. In the interest of both farmers and mills, it is necessary that sugar cane prices are set in such a manner as to balance farm profitability and mills margins. A significant fact that emerges after analysis of arrears of cane payments is that arrears are low in states that adopt the cooperative model and in states that adopt SMP as the basis of cane price. The case for adoption of SMP seems a realistic and more equitable option for both farmers and millers. There is a case for introducing SMP as the only basis of price fixation and payment across the country and ending the competitive SAP announcements through necessary legislative action. The need for and justification for amending the Sugar Cane Control order to provide for one price for sugar cane should be seriously examined by the government of India.

2.8 Sugar cane in India is priced much higher than in other countries and even with that the farmers realize a lower net return per hectare.

The elimination of market forces in price determination of sugar cane does not seem to in keeping with the reforms that have taken in the economy. The argument that the farmers are small compared to the monopoly purchasing power of mills has limited validity as the farmers' loyalty is critical to the mills survival. In years of cane shortage, the prices paid for cane exceed the SMP and SAP with both the mills and farmers coming to an agreement. A long term goal on the cane pricing issue is to let the buyer and seller determine the same without external intervention as in the case of any other agricultural produce. External intervention in price fixation renders the primary stakeholders less responsible and leads to extreme reactions as well vexatious and time consuming litigation. The basic for price determination could be provided by the government from its experience of fixing SMP. The CACP should continue to play an advisory role in carrying out studies and producing analytical recommendations that are region specific. The individual mills or their state level associations could negotiate with the farmer suppliers and fix the price from year to year. Once the state steps out of price fixing role the mills and farmers would adopt a more collaborative attitude. Since State ends up as a party in any litigation that ensues (practically every year), the necessity of state withdrawing from price determination role needs no emphasis. The state could play a role in providing mechanisms of dispute settlement.

- 2.9 The Government would be able to withdraw when the mills and farmers mature under controlled conditions to respect a norm based price that protects the interests of the farmers. Till such time a new framework of negotiated prices is brought in the government should Stipulate the norms for determining price and declare the same to all stakeholders

- Declare a uniform price for cane that rewards the farmers in terms of the uniform norms without allowing State governments to fix their own price
- Stipulate a 14 day period for payment of cane price as per determined rates and enforce the same with penal action where needed
- Stipulate a three month period from the end of the sugar year for additional cane payments under clause 5A of sugar control order
- Create a dispute redressal mechanism on the lines of Lok Adalat that would take care of contract performance issues.

In the expert group's assessment, certain non-negotiable norms should underlie cane pricing, regardless of who fixes the price. These principles are

i. **The price should not only compensate the farmers for the labour and inputs but also provide a net positive return.**
ii. **Further in years when the sugar prices rule high, the price should enable farmer to gain a share of the same.**
iii. The return to the farmer should also take into account the income earning potential of bye-products of sugar such as power from bagasse and alcohol/ethanol from molasses.

These principles should be incorporated in the sugarcane control order as the basis for price determination.

The additional payments (under clause 5A) should take in to account the commercial potential of bye products. Apart from factoring in sale price of sugar during the year, the realizations obtained from use/sale of bye products should also be added in the calculation of surpluses for determining additional payments. As bye product availability is a certainty, the SMP fixation should take in to account its potential value.

The economic potential of cane through understood, is not factored into calculations of its price.

Table II.2

Economic Potential of sugarcane[1]

Products obtained from 1 tonne of cane	Amount	Remarks
Sugar (kg)	100	Recovery rate varies between 9% and 11%
Molasses (kg)	53	Recovery rate can go up to 6-7% depending on route adopted
Alcohol (litres)	13	Can be much higher if cane is directly converted to ethanol
Bagasse (kg)	300	Recovery rate varies between 27-33%
Surplus power (KWhr)	100	Can vary depending on boiler configuration

Table II.3

Value potential per ton of cane[2]

Product	Gross realization per tonne of cane crushed (Rs)	Net realization (Rs)	Price assumption	Unit
Sugar	1,800	300	18	Rs per kg
Molasses	130	90	2,500	Rs per tonne
Fuel ethanol	270	130	21.5	Re per litre
Bagasse	100	70	300	Rs per tonne
Surplus power	300	150	3	Rs per KWhr

The net realisation from other bye products is about 30% of the gross realisation from sugar. In purely net terms, bye products realise a higher value than sugar. Hence the cane pricing formula should capture the full value potential of sugar cane.

The last notification on the subject requires the inclusion of bye-product value in calculating the returns to the mills. Instead of making the bye-product value payable as part of clause 5A payment, the same should be brought in to the SMP. Normative values based on previous years' price trends may be incorporated in the SMP so that the price reflects a fair

[1] Source: Credit Suisse equity research 2008
[2] Source: Credit Suisse equity research 2008

estimation of cane's value potential. The matter needs discussions with the CACP for operationalisation.

Focus on farm income

2.10 Presently both the farmers and the mills intensely focus on the Statutory Minimum Price announced for sugarcane. Farm incomes are no doubt influenced by the price of cane, but more importantly by the productivity levels. Farmers that achieve higher productivity of sugar cane would realize higher net income from the farm. If the higher productivity is of a superior variety of cane, the recovery of the mill would improve thereby improving the price of cane.

The focus on farm incomes should shift from ***"price per ton of cane"*** to ***"return per hectare cultivated"***. The scope for stepping up farm productivity is considerable. The per hectare yield levels of Tamil Nadu are not achieved in the two leading sugar states of Maharashtra and Uttar Pradesh. While climate is a reason, it is not the sole determinant of productivity. The yield levels of Maharashtra have declined over the last ten years, while UP yield levels have stagnated. Table II.2 brings out clearly that high SMP/SAP do not translate to high farm incomes. In fact the highest price fixed for cane still results in lowest income per hectare on account of low yields.

Table II.4

Per hectare income comparison Tamil Nadu, Maharashtra and UP[3]

	Tamil Nadu	Maharashtra	UP
Yield MT per ha	105.1	74.8	60
Recovery %	9.5	11.7	9.8
SMP/SAP for cane recovery Rs (Computed for 2007-08)	105	105.50	125 (SAP)

[3] Calculations made from data available from ISMA sugar statistics 2008

Gross revenue per ha for farmer (Rs)	110250	78914	75000

The sucrose content of Indian cane is low, making high prices for cane uneconomical. Unless the issue of sugar content and yield are sorted out through a well orchestrated cane development programme by every sugar mill (with government support), the contentious issue of adequate remuneration to the farmer cannot be sorted out. Adequacy of farm incomes is a major cause of swings in cane planting. The cane pricing mechanism should include incentives for improved yields as also improved varieties. The mills have a significant role to play in cane development and planting of appropriate varieties with due regard to early, normal and late maturing varieties as per its crushing programme. The farmers have a critical role to play in ensuring that the plan of the sugar mills is adhered to so that profitability of the mills is sustained and thereby the farm incomes.

2.11 A holistic Research and Development approach is necessary to enhance yield of plant and ratoon crops by using improved varieties, optimum dosage of nutrients, water, insecticides and timely agronomical practices. Timely availability of electricity for irrigation is must. Introduction of high sugared and high yielding varieties with close cooperation of the research institutes and sugar industry[4] are the need of the hour.

Low industry investment in cane research is evident from the fact that the amount of funds disbursed from SDF towards research has been 0.7% of the total disbursements. The Industry being the direct beneficiary of research would have to play a major role in funding research activities.

[4] In Brazil, there is a national programme for seed research which involves the Government, Industry and Universities. It has successfully been able to release varieties in 6 to 7 years as against a typical duration of 10-12 years.

2.12 The declining labour availability and increasing labour cost are pushing the cane farmers inexorably towards mechanisation in sugarcane cultivation including planting and harvesting. On account of the small size of holdings farmers mechanized planting and harvesting has not been prevalent in the country so far. It is, therefore, necessary that smaller size implements suitable for use in Indian conditions, where the fields are of smaller size, must be introduced and be made available to the farmers at subsidized rates. Some of the work already done in this regard by institutions like VSI should be validated and the equipments marketed on a wide scale.

2.13 Intercropping and growing of companion crops along with sugarcane will augment the income of the sugarcane farmers. To make it more popular, autumn and spring planting of sugarcane should be encouraged along with which the growers can plant other crops like potato, onion, garlic, mustard and chillies etc. which are short duration crops and which do not affect the yield of sugarcane.

2.14 Irrigation is a key requirement as well as a cost item in sugar cane cultivation. Most cane is cultivated under flood irrigation, which entails higher consumption of fertilizer and water. The productivity levels achieved under managed irrigation systems such as drip irrigation have been better. Field trials by Vasantdada Sugar Institute found that apart from conserving water, the productivity of drip irrigation was the highest.

Table II.5

Yield response to irrigation[5]

Type of irrigation	Water used (ha –cm)	Cane yield (tons/ha)	Water use efficiency(mt/ha-

[5] Based on a paper presented by VSI

			cm)
Furrow (flood) irrigation	258.45	104-42	0.40
Rain gun sprinkler	175.26	126.56	0.72
Drip irrigation	**132.14**	**128.64**	**0.97**

Flow irrigation has adverse environmental impact that affects farmlands. Areas that had continually been under flow irrigation for years, have suffered from high salinity especially in poorly drained, low lying areas. Solutions to such farms both for reclaiming them from salinity and appropriate cultivation practices have to be implemented. Flow irrigation also raises issues of equity in water use and hence deserves to be controlled especially in sugarcane cultivation. While technologies are available to deal with these problems, the mills have to play proactive roles in finding such solutions and making the farmers aware.

2.15 For sustainability of crop productivity and soil health, soil testing programme should be made mandatory to know the fertility status of the soils so that nutrient management programme could be planned and implemented. The sugar mills should take the lead responsibility in organizing these programmes which would also serve the mills well in securing the loyalty of farmers.

2.16 It has been observed that some cane varieties are released by the Research Institutes of the State Governments without involving the sugar industry as well as the farmers. Particularly in the States of Uttar Pradesh, Uttarakhand, Bihar, Haryana and Punjab, the action with regard to the varietal composition is not coordinated, nor there seems to any effective consultation with the sugar industry. Varieties of cane are released by the State Sugarcane Institutes, which are generally not found to be up to the desired standard in terms of recovery and yield. Even the varieties released under the India Coordinated Research Programme for

Sugarcane (ICR) are not adopted by the Research Institute of respective States. It is imperative that the varietal programme of the States must go hand to hand with the full cooperation of the sugar industry and All India Coordinated Research Programme on Sugarcane. In addition to the above, the following steps need to be undertaken:

i) There should be one nodal group for release of suitable varieties comprising the experts of Sugarcane Breeding Institute, Coimbatore, ICAR, Indian Sugar Mills Association, NFCSF Ltd. And representative of State Government to check the release of low sugared unwanted varieties.

ii) Scientific seed production cum distribution programme should be intensified.

iii) Each sugar mill should allocate 50-60 acres of farmland to conduct adaptive trial of new varieties and seed production.

iv) New technologies should be adopted to increase the germination of sugarcane buds from 65% to 70% as in tropical area.

iv) Identification of varieties suitable for late planting (after wheat) in subtropical areas should be prioritized.

v) Crop management programmes that would allow the farmers to take 2-3 ratoons with better yields should be designed and implemented.

2.17 The maximum limit of Rs. 3 crores for cane development schemes under SDF may also be removed[6]. The present procedure of submitting loan application through the concerned State *Government should be modified to permit mills to submit application to* SDF directly with a copy to State Government for information. Loan amount should be paid to be concerned mills directly and not through the State Government.

[6] If it is not feasible to remove the ceiling then it should be increased to Rs. 6 crores

Financial Norms fixed for raising nursery, incentives to farmers for new varieties etc. and ratoon management need to be revised. The Government should appoint competent and independent monitoring agencies having required expertise to ensure proper implementation of the project.

2.18 Credit for sugar cane farming has normally been available on account of its assured market and the arrangement with the mills for recovering and passing on loan dues to banks. There have been concerns that the scale of finance per hectare has been less than the need based cropping requirement and farm and irrigation improvements which required long term loans were generally not entertained by banks. However where the mills are sound and proactive, banks would not normally deny credit to the farmers. NABARD might be requested to issue guidelines to the banks for meeting all reasonable credit needs for both investments on farm as well as cultivation of cane.

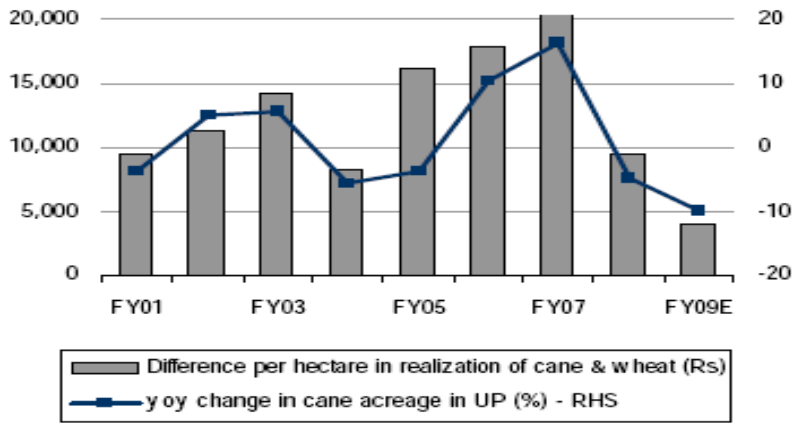
Competition from other crops

2.19 Competition from other crops limits cane planting and weans farmers away towards more certain and remunerative crops. The consistent rise in farm-gate prices of rice and wheat on the one hand and the stagnation/decline in income from cane is fast changing the relative economics of cultivation between crops (Chart II.4). While sugarcane has been one of the most profitable crops for Indian farmers the relative difference in realisation per hectare between cane and wheat is fast diminishing. While in absolute terms, cane is still slightly more profitable, the cane payment arrears and the delay in second instalment of payment render the additional profits insignificant. The threat to cane is not just from wheat and paddy. Price of soybeans and other oilseeds have increased over the past couple of years which will influence farmers

to shift from cane particularly in Maharashtra[7]. Cane price determination and mills response to cane prices should factor in the competitive pressures from other crops with improved profitability.

Chart II.5

Fluctuating cane acreage and income from competing crops[8]



2.10 Apart from determining a reasonable price, payment of the same without delay has also to be ensured. Cane price arrears tend to reduce the returns to the farmers and discourage them from cultivation of cane in the following season. When other crops that do not carry delayed payment problems, the motivation to take up their cultivation is powerful. Presently the stipulations are that the value of cane supplied by the farmer (at SMP) should be paid within 14 days of supply. Very often this time limit is breached. The mills have several problems such as inability to arrange for bank credit, inability to market sugar for want of release orders, etc. In the absence of arrangements for immediate sale of sugar to raise enough funds, cane payments depend on adequacy of bank credit. The expert group is of the view that the mills should pay 66% of the contracted price (if it is higher than the SMP) or the SMP within 14 days. This must be invariably adhered to and any failure

[7] Cane acreage in Maharashtra has been more volatile than in Uttar Pradesh having swung by -30% to 70% Year on Year over the last 10 years decade.

[8] Chart adapted from India Sugar Sector research report by Credit Suisse, 2008.

should be penalized. The provision for payment of penal interest to farmer for delayed payments should be strictly enforced. The payment of additional price for sugarcane (Clause 5A of Sugarcane control Order) is usually delayed; this has to be expedited and payment ensured within three months from the end of sugar year[9]. A cyclical problem that adversely affects the farmers and thereby supply of cane is the 'cane arrears'. The mills which do not have a good margin between the price realized on sugar and the price payable on cane find it difficult to meet the payment obligations to the cane growers by the end of the sugar year. In 2002-03, the total arrears of the industry to the farmers were at a peak of Rs 4770 crores. When payments of such large sums are delayed, farmers find it difficult to cultivate cane in the next crop season. Some suggestions on avoidance of payment of arrears by mills have been made in the later part of the report.

2.21 Cane reservation

The practice of reserving cane from particular areas for specific mills has been in vogue for a long time. The practice ensured that mills are able to procure their requirements near their location. The farmers benefit by the advance knowledge of who is going to purchase their cane. But this arrangement has also been subject to abuse depending on whether the supply of cane in a particular season is short or excessive. The monopolistic purchaser would be compelled to be sensitive to farmers needs if the farmers have the freedom to sell their cane elsewhere. Government should consider allowing sugarcane growers to supply sugarcane to any sugar factory of their choice. The SMP varies from

[9] The CACP has in its report on SMP for 2006-07 stressed this. "The L factor is actual cost of producing one unit of sugar and it is declared, *zone-wise*, by the Directorate of Sugar. Based on the L factor and the accounts of sugar factories, the State Governments determine the liability of each sugar factory to pay the additional cane price. Unfortunately, the Directorate of Sugar could not declare the L factor in time in the past. Government should declare the L factor within three months of the close of a sugar season. Also, the Government should take necessary steps to declare the L factor for 2003-04 sugar season without any further delay. Further, the Government may get the suggestion of the Government of Tamil Nadu examined to delegate the power to declare L factor to the State Governments"

factory to factory depending upon recovery rate of the individual factories. The sugarcane growers in the reserved area of a factory with low recovery receive lesser price even when they supply high quality cane with high sucrose content. There is a need to encourage sugar factories to improve their recovery rates so that sugarcane growers get higher cane price. The freedom to farmers in sale of cane would make the mills to optimise their efficiencies and take measures to increase sugar recovery. The factory wise reservation of cane area (which is in place in a number of states) needs be scrapped both in the interest of farmers and the mills. The mills should command loyalty of farmers through cane development programmes, fair practices in cane procurement, reasonable prices on account of efficient working and prompt payment of price.

The problem of excess crushing capacity within given local area cannot be solved by cane reservation. Either the mills must infuse confidence in farmers to cultivate and supply sugarcane (which is also determined soils and irrigation) or suffer consequences not being able to influence farmers. Reservation cannot augment cane supplies, but can distribute the shortfall across mills. But this is a function better performed by the market and hence cane reservation as a policy exercise of the state must be given up.

2.22 Intermediate organizations of farmers

One of the questions that have been agitating the minds of farmers especially in Uttar Pradesh is the presence of intermediary structures cane societies that handle the sugar cane supply to the factory from farmers and payments from the factory to the farmers. The behaviour of some of the societies has not been liked by the farming community on account of several problems faced in hassle free cane procurement as also settlement of payments. The cane societies play a role in deciding the sequencing of cane cutting, releasing payment received from the mill and ensuring the deduction of bank loan installments if any. The

societies also play a role weighment of harvested cane and transport of the same to the mill. Some of the cane societies have reportedly engaged in rent seeking behaviour in all aspects of their work. On the part of the factories they find it convenient to deal with a cane society instead of dealing directly with hundreds of farmers. The factories do not mind paying a small commission to the societies so that the administrative hassles of dealing with several individual farmers are outsourced. In order to impart a greater measure of freedom to farmers and to ensure that their linkage with the sugar factories remains strong, it is necessary that the intermediating agencies do not become powerful. The farmers should be in a position to take decisions and ensure performance of contract terms by the mills instead of having to rely on intermediaries[10]. The intermediary societies can continue to exist and serve members where they have confidence in their society. But where the farming community feels that the society is not functioning in their interest, the opinion of farmer members using each such organization should be ascertained through a poll) such societies should cease to deal with the mills on behalf of their members. In a phased manner the arrangements should be phased out.

2.23 Contract documentation, enforcement and dispute settlement

Farmers have found it difficult to make mills stick to their obligations under the cane purchase contracts. Enforcement of contracts of supply of cane as also the payment of price (including interest for delayed payment) has been a continuing issue. Presently the terms of supply of cane are difficult to enforce both on the part of mills and on the part of the farming community. While the State takes up elaborate measures for

[10] The experience in Pakistan where the intermediating societies were removed was that the mills had to appoint agents for aggregating and procuring cane. Some aspects of this development were not positive. But the agents bind the company for their acts of omission or commission, whereas the cane societies supposedly intermediate on behalf of the farmers leaving them limited options in case of grievances.

fixing the price of cane, it does precious little for ensuring that the farmers realize the same. In times of cane scarcity farmers tend to breach their contract with the mills and divert the cane to the highest bidder. Similarly in times of excess availability of cane, the factories do not procure the entire cane supplied by the contracted farmers. The farmers insist that the mills procure all the cane grown by them including acreage not registered with the mill. This two way breach of contract terms has to be dealt with in a mature and equitable manner so that continuing loyalty of farmers to the mills is ensured. This has a direct bearing on the issues relating to area reservation referred to earlier.

The documentation of price contract and procedure for settlement of disputes is also an area of farmers' concern. Standard documents should be developed in each state in the local language as a onetime measure. The contract templates should be circulated among the farmer's organizations and the sugar mills by the State Governments. Mills should be persuaded to issue long term purchase contracts of five years or more. The price contracts should be issued each year based on the prices agreed upon at the beginning of the cane planting season. Very often the farmers find it difficult to enforce contract terms including that of price and timely payment. Being small and scattered in nature they are unable to fight out the issues with the sugar mills which have a much larger capacity to engage in litigation. With limited familiarity of law and ability to hire legal expertise, farmers find it difficult to raise a dispute and get it settled. A good functioning mechanism for enforcement of contract on both sides would render area reservation requirements unnecessary. There is a need to set up localised mechanisms on the lines of Lok Adalats/Nyay Panchayats that would be able to arbitrate between farmers and mills and settle disputes quickly. Local persons with credibility who enjoy the confidence of both farmers

and the sugar factory may be identified to head such dispute settlement mechanisms to arbitrate on the disputes.

2.24 The sugar cane economy has numerous farm households producing for a monopoly buyer of raw material. The prices are fixed based on norms relating to cost of cultivation, price realised on the finished goods and the need for a fair return to the farmer. While difference of views exist between farmers, sugar mills and the governments at the centre and states on sugar cane price, the experience of farmer in realising income in full and on time has guided their response to the planting of cane in every subsequent crop season. Arrears of cane payments at times running in to months of delay has discouraged farmers from planting cane with attendant adverse consequences on sugar production, mill profitability and consumer price stability. The policy response has been to view the farm income issue as one dependant on price fixed for cane despite there being considerable evidence to the effect that farmer chooses between alternative crops on the basis of income realised per hectare per crop season. The recent increases in price of grains and oil seeds would tend to put pressure on cane acreage. A long term solution to the problem of volatility in cane acreage and production is to target stabilisation of incomes from cane cultivation and make it competitive in comparison with other crops. Productivity enhancements, introduction of new varieties that improve sugar recovery and mill profitability, ensuring payment of price of cane within reasonable time limits, absorption mechanisms for excess cane including direct ethanol manufacture and responsible behaviour from the mills even during times of cane glut would go a long way in stabilising cane availability. A point worth remembering is that the farmers have alternatives to sugar mills and sugar cane, but the mills have no alternative to farmers for their raw material supplies. This realisation would work on the mills in a freer

environment and make them behave professionally in their commercial interests.

2.25 Sugar Beet prospects

Sugar cane is almost the sole source of sugar in India. Due to the cultivation patterns and the sugar loss in summer months, the mills have to remain idle for more than six months in a year. Alternative sources that could supplement cane as a raw material for sugar could improve mills economics and also provide an opportunity to more farmers for growing cash crops. Sugar beet has shown considerable promise in the trials conducted so far. The normally sub-tropical crop has now been tropicalised with considerable improvements in output. This is salinity resistant and requires much less water than cane. The crop duration is also short (about 5 months) and can be cultivated so as to be available for crushing after the cane season is complete. Egypt and Iran have mills that use dual raw material of cane and beet. Beet development program should be taken up to relieve the stress on scarce cane supplies in some years and the demand on water from sugar cane crop. Balancing equipment would be required in the mills to slice and extract juice from beet for which technology is available.

Apart from sugar beet, other raw material such as sweet sorghum

2.26 Future scenario for cane production[11]

Table II.6

Sugar required in 2025	37 million tons		
Cane required Million tons	At 10.5% recovery	At 11% recovery	At 12% recovery
	352.38	336.36	308.33

[11] Calculations made by consultant

Milling at 75% of output, total cane required	469.84	448.48	411.11
Land needed million ha			
Output assumed at 70mt /ha	6.71	6.41	5.87
Output assumed at 85 mt/ha	5.53	5.28	4.84
Output assumed at 100 mt/ha	4.70	4.48	4.11
Land under cane - million ha			
2006-07	5.15		
2005-06	4.2		
2004-05	3.66		

Based on the current consumption pattern, it is projected that domestic requirements of sugar would increase to about 34 million tons. India should also export about 3 million tons of sugar, partly capturing the market space vacated by EU. The total requirement of 37 million tons of sugar is 40% higher than the last two years average production of sugar. The key raw material, cane would determine whether the industry is able to respond to the demand. At present levels of sugar recovery and sugar cane productivity, 6.71 million hectares of land would be required. This in effect requires diversion of more than 1.5 million hectares of prime farm land to cane from other crops. Such large scale diversion of land would undermine food security and is not considered feasible. The maximum area under cane was reached in 2006-07 with 5.15 ha of farm land being used for sugar cane. With the income pressure from shorter duration crops, expansion of cane acreage significantly is not a feasible proposition.

Improving cane productivity and cane quality is the only solution to challenge facing the industry as well as the country. As the table II.4 reveals, less farm land than is currently under cane is sufficient to produce the required cane if suitable varieties that would ensure recovery of 11% are raised under good cultural practices to achieve a yield of 100 MT per ha. Recovery of more than 11.5 % has been achieved consistently in Maharashtra with some mills having more than 12%

recovery. Tamil Nadu farmers have been able to harvest 100 Mt per ha of cane over the last four years continuously. Unless a combination of suitable varietal selection and good cultural practices are introduced under a well orchestrated cane development programme by every sugar mill, India may have to turn in to a sugar importing country. The various possibilities for producing required cane under differing recovery and yield have been presented in the table II.6. The proposed Technology mission on Sugar should prioritise productivity improvements that would enable raising enough sugarcane to meet the future requirements within cane acreage of less than 4.5 million hectares. This is essential not only for improved profitability of sugarcane farming and sugar milling, but also for saving cultivable land for other crops in the interests of food security.

III Sugar Industry

3.1 The sugar industry has registered impressive growth in installed capacity as well as production. While cyclical fluctuations have impacted the industry from time to time, it has managed to add to sugar manufacturing capacity and also diversify in to ethanol manufacture and cogeneration of power. The capacities existing in 2007-08 across the country are in the following table

Table III.1[12]

Installed capacities

Product	No of mills	Capacity

[12] Data source: ISMA sugar statistics

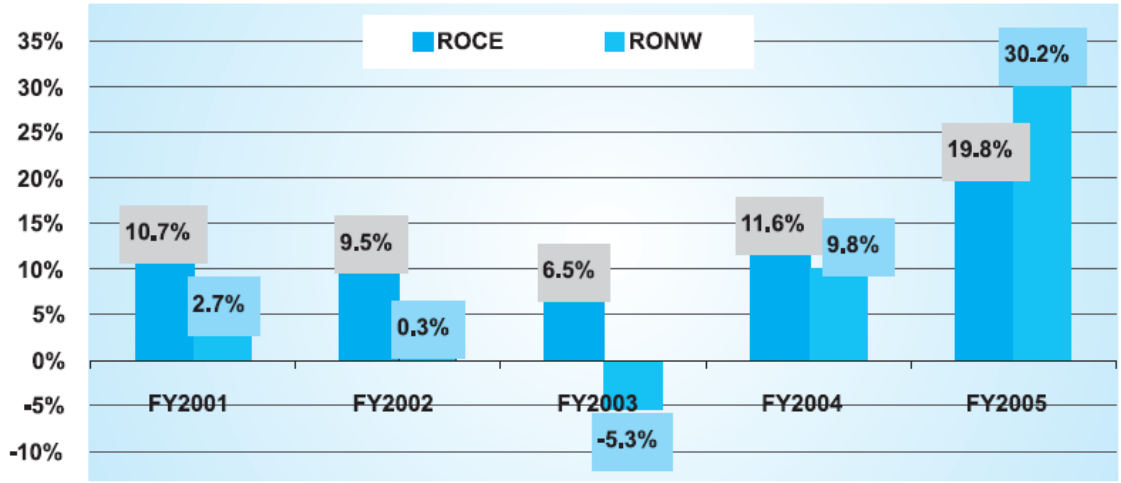
Sugar	516	224.8 lakh tons
Ethanol	125	16.9 lakh kilolitres
Power (06-07)	80	1807 MW

The industry had exported 22.2 lakh tons of raw sugar and 13 lakh tons of white sugar in 2007-08. But continued exports from India would depend on the export policy of the government. The cyclical nature of sugar in India is not just on account of commodity cycle, but also due to the regulatory attempts to balance the interests of all stakeholders. Sugar milling is not a highly profitable proposition.

The KPMG report[13] on sugar sector roadmap concludes that many major companies posted zero returns in certain years and during the ten year period 1997-2006 large listed companies failed to produce economic profit – that is a return in excess of weighted average cost of capital.

Chart III.1

Return on capital employed and net worth – sugar industry[14]



[13] The Indian Sugar Industry Sector Roadmap 2007, KPMG India
[14] Source: ICRA sector analysis, Indian Sugar Industry 2006.

ROCE – Return on Capital Employed

RONW – Return on Net Worth

Source: ICRA sector analysis Indian Sugar Industry 2006

3.2 The periodic addition to installed capacity is as shown in table III.2. The production has been in excess of the installed capacity in some years as the crushing season was much longer than the average of 160 days assumed while working out the production capacity.

Table III.2

Growth of installed capacity over years[15]

Year	No. of factories in operation	Installed capacity (L/tons)	Actual sugar production (L/tons)	Duration of crushing (Days)
1950-51	139	16.68	11.01	101
1955-56	143	17.77	18.90	145
1960-61	174	24.47	30.21	167
1965-66	200	32.10	35.37	159
1973-74	229	43.06	39.48	138
1978-79	299	59.10	58.44	140
1984-85	339	72.74	61.64	107
1990-91	377	98.48	120.46	166
1995-96	415	127.61	164.29	182
2001-02	433	178.40	185	151
2006-07	500	216.25	283	165

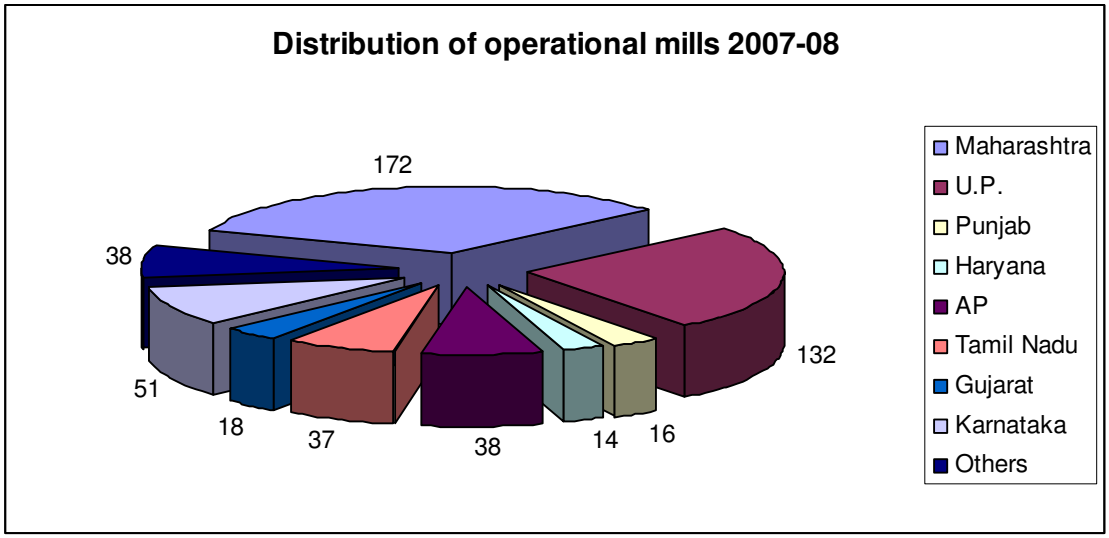
The manufacturing capacity is distributed over 10 States. During 2006-07 these states were responsible for 99% of the national sugar production with Maharashtra and Uttar Pradesh leading with 32 and 30% of the total sugar output respectively. Four States (Andhra Pradesh,

[15] Source: ISMA sugar statistics

Gujarat, Karnataka and Tamil Nadu) produced more than 1 min. tons of sugar per annum. Four States (Bihar, Haryana, Punjab and Uttaranchal) have annual production from 0.4 to 0.7 min. tons each.

The state-wise break-up of factories at during 2007-08 is in the following chart:

Chart III.2[16]



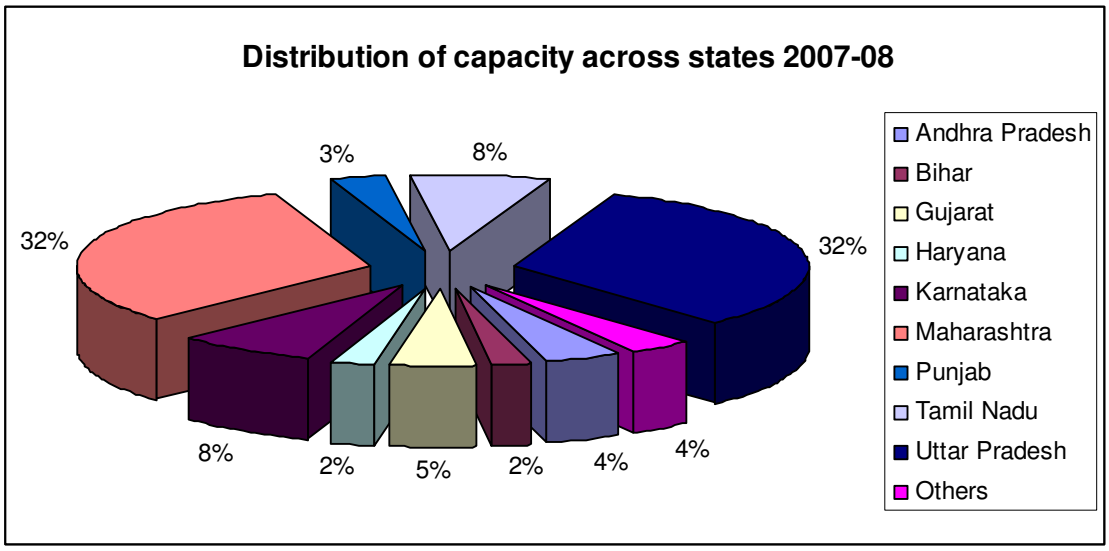
Maharashtra had more operational mills followed by UP. Together they accounted for 58% if operational mills. The rest of the states have a few mills.

Most sugar manufacturing mills are in the cooperative sector in terms of numbers. While 249 coop mills were operational in 2007-08, 267 mills in private and public sectors were functional.

While Maharashtra had more operational mills (40 more than UP) it had the same sugar manufacturing capacity as UP. The average size of mills in Maharashtra was smaller as most of the mills were cooperatives.

[16] Chart prepared from data in Cooperative Sugar journal December 2008

Chart III. 3

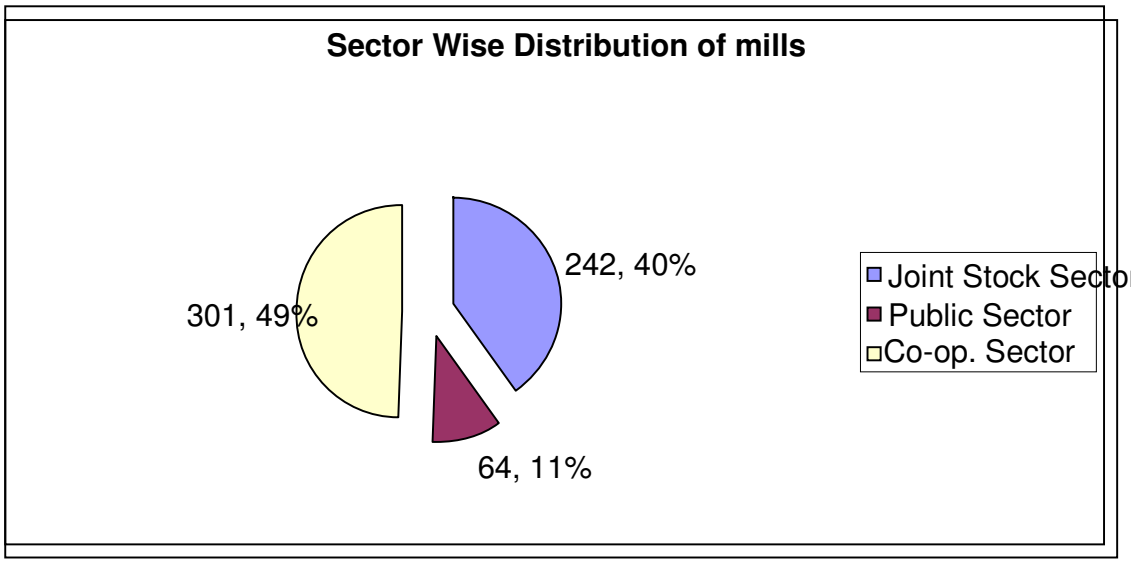


The total installed capacity of operational cooperative mills in 2007- 08 was 107 lakh tons compared to 117 lakh tons in the public and private sectors[17].

The cooperative mills were more concentrated in Maharashtra than in other states. 147 out of 173 operational mills in Maharashtra were cooperatives[18].

[17] Based on information provided in Cooperative Sugar Journal – December 2008
[18] Information provided by VSI, Pune

Chart III. 4[19]

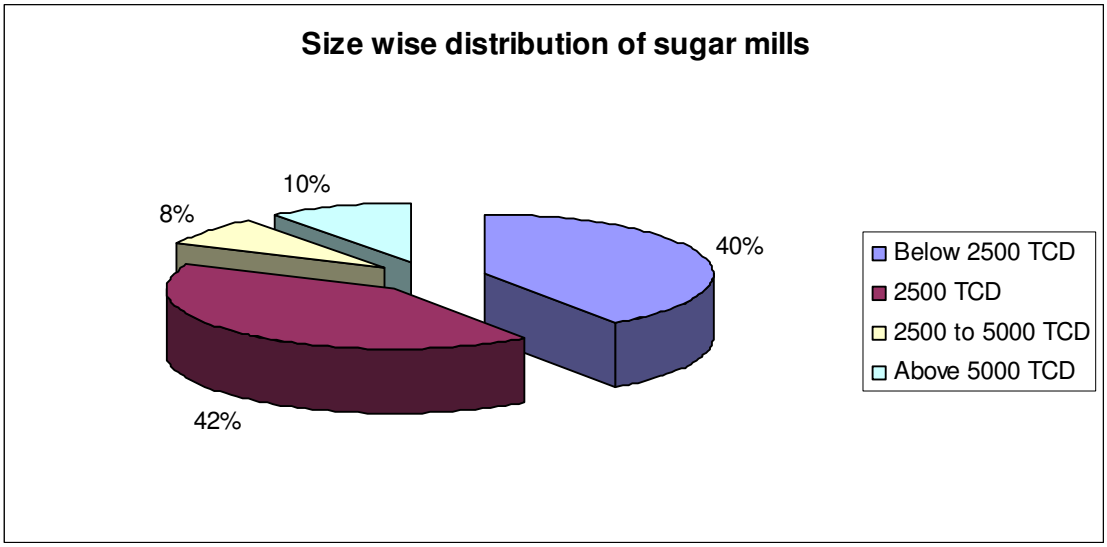


3.3 Size of sugar mills

Initially, the scale of operation of the sugar factories was low because of the prevailing economics. However, gradually the economic scale of operation increased and the factories which came thereafter were of higher capacity.

[19] Chart prepared from data furnished in Cooperative Sugar Journal December 2008

Chart III. 5[20]



However, a large number of factories are still having low capacity. 40% of the mills were below economic size, i.e., less than 2500 tons cane per day crushing. 25% mills were in fact 1250 TCD or less which is highly uneconomical in terms of efficiency. The large mills of 5000 TCD and above were just 10% of total number of mills. As the industry globally is moving towards integrated complexes with manufacturing capabilities for sugar, alcohol, ethanol, cogeneration of power, small sized units would find it difficult to operate profitably. Given the number of small farmers whose livelihoods are intertwined with the fortunes of sugar mills in India, it is difficult to ignore the large number of uneconomic size of mills. The government should, as a policy, incentivize consolidation of the smaller capacities in to larger ones of say 5000 TCD or more so that they have a better chance of withstanding cyclical factors.

Larger mills would enjoy economies of scale, lower overheads and higher energy efficiency. They are in a position to install high technology equipment, invest in downstream units and also in pollution control. Larger mills through better capitalization and asset base would be in a position to raise loans from banks and handle cyclical shocks.

[20] Chart prepared from data furnished in Cooperative Sugar Journal December 2008

3.4 Setting up of new mills

The sugar industry has been subject to regulation since its beginning. During the regime of licensing for sugar industry, the applications in the prescribed "I L Form" for establishment of new sugar factories and for expansion in capacity of existing factories were examined in detail by the Screening and Licensing Committees of the Government of India, Ministry of Industry in the light of guidelines issued by them in this behalf from time to time.

However, the sugar industry was delicensed in august 1998, wherein it was provided that a new sugar mill could be set up subject to:

a) The entrepreneurs filing an 'Industrial Entrepreneur Memoranda' (IEM)
b) Observance of Minimum distance of 15 km. between an existing mill and a new mill.

As the entrepreneurs were required only to file an IEM for setting up new sugar factories, a large number of IEMs by various entrepreneurs were filed at a nominal cost of Rs. 1000 without any intention of setting up a mill. Several existing factories also filed IEMs in the nearby areas to reserve additional cane area for them and also to avoid any other new units being set up in the neighborhood. In the absence of a time limit to convert the IEM in to an actual sugar mill, filing of IEM had become an effective competition strategy to block others from coming in to their area of operation.

3.5 The absence of a legal provision to enforce the minimum distance criteria of 15 km between two factories has complicated the matters. In fact, taking advantage of the lacuna several new factories were set up. As a result, the neighboring factories suffered and their

cane areas were diverted to the new units. In view of the problems being faced by the industry after de-licensing the Government issued a notification in 2006 requiring the entrepreneur to obtain a certificate from Cane Commissioner certifying that the distance is not less than 15 km from existing factories, prior to filing IEM. Further after filing IEM, a performance guarantee of Rs. One crore is also required to be submitted to the Chief Director (Sugar) within 30 days. Persons who have already filed IEMs were required to submit performance guarantee within 6 months from date of Notification. Production should start within four years of filing the IEM. These measures are intended to enforce the minimum distance and prevent anti-competitive strategies being employed by existing mills.

3.6 Inter mill distance criterion

The Tuteja committee had recommended that the distance between the two sugar mills should be at least 25 km. This was advocated to ensure that the sugar mills have an adequate cane command area. There have also been demands from a section of the industry that this distance restriction must be removed. If new mills want to set up manufacturing facilities within this command area, they should be permitted to do so with the most efficient of mills surviving in those locations. However, looking to the nature of investment that has already been made and the public money spent in some of these mills (through subsidies, equity participation in cooperative mills, etc) it is difficult to allow unhealthy competition.

ISMA has made a plea for a 25 KM distance being stipulated between two mills. The reasoning behind the demand is that cane planting in several parts of the country is sparse and an average mill of 2500 TCD may not be able to get adequate cane in an area of less than 25 km diameter. Even this extended cane command is not likely to assure availability of

adequate cane to the mills. One of the problems that would remain unsolved is the extent to which farmers would be ready to cultivate cane and supply to the sugar mills[21]. There are locations in which cane is intensively cultivated where a much smaller command area might be sufficient. There are no methods of ensuring a minimum extent of the area covered within the command of a sugar mill would be brought under cane cultivation. A matter of concern is also the virtual monopoly over a large area that a mill will exercise over its farmer suppliers. One of the issues relating to the distance restriction is that there is no enforcement capability with the government. Units making Khandsari or gur could set up their operations practically anywhere, leading to pressure on tight cane supplies. Further where existing mills are not running on sound lines there must be a mechanism of replacing the same with more efficient units that serve the farmers well. The distance criterion might block the setting up of new mills under such circumstances.

Location of mills is an entrepreneurial decision. Those setting up a new mill would normally be aware of the limitations in cane supply when they plan their location. The existing mills should be able to handle competition better and fight to retain farmers' loyalty. After considering the foregoing points of view, the Expert Group recommends that the minimum distance criterion for location of mills may be retained at the existing 15 km. However in areas where the existing mills are not functioning well and are not serving the farmer clients optimally the distance restriction could be relaxed to provide space for new mills to enter. Then the farmers would get more choices for selling their cane in a competitive market.

[21] The competitiveness of cane in terms of income is not sound compared to other crops. Given the delays in payment and the arrears that run for months, farmers might well turn to other crops. The volatility in cultivated acreage under cane is clear proof of this.

3.7 Manufacturing flexibility

One aspect of control over manufacturing capacity that needs examination is the flexibility available to the factories to produce sugar, ethanol or other products. The present regulation has been amended to permit sugar mills to produce ethanol directly from sugarcane juice. No unit can be set up for manufacture of ethanol directly from sugarcane juice without a sugar manufacturing plant. Stand alone ethanol units based on other raw materials can however be set up. This in effect means that extra investment costs are loaded on to an entrepreneur who would like to produce only ethanol or its derivatives.

A critical question here is of ensuring food security when it comes to production and availability of sugar. The fear is that when permission is given for setting up stand alone ethanol units many of the existing players might opt out of making sugar especially in the years when profitability of sugar is low. The maximum demand on cane for direct manufacture of ethanol (for E10) from cane juice has been estimated at less than 10% of cane production. In any case diversion of cane for direct manufacture of ethanol takes place at any point of time would be a short term phenomenon, as the ensuing shortage of sugar (with resultant high sugar prices) would tend to bring mills back to sugar manufacture. The present controls on direct manufacture of ethanol, limit the returns that could be generated by the sugarcane farmer on account of higher prices for certain types of products that are possible from sugar cane. The cane growers would stand to benefit from steady prices for cane as a combination of sugar and ethanol would keep sugar cane in demand. Any excess production of cane could be safely to direct manufacture of ethanol without increasing production and consequent lowering its prices. The cyclical issues in sugarcane and sugar could be addressed to a considerable extent by introducing manufacturing flexibility. The flexibilities required are that sugar cane should be allowed to be used to produce sugar, ethanol or any other products or derivatives from out of

their plant and the entrepreneur be allowed to set up stand alone units producing only ethanol or other derivatives directly from sugarcane juice.

3.8 Economics of Sugar manufacture

India's competitiveness for export of raw sugar and white sugar is lower due to cost differential of its sugar compared to other exporters in the world. In order to be able to export sugar, it would need to improve its cost structure through productivity and efficiency improvement in the long term. Currently, India mostly produces plantation white sugar. Considering that export demand for raw sugar and refined sugar of 45 ICUMSA will increase going forward. India would need to develop the capacity to produce these varieties of sugar in order to leverage the export opportunity.

India's cost of production

India's mill cost is comparable with major sugar producers. On the other hand, India's farm cost places the overall cost structure in a disadvantageous position. India's cost of production is higher than major exporters like Brazil and Australia whereas it is comparable to china and Thailand.

Table III. 3

Comparison of global costs of production

(US$ per Ton)[22]

Sr. No.	Country	Farm Cost	Mill Cost	Total
1	Brazil	134	56	190
2	Australia	203	119	322
3	India(SMP)	211	137	348
	(SAP)	247	137	384
4	China	233	158	391
5	Thailand	219	188	407

[22] Source: ISO sugar statistics 2008

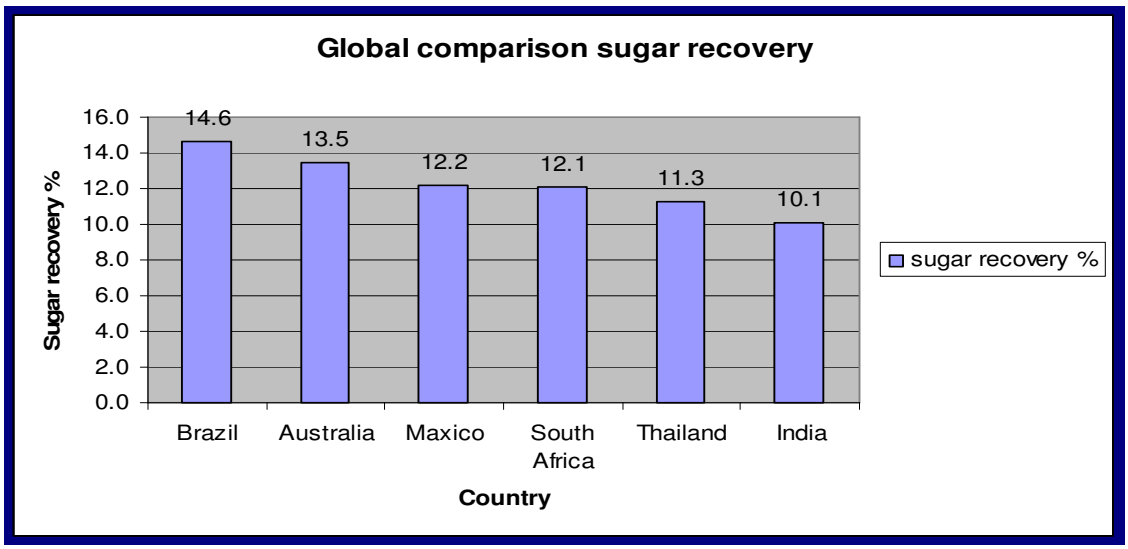
India needs to improve its overall cost competitiveness in order to be a competitive exporter. The headroom for cost reductions is more in the farm side where both yield and sucrose content should increase. The basis for price determination should not be arbitrary as in the case of SAP in some states.

3.9 Sugar recovery

The recovery of sugar in India is lowest amongst key geographies. Recovery is a function of cane sucrose contents as well as mill efficiency. India has the lowest recovery of sugar amongst the major sugar producers. The adoption of better seed varieties and farm protection can improve sucrose content leading to an increased recovery. Minimization of mill losses can improve mill efficiency thereby increasing the overall sugar recovery.

Chart III.5

Sugar recovery[23]

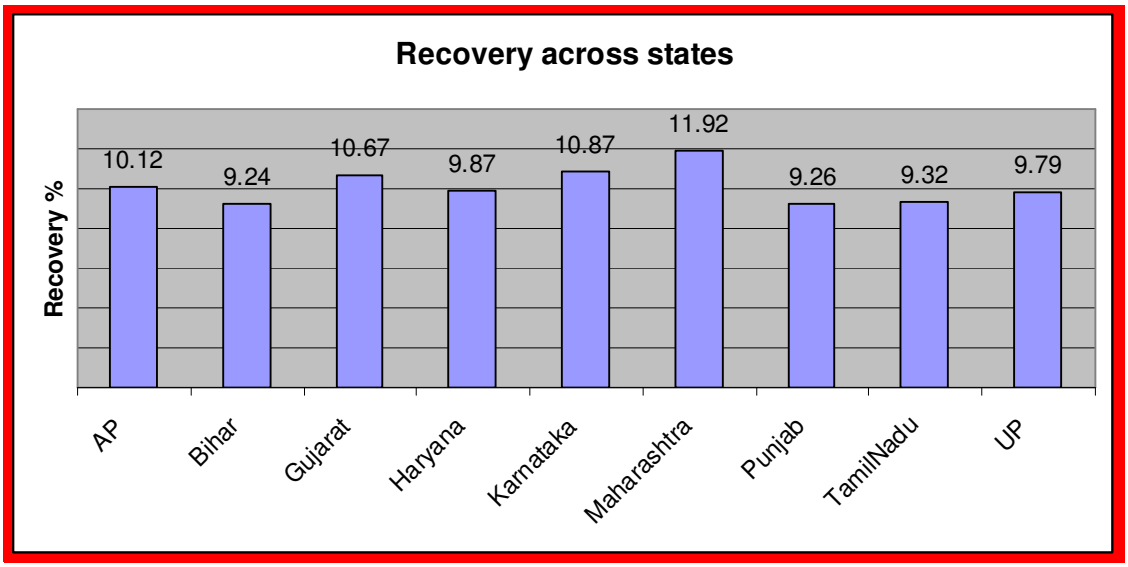


There is high variability in recovery across states. Maharashtra has the highest recovery in India and Bihar the lowest. As seen in the

[23] ISO sugar statistics

case of yields, the best in India is comparable with the best in the world but there is high variability across the states. Recovery in Tamil Nadu, Maharashtra and Karnataka has improved by 40-50 basis points over the last seven years. But there is a long way to go.

Chart III.6 Sugar recovery[24]



3.10 Mill efficiency has high variation across the states and adoption of best practices for sugar production can lead to lower losses. Tamil Nadu has the lowest mill losses and Bihar has the highest. Mill losses are a function of technology and processes used for sugar production. Therefore, it is not impacted by climatic variations across the states. However, state of the art technology does contribute to a great extent on minimising sugar losses and improving productivity. The mills need to adopt the technological practices of the best mills so that energy conservation through efficient technologies in sugar boiling and milling become possible. The steam consumption for sugar manufacture has declined from 60% about twenty years back to 40% currently, reflecting the progress made in improved technology adoption. It is possible to reduce this further to 35%, freeing additional steam for cogeneration.

[24] ISMA sugar statistics

Power consumption average is 28 kilo watt hours per ton of cane. This could be brought down to 22 kilo watt hours per ton of cane. The technological options available for improving the steam and power efficiencies are listed in annexure 5.

Over the last few years new milling machinery using "Compact Multi Rollers" have been used by some mills with significant cost reduction and improved efficiencies particularly in primary extraction of juice and moisture content of bagasse. Mills have reported reduced power consumption to the extent of 30%. Such milling plants should be increasingly used in both new mills and modernisation of existing mills.

If adoption of high sucrose varieties is encouraged India can aspire to improve its recovery by 50 basis points over the next 10 years to an average recovery of 10.75%. To achieve the target, policy needs to encourage efficiency at the mill side and quality improvement at the farm side.

3.11 Productivity Improvement

To meet the projected sugar demand in 2017, India will need to produce additional 5 MMTs of sugar. This can be achieved through capacity expansion both at the farm side and mill side. The farm capacity expansion can be by increasing the area under sugarcane as well as farm productivity improvements. The farm productivity improvements would be enabled through increased yields as well as increased sucrose contents of cane. Both of these would be driven by research and development which will focus on developing seed varieties advanced farm practices and improved infrastructure for cultivation, harvesting and transportation.

The mills have to take a very active role in improving cane productivity through a comprehensive development programme. The mills have to identify the necessary varieties and plan the planting of early, normal, late maturing varieties. The farmers have to be provided crop advisories

on cultivation practices at different stages of the crop. Harvesting schedule for the different varieties should be drawn up in a manner that suits the cane crushing programme of the mill. The mills should ensure that harvested cane is crushed within 24 hours of harvest. The cane officers / representatives of the mill should be available in the farm gate to receive the cane before being loaded for transport. These measures would ensure that the mills get cane in tune with its crushing programme and that cane remains fresh enough to avoid recovery losses. While harvesting should be the responsibility of the farmer, in the interest of timely movement of cane to the factory, transport should be arranged by the mills. The concept of taking cane from the farmer's fields should be introduced so that the responsibility for the harvested cane is held by both the farmer and the mills.

Arrears in payment for sugar cane

The cyclicality of industry has resulted in buildup of arrears in payment of prices to sugar cane suppliers especially in years when sugar prices are low and supply of cane is high. High level of arrears has been seen to have a positive correlation with states having a State Advised Price regime. The manufacturing flexibility would, to a large extent, avoid gluts in sugar supply, ensuring that mills have control over drastic fall in price of sugar. The flexibility over marketing of sugar would make it possible for mills to raise funds at any point of time for meeting their payment obligations, including sugar cane payments.

As the cyclical movements in sugar price are also influenced from global markets, there would years of high price realization, resulting in high profits. There would also be years of low profits. Recognising the cyclical nature of the earnings, the mills should increase their ability to meet liquidity mismatches over the cycle by creating adequate reserves out of "high profits" in the concerned years. Such reserve funds should be set aside before arriving at net profit by appropriating a pre-determined

percentage of surpluses. Government should facilitate the creation of the reserves in high-profit years through providing allowances to the extent of reserves created while computing taxable income. Further RBI and NABARD should also be requested to advise banks to take in to account the creation of reserve funds for determining the size of credit limit and other credit terms. The EG is of the view that any government support to mills in the sector (such as export subsidies, assistance from SDF, etc.) should discriminate in favour of mills that have created such reserves.

3.12 Marketing of Sugar

In case of sugar a system of levy is in place which takes away a part of the production (presently 10%) for distribution through PDS at a price fixed (which is mostly unremunerative) by the government. But the quantity earmarked as levy sugar is not immediately lifted or paid for. The sugar mills have to carry these stocks till such time the government issues a release order which might be some months later. The remainder of sugar (90%) is not also free to be sold at the discretion of the mills. The government has a system of monthly sugar releases in to the market by which it announces the quantity that could be sold by the mills. The mills can neither take advantage of high prices to sell maximum possible stock, nor can dispose of their stock to raise cash for meeting their obligations. There have been instance of mills moving courts for disposal of sugar stocks for meeting emergent cash requirements. Later in the section on consumer protection some of the connected issues are examined. The denial of control over marketing of sugar hinders the mills from protecting their commercial interest. The EG is of the view that the mills should be given the freedom available to other industries to market their produce. If any restrictions are to be placed on the mills on account of national or strategic interests, the resultant losses if any

should be reimbursed by the government. The withdrawal of market release mechanism would provide more flexibility to mills for raising cash to meet payment of cane arrears, repayment of loans and reduce interest costs and improve their ability to leverage equity for investment loans.

Along with dismantling the market release mechanism the controls on molasses marketing and movement should also be removed. The quota allocations for different purposes and sectors should also be removed. These controls on molasses are exercised by the state governments. Hence the Centre should persuade the States to move towards a more market oriented regime in both sugar and its bye-products by dismantling controls.

While the controls over marketing of sugar should be dismantled, it should take place in a calibrated, phased manner. A three year phasing might make the changeover smooth, devoid of chaos in the marketplace. In the first phase, during the first year mills maybe permitted to market 25% of their stocks at the end of crushing season (or end March) freely during the next one year as per their commercial judgment. The balance of 75 % may be subjected to release mechanism. In the second year the mills may be permitted to market 60% of the stock freely without any controls and the balance 40% subjected to market release mechanism. In the third year the market release mechanism may be entirely withdrawn and the mills allowed to market sugar as per their commercial judgment.

3.13 There have been suggestions that the industry should be supported to operate a strategic stockholding in sugar which could release sugar in to the market during times of higher prices and procure sugar for stocking during times of low prices. This is supposed to act as a stabilization arrangement for sugar stocks and prices. It is difficult to envisage a situation where the industry would come together jointly for undertaking such strategic market intervention mechanism. This would

require large amount of finance as also storage capacity coupled with transport logistics. If the industry feels that it is feasible, then it should undertake this through the different associations (ISMA, NFCSF) that are in place. The expert group does not envisage any major role for the Government in what should be clearly an industry level initiative for stabilisation.

3.14 Exports

India has not been a major player in export of sugar. It has been an importer and exporter alternately depending on the domestic availability of sugar. Investment in capacities for exports have not been made as Indian sugar could not compete with other countries on account of freight disadvantage, quality issues and high levels of subsidies prevalent in Europe and US. With dismantling of subsidies on sugar underway in Europe, Indian sugar industry could occupy the market space vacated. The sugar market vacated by EU is estimated at 4.5 million tons. If backed by a suitable trade policy, India could emerge as an exporter of sugar. The Indian Sugar Exim Corporation (under the aegis of ISMA and National Federation of Cooperative Sugar cooperative Factories) has contracted exports of 22.25 lakh tons of raw sugar last year and another 13 lakh tons of white sugar was also exported. In case of white sugar, many mills do not have the capacity to manufacture refined sugar acceptable internationally. In case of raw sugar (which is refined later in to white sugar) Indian quality is one of the best with low dextran levels which facilitates low cost refining. Raw sugar demand is expected to rise in global markets as many countries have set up refining capacities to convert raw sugar in to refined sugar.

India is surrounded by sugar deficit countries in the Middle East, East Africa, Bangladesh, Pakistan and Srilanka. India enjoys freight

advantage in exporting sugar to these countries in the post EU sugar sector reform scenario. The Indian sugar sector should make the necessary investments to capture these markets on a long term basis.
Export of large quantities of sugar requires handling infrastructure in the ports. Dedicated storage, silos and conveyers are required to ensure that shipments could be made without delays and low portside costs.

3.15 Ceiling on capacity of mills

In India large capacity mills are viewed with disfavour. Hardly 10% of operational mills had an installed capacity of 5000 TCD or more. Globally the typical sugar mills are of capacities between 10000 and 15000 TCD. In India mills that want to expand to 10000 TCD are denied loan assistance for modernization and expansion from SDF. But international experience shows that some of the larger units have been more profitable and can withstand the fluctuations in international commodity prices better. They are able to invest in better technology as also a flexible manufacturing arrangement that can switch from sugar to ethanol and its derivatives. The movement from small 'sugar-alone' factories to sugar complexes which manufacture a wide variety of sugar and ethanol based derivatives should be encouraged. Integrated facilities enjoy cost advantages in raw material availability for downstream products and apart from assured availability of captive bagasse or molasses, the also avoid costs of transportation of raw material and taxes thereon. The energy requirements of integrated operations are shared across sugar boiling, distillation and cogeneration with significant cost reductions. Keeping these in mind the expert group is inclined to recommend that the factories should be allowed to not only expand but also diversify in to the different possible derivatives and products arising from sugar and its by-products. The investments in diversification should be supported on a non-discriminatory basis by the government regardless of the size of

the mill. When support is made available from the SDF, ceiling limit on the quantum may be stipulated to ensure that a few large mills do not take away a large part of the resources. The export opportunities as explained earlier would be easier to exploit for larger mills as they can make the necessary technology acquisition for manufacturing export quality sugar.

When existing mills increase their capacity beyond 10000 TCD per day the mills should have strategies in place to ensure that additional cane availability substantially through improvement in productivity and better cane management practices. The mills need to invest in a comprehensive cane development and productivity enhancement programme even as they commence the work on capacity augmentation on the plant side.

3.16 Sugar Packaging

The sugar packaging marketing order stipulates that sugar should be packed normally in jute bags. The exceptions are for smaller consumer packs and bulk sugar in large packs above 100 kg. The industry conventionally packs sugar in 100 kg. But this runs counter to the ILO convention that manually handled consignments of commodities should not exceed 50kg per bag. The cost of packing sugar in two 50 kg jute bags is much more than packing the same in one 100 kg bag. According to the industry, alternative packaging materials do not impose additional costs for packing sugar in ILO convention compliant 50kg bags. The insistence on using jute as a packaging material is not justified on account of the inherent potential for spillage and spoilage of food stuff when it is stored for long periods. The other commodities such as cement which were subject to such an order have been freed from the same. The tropical climate demands that packaging improves shelf life especially as sugar remains stocked for long periods of time. Hence the sugar packaging order should provide flexibility to the mills to take suitable decisions in the matter.

3.17 Bank loans and financial position of mills

There have been representations for raising the loan value of sugar to 100% from the present 85% of collateral. Given the fluctuations in the price of sugar and prudential requirements to be followed by banks, the Expert Group feels that loan terms should be left to the banks and borrowers. Going by the spirit of deregulation, the banks should not be given an external mandate on a business decision that they need to take through negotiations with their clients. A case has been made out for low cost financing of investments in ethanol and cogeneration plants. The 'green' nature of these investments is cited as the reason for capital/interest subsidies from banks. Looking to available schemes for availing subsidies, the Committee is not inclined to accept this suggestion. However the SDF which provides a soft loan window should continue to explore possibilities of financing mills for such purposes.

There are special problems of cooperative sugar mills in accessing bank finance and also strengthening their financial position. These are detailed in annexure 6. The weak sugar mills that are under capitalized with low or negative net worth should ensure that they raise adequate equity and allocate surpluses in good years to their reserves and funds. Failing this they would not be able to raise loans from banks.

3.18 Ethanol manufacture

The cane based ethanol production may potentially impact India's sugar market. The ethanol based petrol programme was launched in the beginning of 2003 when mandated blending of 5% ethanol in gasoline in 9 states and 4 UTS. The programme was implemented only partially due to various constraints. In September, 2006, Government announced the second phase of EBP programme that mandated 5% blending of ethanol with petrol with effect from November, 2006. The programme of the second phase was slow due to commercial unviability of ethanol

manufacture at the prices offered by oil marketing companies. The Government further mandated 10% ethanol doping of petrol which was scheduled by October, 2008 but it had not yet taken off. Further, sugar mills were permitted to convert cane juice directly into ethanol instead of molasses which was the only permitted feed stock.

Ethanol production capacity in India

There were 296 distilleries with annual licensed capacity of 3.8 million kilolitres. Of this 125 units with an installed capacity of 1.7 million kilolitres were attached to sugar mills producing alcohol/ethanol from molasses. At 5% doping levels 600 million litres of ethanol is required for blending with petrol. The present demand and supply for alcohol leaves a surplus of 850 million litres which is adequate to meet the ethanol requirements of 5% doping. Even when 10% ethanol blending is enforced, the available capacity of 1700 million litres of ethanol of a total installed capacity of 3800 million litres is sufficient to meet the requirements. The recent notification of the government to permit mills to produce ethanol directly from sugar cane juice makes additional production of ethanol feasible.

Table III.4

Ethanol capacity – state wise[25]

(Million liters.)

State	No. of Units	Annual Installed Capacity
Uttar Pradesh	28	510
Karnataka	9	109
Tamil Nadu & Pondicherry	5	68

[25] Source: Cooperative sugar journal

Andhra Pradesh	10	100
Maharashtra	55	665
Gujarat, Daman Diu & Dadra and Nagar Haveli	8	75
Bihar	4	60
Total	**119**	**1587**

Ethanol manufacture should not depend solely on sugarcane and molasses. The raw material sources should be diversified to include beet, sweet sorghum, cassava and other materials. This would ensure that supply of raw material is unhindered. The ethanol units should have the flexibility to manufacture other forms of alcohol and derivatives to ensure that they meet the demands of the market.

3.19 Cogeneration of power with Bagasse feedstock

The Government has been supporting a programme for promotion of cogeneration of power by the sugar mills. However, it has also not progressed well due to various constraints. The pace of progress of these two programmes is evident from the following comparative data.

Table III.5

Cogeneration capacity in India[26]

(Mw.)

State	No. of Units	Installed Exportable Capacity
Uttar Pradesh	28	924.7
Uttaranchal	-	-
Punjab	1	6.0

[26] Source: cooperative sugar journal

Maharashtra	7	50.0
Andhra Pradesh	14	271.2
Tamil Nadu	13	285.0
Karnataka	17	271.0
Total	**80**	**1807.9**

The total cogeneration potential for exportable power in sugar industry is estimated[27] at 7000 MW, which is sufficient to meet half the power deficit. But the conditions imposed by state power regulators have been found to be difficult to meet rendering the sale of power to state utility grids. Third party sale of power and sale outside the state have to be explored besides adoption of a facilitative policy on power purchase from sugar mills to improve generation from this green and renewable source of electricity. Some of the policy issues relating to cogeneration and sale of power have been dealt with in a later part of the report (para 5.3)

3.20 Gur and Khandsari

There have been apprehensions that the gur and khandsari units which fall outside regulation and control could spoil the market and economics of sugar manufacture. The consumption trends clearly show that the market for the traditional sweeteners such as Gur and Khandsari have declined significantly. The cane drawal rates in favour of sugar manufacture have increased significantly from 46% in 1997-98 to 68 % in 2002-03. This rate is projected to have increased further in the last five years. The competitive threat from gur and khandsari is on the wane and is not likely to be significant. The industry should concentrate on other challenges and allow the traditional sweetener industry to continue to operate for servicing whatever demand that exists.

[27] Estimate by KPMG

3.21 Pollution control

Sugar industry has been placed in the *red category* denoting that it belongs in the highest order of environmental risk in terms of its effluents and pollutants that arise from its manufacturing processes. Sugar mills produce waste water, smoke, particulate matter in the form of ash, etc.

The existing norms of Central Pollution Control Board and State Pollution control Boards stipulate that the sugar mills should achieve zero effluent discharge. In other words the effluents from mills should be fully treated and recycled. However the industry (barring a few exceptions) has not been able to achieve zero discharge. Sugar manufacture utilises huge quantities of water, up to 200 litres per ton of cane crushed. With factories having capacities to crush 5000 tons of cane a day, large quantities of water have to be treated on a continuous basis.

Typically factories have installed the activated sludge process, which cannot handle shock loads and hence fail to comply with the control parameters. Cost of investing in pollution control as also the current costs of maintenance are seen to be high, in an industry which is not posting sustained profits.

But pollution control is a non-negotiable aspect of the mills functioning. Adequate investments should be made to ensure that treatment of effluents to a practically reasonable extent carried out. Waste water from spray pond should be treated with factory effluent. Reuse, recycle and reduce programme should be implemented. For cooling of excess condensate, cooling towers could be installed. A sequential combination of anaerobic digester, bio-tower, activated sludge process, filtration and carbon filter should be in place to achieve zero discharge. The cost of

investment in ETP for achieving zero discharge in a 2500 TCD plant is estimated to be around Rs 75 Lakhs. If zero discharge is not imposed and treated water with BOD of 30 or less is allowed to be discharged, then the cost would decline to Rs 50 Lakhs. The overall cost of fixed and current cost of pollution control for achieving zero discharge amounts to 5 paise per kg of sugar on average.

The mills could be helped to invest in pollution control equipment through a subsidy scheme which would either provide a part of the capital cost or a part of interest payable every year for the duration of the loan.

3.22 The fly ash produced has to be disposed off safely with minimal impact on the local ecology. While in older mills, installation of electrostatic precipitators and wet scrubber fly ash arresters has been done, in case of new mills, the boilers are built with precipitators or fly ash arresters. The burnt residue of bagasse still has to be disposed. Technological solution such as use in building materials, mixing with bio fertilizers, etc., need to be tried out as a large experiment.

3.23 The Clean Development Mechanism under the Kyoto Protocol, rewards producers of green power from renewable alternative sources with carbon credits which can be sold for realisation of value. As stated earlier, KPMG has estimated that the industry could generate about Rs 2000 crore by way of carbon credits each year from cogeneration. *The industry should be incentivized to invest in co generation thro*ugh long term loans from the banking sector and allowed to reap the benefits arising from carbon credits.

The issues surrounding sugar cane cultivation affecting farm lands on account of sustained flood irrigation over the years have also to be addressed. Reclamation of saline soils is a priority as these were prime farm lands. Prevention of further degradation of soils through improved water management solutions such as drip irrigation has to become a part

of the agenda for the mills in order to retain their cane supply base. Support from governments available for drip irrigation projects at farm level should be availed and the mills have a role to play in ensuring that their cane suppliers are able to access the benefits under these schemes.

IV. Protection of consumer

Sugar Consumption in India

4.1 India's sweetener market comprises two main sectors. Centrifugal sugar on one hand and traditional cane derived sweetener as gur and khandsari on the other hand. Gur and khandsari producers constitute the un-regulated sector. In terms of per capita consumption the use of jaggery fell from 10.5 kg in 1994-95 to 2.4 kg only in 2006-07. In contrast, per capita sugar consumption shows a stable growth. It improved from 14 kg in mid 1990s to 16.8 kg in 2006-07 as against the world's average of 23.1 kg. If, however, other sweeteners are added India's per capita consumption would amount, however, to more than 23 kg raw value. Similar to other developed countries, sugar consumption in India is driven mainly by growing population and income growth. In the past sugar consumption trend was also influenced by developments in gur and khandsari consumption. It is likely that their replacement by sugar have already reached a saturation point. It is likely to maintain its current average growth rate of about 3 % per annum. This would mean an increase of consumption from 19 MTs white value reported for 2006-07 to 25.8 MTs in 2014-2015 and further to 34 MT; a cumulative growth of 4.8 Million Tons. Under the present sugar regime the national market is divided into two segments. 10% of the annual production is sold in the PDS as levy sugar and the balance 90% is sold in the free market. Of the total sugar sold in the free market an estimated 61% is for industrial use assuming that all the sugar distributed in PDS is for household consumption. The overall share of direct consumption reaches 46% of the country's sugar production.

Table IV.1

Stock, production, consumption & export of sugar

(Lakh tons)

Season	Opening stock	Production	Imports	Total availability	Off take for		
					Domestic use	Exports	Closing stock
1970-71	20.84	37.37	-	58.21	40.24	3.90	14.07
1975-76	12.07	42.62	-	54.69	36.87	9.50	8.32
1980-81	6.45	51.47	1.53	59.45	49.70	0.60	9.15
1985-86	15.79	70.16	16.19	102.14	82.72	0.36	19.06
1990-91	22.21	120.46	-	142.67	107.14	2.23	33.30
1995-96	55.98	164.51	-	220.49	131.21	10.21	79.07
2000-01	93.40	185.11	-	278.51	162.01	9.87	106.63
2001-02	106.63	185.29	-	291.92	167.81	10.94	113.17
2002-03	113.17	201.40	0.41	314.98	183.84	15.00	116.14
2003-04	116.14	139.95	4.00	260.09	172.85	2.24	85.00
2004-05	85.00	126.91	21.38	233.29	185.00	0.04	48.25
2005-06	40.00*	192.67	-	232.67	185.00	11.30	36.37
2006-07(p)	39.02*	283.00	-	322.02	190.00	17.28	114.74

4.2 A survey by AC Nielsen[28] concluded that of the total sugar consumed of 17.52 million tons, 6.75 million tons (38%) were for household use, with the balance taken up for industrial/small business use. Of the household consumption of sugar 4.51 million tons were consumed by low income households and the balance by high income households. The sensitivity attached to sugar as an essential commodity is not warranted as just 25% of consumption is taken up poor households when the entire value chain of the commodity is sought to be controlled for protecting consumer's interest. A further point of note is

[28] A market research firm

that sugar consumption at low income households is low at 2.2 kg per month and along with income level, sugar consumption also rises. The high income households had a consumption of 5.1 kg per month per household. The impact of a 10% rise of sugar is less than 1% increase in the monthly food expenses of poor households.

Industrial consumers (dairy processors, confectionary units, soft drink units, bakeries, etc) accounted for 5.26 Million tons of sugar and small businesses (sweet meat vendors, restaurants, juice centres, etc) accounted for 5.51 million tons of sugar. The present effort at keeping sugar prices reasonable shelters the industrial and commercial consumers of sugar more than poor households.

4.3 The issue of protecting consumers' interest in the sugar sector is addressed by the government through influencing the supply of sugar in the market, altering the tariffs on export and import of sugar, stocking and selling sugar through a combination of levy, controlled market releases and other arrangements and making available sugar through the public distribution system to the target group of narrowly defined poor people. The action taken by the government in trying to influence the availability of sugar in the market through introducing a levy system as also operating a mechanism of market releases of sugar has been effective in dealing with price and availability issue, but limits the profitability and adversely impacts the long term sustainability of the mills. The expert group totally endorses the policy view that the consumers belonging to the poorer sections of people should be protected. This protection of meriting consumers should be well targeted through the public distribution system in which sugar may be supplied at reasonable rates. Barring this section of consumers all other consumers do not need any kind of price based protection. It is a fact that the non-PDS consumers do not enjoy special protections in case of commodities other than sugar and are able to handle issues in both

availability and prices in respect of a host of other goods and services. As already indicated, about 25% of annual sugar consumption is attributable to low income households[29]. Hence sugar price protection across the board results in avoidable public spending that is not targeted and ends up subsidising the raw material cost of a variety of industrial and commercial units and undeserving sections of population. The sugar required for PDS could be procured from the market without resorting to levy and similar other mechanisms.

4.4 There have been pleas from the industry for a buffer and strategic stocking of sugar to stabilise price and availability of sugar in the interest of consumers. The expert group feels that maintenance of strategic stock for managing prices is not a legitimate role for the government. The strategic stocks would not result in significant impact as the cyclical price fluctuations are not only from domestic scarcity, but also influenced by the global market trends. Even where buffer stock is held, the extent of stock and the imminence of its release or otherwise tend to impact market prices. In other words markets tend to factor in known stocks and market behaviour and price commodities accordingly. Government's active involvement in managing stocks would tend to take focus away from managing the risks in the sector and optimizing its performance. As stated earlier the interest of poor consumers could be protected by a targeted programme that supplies sugar through the existing PDS to the existing clients of PDS.

[29] Of the non-levy sugar consumed, 61% is by industries and small businesses and 39% is by households. Low income households (with less than Rs 5000 monthly income) account for 25.8% of non-levy sugar consumed. Survey by AC Nielsen 2007.

V. Policy issues

5.1 The Essential Commodities Act

Sugar cane and Sugar have been placed under the essential commodities Act in view of its mass consumption nature. Sugar cane is cultivated by millions of farm households and many of them are small and vulnerable. They deal with large corporates to sell cane and realize incomes. The industry has been making the point with justification that a large part of sugar manufactured is not directly consumed by households and even of the consumption made by individuals, only a small part is actually consumed by those sections of population that could be deemed to be poor. Sugar, based on the consumption patterns and its criticality to the people does seem to be a fit case for continuation in the essential commodities list.

Another issue that has been raised is the weight given to sugar in the consumer price index and the wholesale price index. The weight given to sugar is more than the weight of rice and wheat! A study by Madras School of Economics has suggested that the weight given to sugar in the WPI should be reduced to 2.02[30] from the present 3.62. This needs to be reduced as most of the consumption is by industrial units engaged in confectionary, bakery, soft drink manufacturers and the like. If sugar is removed from essential commodities Act and its weightage reduced from the price indices then the present focus on control over price of sugar with all the attendant consequences could be avoided.

The value attached to sugar as an essential commodity also influences the state's policies that are pursued with regard to the sugar sector. The high weight given to sugar in computation of the price indices (both WPI

[30] This is based on the finding that share of expenditure on sugar in the basket of consumption and investment goods is 2.02%. MSE further suggests that WPI should also include services in which case the weight given to sugar would decline to 1.04%

and CPI) compels the government to take even extreme steps to keep sugar prices within a narrow band of affordability for the consuming public. Steps such as banning of exports in anticipation of reduced production in future, stipulation of rigid manufacturing systems, changes in forward contracting on commodity exchanges and control over marketing of sugar have been witnessed from time to time.

In respect of sugar cane the EG feels the necessity of retaining the same in the essential commodities list. The small and distributed nature of sugar cane farmers makes it necessary that the state retains powers to protect them from large organized mills in case problems arise. Retaining sugar cane in the essential commodities list would provide the government with necessary powers for securing the interests of cane farmers, who cannot escape dealing with large corporates for sale of their produce. The Essential commodities cover would enable fixing of fair price for cane, ensuring payments to the farmers and checking wayward behaviour of mills in cane procurement. The powers to regulate sugar cane are to be exercised more in the nature of a deterrent of deviant behaviour by the mills rather than as a continuing affirmative exercise which intermediates between the mills and farmers. Thus the EG is of the view that the entry of sugarcane under essential commodities by virtue of section 2 (xi) (b) should be retained. Sugar which is separately included in the list under section 2 (xi) (e) should be deleted.

5.2 Ethanol policy

Ethanol and molasses have been the subject of discussion in relation to the desirability and extent of control and taxation by the State Governments. The committee recognizes that while states have the constitutional power to impose taxes and restrict movement of molasses (raw material for alcohol/ethanol) the states have to be persuaded to be reasonable in controlling the movement of molasses and also in taxing ethanol and its derivatives. The State governments should standardize

the terms of the market and ensure that the factories do not arbitrage between the variable regulatory and fiscal frameworks prevalent in different states.

Looking to the problems in manufacture and sale of ethanol to oil marketing companies, the Committee recommends that the Government should come up with Comprehensive Ethanol Policy that takes in to account manufacture, blending programme, pricing and investments in new ethanol capacities. As explained in an earlier paragraph the recent notification for direct manufacture of ethanol from cane juice is a welcome development in the interest of energy security. This should be made a part of the long term policy. Further the policy should permit new stand alone units for ethanol manufacture from cane juice. This would reduce the cyclical aberrations introduced by excess production of cane and consequent glut in sugar stocks as explained in a later paragraph. Further the following need to be incorporated in to the policy framework.

1. Excise duty waiver on Molasses
2. Uniform Sales Tax across states and on interstate sale
3. Encouragement to manufacture of flexi fuel vehicles that could run on ethanol as well other conventional fuel
4. Special incentive to ethanol blended petrol on par with Compressed Natural Gas (CNG).
5. Rigorous implementation of 10% doping of petrol with ethanol.

5.3 Cogeneration of power

The committee feels that investments in cogeneration capacities would accelerate only if the norms for power purchase by the power utilities is codified and implemented uniformly across the country. Due to its nature, power has to be sold to a monopoly buyer (barring few exceptions), who in the absence of well set norms and enforcement by

government might not honour agreements with the sugar mills. The state electricity regulators and utilities have imposed tough conditions for purchase of power from sugar units. The regulators have also not been flexible in allowing third party sale or interstate sale of power by sugar mills in case the home state utilities are unable to either relax conditions or make satisfactory arrangements to evacuate power. Taking into account the problems in cogeneration and sale of power, the EG recommends that:

i. SEB's/utilities should be mandated to purchase power to the extent of 10% of their total generation/supplies from non-conventional sources such as cogeneration units (as has been done in countries like USA).
ii. Policy for wheeling, banking and third party sales should be uniformly set as per MNRE guidelines.
iii. Grid connectivity to cogeneration units should be provided by State Electricity utility
iv. Preferential tariff structure for power generated by sugar mills to avoid diversion of bagasse for other purposes
v. Transmission cost to be borne entirely by the utility grid.

The investment requirement in cogeneration for utilizing the present output of bagasse is estimated to be about Rs 37000 crores[31]. The seasonal nature of cogeneration units and fluctuating bagasse availability makes the payback period of investment long. When long payback period is compounded with uncertainties in power sale and pricing, sugar mills find it hard to come to investment decisions in cogeneration units. However the green nature of power produced could

[31] Estimate made by KPMG as part of their sector study. Investment cost is taken at Rs 4.50 crore per mw capacity.

yield carbon credits[32] of more than Rs 2000 crore per annum to the industry. Capital subventions for setting up cogeneration units or interest subventions for the duration of the gestation period would accelerate additions to cogeneration capacity. The SDF could be well used for this purpose

5.4 Cyclicality and control of volatility

The sugarcane and sugar cycles feed on each other to produce peaks and troughs in production and prices. High production and low prices are followed by low production and high prices in a six to seven year cycle. Price of sugar rules high in a year in which cane production is low and resultant sugar output is low. The high price of sugar raises expectations that in the next season sugar cane will fetch a high price and leads to increased planting of cane over a larger area. The higher production of cane, leads to a glut in the market and high sugar output which brings down the prices. The crop being a long duration one and immediacy of sugar consumption needs do not lend for short term responses which could facilitate farmers to benefit immediately from supply deficits and higher prices. The cycle is perpetuated on account of alternating peaks and troughs in supply of cane. Policy response has not so far been able to stabilize the cane supplies on account of low profitability of mills and the compelling need to protect consumer's interests.

The main factor attributed to the cyclicality of sugar production in India is the cane price payment arrear. During the surplus seasons when overproduction results in lower prices of sugar, it severely impacts the ability of the factories to pay the farmers. This leads to huge cane price arrears and results into significant fall in cane cultivation in favour of other alternate crops. Unfavourable weather conditions can exacerbate

[32] KPMG estimates that annual income from carbon credits on account of cogeneration would be about Rs 2150 crores. This is based on an exchange rate of Rs 44.50 per US $ and a value of $ 10 per carbon credit. Both these rates are subject to fluctuation.

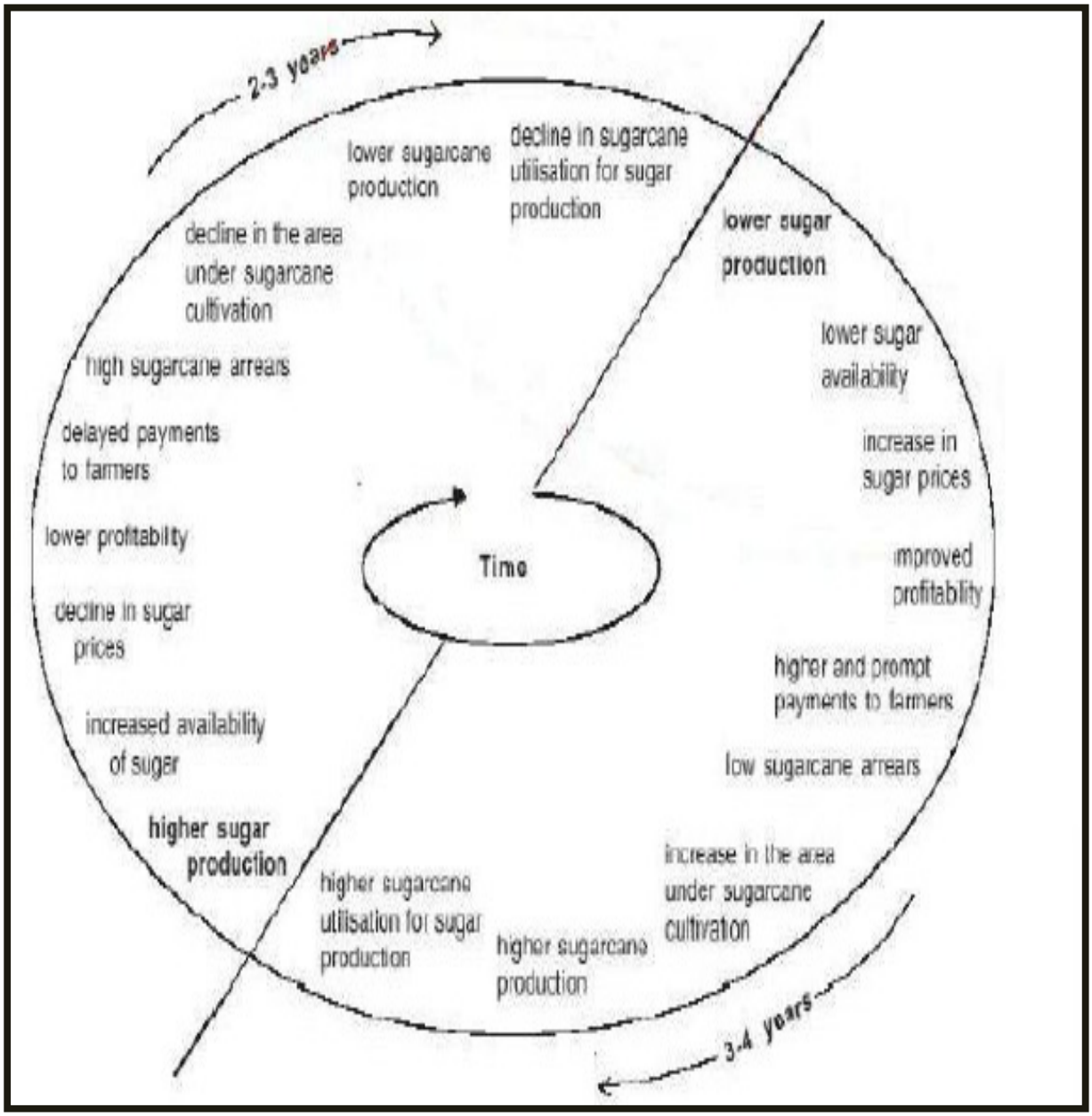
the decline in production as in the case of bad monsoons in 2003-04. The deficit in cane production eventually brings remunerative domestic prices and higher revenues for the industry enabling to liquidate part of the arrears to the growers. Government also steps in to provide relief to farmers affected by cane arrears. The payment of the arrears coupled with high prevailing prices of sugar boosts cane cultivation. With good financial liquidity, the industry also expands its production capacity. Thus, the upward phase of the cycle starts again.

While sugar production in India remains highly cyclical, demand growth is relatively stable growing on average by about 3% a year. The national sugar balance, therefore, periodically swings from surplus to deficit and back resulting into country's position on the world sugar trade map. Thus, sugar imports may exceed 2 million tons in a year of deficit only to be quickly replaced by exports of similar or at times higher magnitude (e.g. 2001-2003, 2006-07 and 2007-08).

A combination of actions is required to lend stability to cane supplies through reducing volatilities in cane price. The present use of cane only for manufacture of sugar tends to feed the cycle based on sugar price movements. In a season when sugar prices are low, if cane could be directly diverted to manufacture ethanol, sugar production and stocks would remain stagnant thereby improving the price sentiment. Cane would be able to get a due price on account of ethanol and cogeneration revenues which are not impacted by cycles in commodity sugar. While cogeneration would always remain a remunerative activity on account of power shortage as well as the focus on renewable energy, ethanol is subject to a different commodity cycle – that of crude oil. Even here ethanol's status as a green alternative should find it a ready market, with the government's commitment for increasing the mandated blending percentage.

Chart V.1

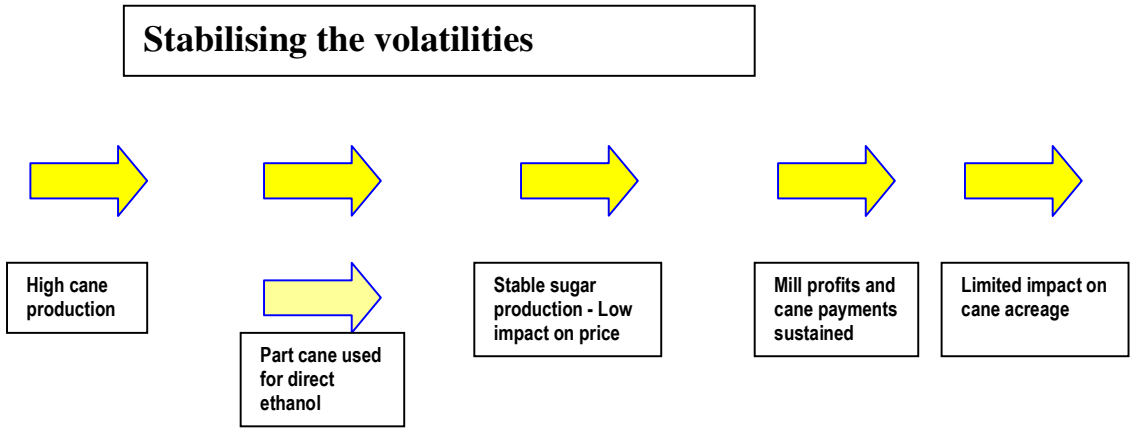
The sugar cycle



If the cane production above a threshold could be directly converted to products other than sugar, then low sugar prices and low mill

profitability could be avoided. Here the flexibility to the mills for switching from sugar to ethanol or vice versa would ensure that cane is put to the most profitable use and sustain the mills ability to pay an appropriate price to the farmer on time. The second merit of this flexibility is that mills do not have to wait for sugar stock to be disposed off for making cane payments, but dispose of ethanol/ alcohol and power to generate funds for paying the farmers. Maintaining cane payments current prevents erosion of farm incomes and ensures that next season's cane planting does not suffer

Chart V.2



The shifting of the decision on appropriate cane use to the mills would decentralize the same and break down a large problem in to several small enterprise decision situations. A wrong decision by a few mills would not lead to a nationwide problem of glut in sugar stocks and mounting cane arrears as is the case presently. For this anti-cyclical measure to work, mills should be encouraged to ramp up their ethanol manufacturing capacity quickly. New *stand alone* ethanol manufacturing units with

multiple raw material (Cane juice, Molasses, beet, sweet sorghum) capability should also be encouraged. In the expert group's view, the desired policy response for stabilization of cane and sugar production and their prices thus comprises offering full flexibility to sugar mills in manufacturing of any product from cane, support to investment in new capacities for direct production of alcohol, ethanol and derivatives from cane, permission for setting up stand alone cane based ethanol units and dismantling the market release mechanism for sugar.

5.5 Decontrol and deregulation

In most other industries, commercial decisions on procurement of raw material, transport, manufacture of the finished goods, packing, marketing and the sourcing of finance for the entire gamut of operation is done by the industrial units, but in the case of sugar, almost every single aspect of operations is mandated by the government and subjected to regulations. Other sectors have benefited considerably from decontrol and deregulation through promoting greater market discipline in the primary stakeholders. Profitable running of enterprises is a basic requirement if the economy has to thrive. Private enterprise is able to perform better with autonomy, freedom from control in business decisions and non-interference with markets. In case of sugar, as indicated earlier, the almost total control has limited the industry's ability to innovate, invest and improve its efficiency. Higher investments do not flow in to sectors with high level of state control. With low profitability and only windfall profits arising from trading based on a skewed market cycle, entrepreneurs might shy away from making investments required for export markets and integrated sugar complexes.

The sector's future depends on its ability to diversify into bio-fuel and power generation as these have the ability to add as much as 30 t0 50% to the value of sugar produced. Large sized sugar complexes would perhaps be able to function with cost economies of scale and manage their market risks through manufacturing flexibilities and exports. Such large complexes would be driven by merger of existing mills as well investments in new mills. Such investments would be forthcoming only if the government provides autonomy and a stable policy regime which makes returns on investments more certain.

As stated earlier one of the more urgent measures is to consider removing sugar from the list of essential commodities and take care of interest of small consumers through the PDS. The statutory basis for fixing the sugar cane prices and setting terms of market releases of sugar would stand removed.

The reduced government role in these areas would result in cost saving to the government that could be applied for the development of the sugar sector and targeting the protection of interest of small farmers and small consumers through very specific programmes. The industry should be given a 3 to 5 years time frame in which the measures for decontrol are to be taken. Without such a calibrated mechanism of decontrol it is difficult to envisage the sugar sector marching towards a sound future where it is internationally competitive. Some specific aspects of deregulation are discussed in the following paragraphs.

5.6 Trade policy

The policy on import and export of sugar has been geared to protect the domestic consumer rather than develop the sugar industry as leading player in the global market. The industry advances the argument that it is unable to take advantage of remunerative global markets on account of ban on exports that is aimed at maintaining the domestic prices at

reasonable levels. The inconsistency in export import policy and the ad hoc nature of ban and permission for export of sugar have made Indian sugar an unreliable commodity in the international market. Sellers of sugar from India do not enjoy credibility in the international market as their ability to deliver on commercial contracts is solely dependent on government's trade policy. The emerging large market space on account of EUs reforms in terms of WTO regulations is sufficient reason for the Government to think of reviewing trade policy on sugar. With adequate investments in higher capacities and better coordinated cane development program India can emerge as a sugar surplus country that offer reliable quantities for exports. But for such investments to happen, a stable policy that would remain place till such time the investments are recovered is necessary. The investments required to produce internationally acceptable quality would not be made without a favourable trade policy regime. The expert group recommends that the export import policy in relation to this sector should be reset to encourage exports; and also provide assurance that it would remain so for a given period of time. The fear that the investments could turn sour if the trade policy changes midway should be allayed.

5.7 Sugar Development Fund

The sugar development fund loans should continue in their present form. The plea made out for using SDF to provide capital subsidy across the board for augmenting sugar manufacturing capacity does not seem to merit serious consideration. Capital subsidies are targeted towards those activities which are in the public interest but which are not viable without some form of support. The mere fact that the commodity cycles impart volatility to the prices should not lead to a capital subsidy being offered for setting up of sugar mills. The cyclical factors should be identified and mitigated instead of providing subsidies on capital investments. However, for carrying out measures which are in interest of

environmental conservation, tapping alternative clean energy sources and pollution mitigation where the costs cannot be easily absorbed by the existing functional mills, SDF may consider some kind of concessional financing under a very clearly articulated policy.

There some other issues that needs attention in the operation of SDF that are detailed in the following paragraphs.

Under present SDF norms, the cane development loan applications are routed through the respective State Governments which take long time to forward them to Sugar Directorate, Government of India. After the approval of the loan, the tripartite agreement between SDF, Government of India, State Government and the sugar undertakings also takes long time. The mills may be allowed to directly apply to the SDF with intimation to the State government to avoid delays. A nodal agency may be notified to monitor impact assessment on the cane development activities of the sugar factories availing the loans.

Only mills that are five years old or more should qualify for assistance for modernization.

For cane development schemes, there is a limit of Rs. 3 crores on the financial assistance. This should be abolished or suitably raised.

The duration of the cane development schemes from the present 3 years needs to be reduced to 2 years and consequently the release of the installments should also be reduced to two.

Additional schemes proposed in the sugarcane productivity chapter should also be considered eligible for financial assistance from SDF.

At present, it takes about six months to one year for sanction of loans from Sugar Development Fund though most of the expansion projects are to be completed within one year. The factories resort bridge loans from the Financial Institutions / banks which increase the cost of funds. Application for loans from SDF should be cleared within 60 days on receipt of application. For this purpose some staff with knowledge from banking sector may be provided or outsourcing of the work may be considered.

The present repayment period of SDF loan for the co-generation & ethanol projects is short and needs to be increased, so as to make the projects more viable.

There may be a nodal agency to make impact assessment of the financial assistance availed by the factories from SDF. This may comprise of experts from NSI, VSI.

Schemes for production of below 100 ICUMSA sugar, sulphur free sugar, raw sugar and refined sugar by the existing sugar factories to provide for the flexi 'products', production should be eligible for financial assistance. The specialty sugar like liquid sugar vitamin fortified sugar should also be eligible under financial assistance from SDF.

Scheme for value addition to press mud being produced by the sugar factories for production of bio gas etc.

There is a need to expand the coverage of activities for soft loans from SDF for improving cane productivity. Some of the proposals made in this regard are already under consideration of SDF could make a difference to farm productivity.

Integrated Nutrient Management system

Improvement of problematic saline, waterlogged soils through appropriate solutions (physical, chemical and biological)

Farm implements acquisition by sugar mills for hiring out to farmers to improve mechanisation of farming

Field demonstrations and extension for improving quality and productivity of cane as part of a cane development programme

5.8 Regulation of the sector

When the decontrol of the sector takes place, there would a regulatory void in the sector. With millions of farmers on one side and millions of consumers on the other a few sugar mills should be brought under a normative oversight. Disputes and conflict resolution arrangements that operate on an understanding of the sector should be in place. As in other sectors where direct controls have given way to an independent regulator, in sugar sector too, an arbiter with statutory powers would be needed. The regulator could draw powers under the sugar cane control regulations. The role of the regulator would be to evolve norms relating to market behaviour of farmers and mills (including determination of prices and payment thereof), contracting between farmers and mills, conflict resolution between mills and stake holders, ensuring orderly growth of the sector, carrying out sector studies and providing policy inputs to government.

5.9 Research and Development

Academic institutions

The cost of conversion from sugarcane to sugar includes the cost of manpower, energy and consumable cost. Besides, sugar loss in processing and maintenance of plant, equipment and state of the art technology have a direct impact on the economics of sugar production.

Therefore dynamic and continuous research is required in all the above areas. There are two premier Research & Development and Training Institutes in the country viz., National Sugar Institute, Kanpur and Vasantdada Sugar Institute, Pune. Apart from these Institutes, Sugarcane breeding Institute, Coimbatore and Indian Institute of Sugarcane Research, Lucknow are engaged in varietal development of sugarcane and its commercialisation.

These institutes, despite their hard work have not been able to make the desired head way as reflected in the stagnation in productivity in many states. They have not been able to meet the expectation of the sugar industry due to several constraints. In view of the above, the Committee feels that the following aspects may be adequately addressed.

(i) There is a need for greater interaction between the Industry and Research Institutes and also enhanced coordination between the two Research Institutes. All the Research and development activities relating to sugarcane, sugar technology, sugar engineering, by-products, instrumentation should be carried out on an integrated manner under the auspices of an apex organisation. For the purpose the activities of R&D could be brought under a designated apex body that would function autonomously, guided by a governing council comprising participation from government, industry, research institutes and farmer's bodies.

(ii) The human resource is the most valuable asset of an organisation and, therefore, quality of the technical personnel being trained out from the Institutes needs to be enhanced. To meet the requirement of Industry particularly rapid change in technology, the training of personnel is of utmost importance.

Therefore, the existing facilities at these Institutes in terms of technology and teaching manpower need to be upgraded and strengthened to meet the emerging requirements.

(iii)The course content and syllabus should be reviewed and revised from time to time in line with the changing needs of the Industry. The National Sugar Institute in particular is in very critical state with regard to faculty vacancies. There is large number of vacant posts at senior levels for the last several years. This has adversely impacted on the quality of training and no R&D work of significant merit has been carried out during the period. The remedial measures, therefore, need to be taken to tide over the problem. It is learnt that a proposal to convert this Institute in an autonomous body is before the government. The Committee recommends that an expeditious decision to provide autonomy to the institute should be taken.

(iv) In most of the major producing countries the research for sugarcane is funded by the growers or jointly by the grower and sugar mills. The growers and sugar mills also control management of such Institutes. Similar arrangement exits at two industry funded training research institutes in Brazil and Australia. The Committee, therefore, that the sugar industry and growers should fund the R&D activity relating to sugarcane, sugar process and engineering through autonomous organisations who would be in a better position to ensure quick dissemination of research findings.

(v) The Committee recommends that these autonomous R&D training organisations may be provided financial assistance from SDF and Industry. Besides, they may also attract project linked grants from industry, other sources or abroad.

After a review of the position of the two institutes, (NSI and VSI) the EG has come to the following conclusions:

NSI had since inception in 1936 been working as a subordinate Department under the Ministry of Food. While the VSI was established in 1976 to specifically cater to the need of the cooperative factories in the western India region. The NSI is provided budgetary grant by the Government of India and VSI is financially supported by the cooperative sugar factories, Government of Maharashtra and project based grants from other agencies. The working of the VSI is satisfactory. However, the National Sugar Institute has suffered deterioration in terms of standard and research output during the last 10-15 years. One of the major drawbacks with NSI had been that a large number of faculty positions could not be filled up. There is acute shortage of talented technical personnel. Both the Institutes have to cater to the need of trained human resource and R&D support required by sugar and allied industry. Under the circumstances both the Institute have to exist and, therefore, National Sugar Institute needs to be revitalized, restructured to serve its objective. The working of NSI as purely Government Department has exhibited that an academic and research institute cannot deliver desired results under the various constraints.

The EG is of the view that the institutes should be run autonomously by boards constituted with representation from industry, farmers organisations and the government. No interference from the Government in the working of these institutes is envisaged. The government should invite the industry to come forward and design the governance and funding of the institutes in a PPP mode. Hiring of quality professionals on contract and short term secondments from

industry should be left to the institutes. In keeping with the current trends in staffing, contract based short term appointments would tend to facilitate the entry of talented professionals. The EG advocates that while both the Institutes should get funding from the government for infrastructure development, basic research and extension programmes, the institutes should access project based grants from different agencies (from government, research institutes, mills, mills associations, federations and farmers organisations, etc) for applied research, action research, studies and training. The funding from the government should be made available in a time bound manner with clear timelines for sanction and disbursement of funds which seem to an area of concern presently. The institutes should also actively pursue consulting opportunities with the industry so that their academic activities have the necessary practical rigour. The VSI already adopts some of these measures, but it does need to access funding from government for its common and sector wide activities that are not specific to any individual mill.

The government may consider setting up a technical committee to prepare a rehabilitation plan for the NSI in accordance with the recommendations of the EG.

5.10 Themes for R&D and action research

There are a number of aspects of cane production and sugar manufacture that require in depth research. Known technologies that are not currently popular, but nevertheless have potential have to be tested under the current conditions to establish their viability for commercial adoption. While research themes could be taken up by institutes and researchers after initial identification in consultation with

the industry, testing technology applications and adaptation of the same would be possible only with active participation of the industry. The themes of research in the areas of cane improvement, crop production and crop protection have been listed in the annexure I. The areas of action research that need to be carried out in field conditions in collaboration with the mills are in process improvements, alternate processes and technologies and revisiting some of the technologies that were in use earlier (ahead of time). The indicative list of areas for action research is contained in the annexure 4.

5.11 Technology Mission on Sugarcane

The EG has considered the issues in the sector and come to the conclusion that farm profitability and mill profitability converge on quality and productivity of sugar cane and mill efficiency more than any other factors. Research, development, extension and technological upgradation become the most important aspects that need to be driven across the industry externally. Looking to the success of the Technology missions in Oilseeds, cotton and the like, the EG recommends the set up of the Technology Mission on Sugarcane, which should address the issues relating to the sector from a techno-economic knowledge base. The mission could be designed on the lines of the earlier successful technology missions, with participation from farmers and industry.

VI International scenario

6.1 India is the second largest producer of sugar in world after Brazil and largest consumer of sugar in the world.

Currently, India is a large scale in the Middle East and South Asian markets exporter successfully competing with the leading sugar exporters like Australia, Brazil and Thailand. In 2007-08, the country has demonstrated an ability to deliver significant volumes of both raw and white sugar to international trade. The growth in production has more or less kept pace with the growth in consumption demand which has mainly been met primarily from domestic production with only marginal imports. The industry, however, is not most competitive in the world. There are also wide cyclic fluctuations in production with attendant effect on sugar availability and financial health of the industry.

Sugar is produced in 110 countries. The leading sugarcane producing countries are Brazil, India, Australia, Thailand, China and Cuba. Sugar is extracted from two major agricultural raw materials, sugarcane and beet. Both produce identical refined sugar. Sugarcane is grown in semi-tropical regions, and accounts for around two-thirds of world production. Beet is grown in temperate climates, and accounts for the balance one third of world production. The Russian Federation, Ukraine and Europe account for around 80% of total beet sugar production. In addition to weather conditions, diseases insects and quality of soil, production of sugarcane and beet are affected by international trade agreements and domestic price support programmes.

Table VI.1

10 Largest producers

(In million MTs, raw value)

Sr. No.	Country	value
1	Brazil	33.20
2	India	29.09
3	EU-27	18.45
4	China	13.90
5	U.S.A.	7.68
6	Thailand	7.15
7	Mexico	5.42
8	Australia	4.63
9	Pakistan	4.36
10	Russian Fed.	3.40

Table VI.2

10 Largest Consumers

(In million MTs, raw value)

Sr. No.	Country	Value
1	India	20.88
2	EU-27	19.31
3	China	13.82
4	Brazil	12.47
5	U.S.A.	9.11
6	Russian Fed.	6.50
7	Mexico	4.94
8	Indonesia	4.40
9	Pakistan	4.25

10	Egypt, Arab Rep.	2.70

Table VI.3

10 Largest Cane Sugar Producers

(In million MTs, raw value)

Sr. No.	Country	Value
1	Brazil	33.20
2	India	29.09
3	China	12.55
4	Thailand	7.15
5	Mexico	5.42
6	Australia	4.63
7	Pakistan	4.34
8	U.S.A.	3.22
9	Indonesia	2.81
10	Guatemala	2.36

India is among the largest producers of sugar in the world and ranks as the largest growing global market for the product. India has 20% of the total sugar mills in the world and accounts for about 15% of the global production.

6.2 The World Sugar Economy

The world sugar economy struck a record high surplus in 2007. World sugar production exceeded global use of sugar by 8.6 million tons. World production grew by a massive 14.2 million tons to a record 166.3 million tons. A continuing sharp growth in India's sugar harvest (+6.8 million tons from 2006) was one of the main supply features in 2007. Large

production gains were also reported by other major Asian producers such as China (+3.2 million tons), Thailand (+1.6 million tons) and Pakistan (+1.1 million tons) as well as Brazil (+1.6 million tons).

In 2006 world sugar consumption grew by a healthy 2.6% to 157.7 million tons. World per capita consumption also grew to 23.8 kg as against 23.6 kg in the previous year.

The robust growth of world trade, which started at the beginning of the current decade, slowed down in 2007. The volume of sugar traded internationally decreased to 48.8 million tons from 49.6 million tons in 2006. On the supply side, the decrease (-5.1 million tons) is mainly attributed to a drastic fall in EU exports following reform of the sugar regime there. A severe fall in sugar supply from the EU was partly compensated by Thailand (+2.4 million tons), India (+1.5 million tons) and Brazil (+1.0 million tons). Major year-to-year changes in imports were sharp decreases by Pakistan (-1.5 million tons) and the US (-0.9 million tons), as well as significant increases in sugar purchases by Indonesia (+1.5 million tons) and Russia (+0.8 million tons). By the end of 2007 world stocks of sugar grew by 8.6 million tons to 87.3 million tons, representing 55.4% of world consumption.

Table VI.4

World production, consumption and balance (million tons, raw value)

Quantities in Million tons	2008-09 projection	2007-08
Production	162.2	168.6
Consumption	165.9	162.0
Surplus/deficit	-3.6	+6.6
Import demand	47.7	45.8
Export availability	47.8	47.5

End stocks	65.6	69.3
Stock to consumption ratio	39.58%	42.76%

6.3 India is located close to major sugar deficit markets. The Indian ocean countries like Indonesia, Bangladesh, Sri Lanka, Pakistan, Saudi Arabia, UAE and some African countries are import dependent in sugar. India has a natural freight advantage to these countries due to its geographical location. In past, India has exported sugar to the identified deficient countries. At present, these countries import primarily from Brazil, Thailand, EU and Australia. Thailand, Australia and South Africa are present only in a few targeted countries while Brazil and EU supply sugar to most of deficient markets. Barring EU, the others would be key competitors for India in the future. Bangladesh and Sri Lanka primarily import white sugar while UAE, Saudi Arabia, Indonesia are major importers of raw sugar due to the presence of destination refineries in these countries. Pakistan is an occasional importer. It imports only if domestic production is inadequate. UAE is a large importer due to the presence of the refineries that import raw sugar and export white sugar. All the other countries are structural importers with imports accounting for 50-75% of the consumption. These countries are expected to continue to be net importers on account of their domestic agriculture pattern which might not allow them to become self-sufficient in sugar. In 2005, EU exported sugar to more than 100 countries across the world including 1.5 MTs to Asia and Africa. The reduction in EU exports which started in mid 2006 as a result of WTO ruling is scheduled to continue till 2010. It is expected that India would benefit as a result. The world sugar prices are likely to increase due to the withdrawal of EU from the export market in the period 2006-2010. This would in turn make Indian exports more viable. While world prices did increase due to reduction of EU exports, currently prices are low due to a spurt in production leading

to global surplus. EU exports were of the 45 ICUMSA quality whereas the Indian sugars are typically of 100-150 ICUMSA quality. For India to be able to benefit from the market vacated by EU Indian mills would need to develop the capability of producing 45 ICUMSA sugar. During 2007-08 India for the first time has demonstrated its ability to produce dextran free raw sugar and successfully exporting the same to UAE.

In the projected situation India can look forward to become a significant exporter in the coming years. The international trade can be used to manage the surplus and deficit in the domestic market. This has further potential to enable stability in the domestic market. With cane diversion towards ethanol and an export market for sugar, India would be able to manage cyclical factors with relatively lower impact on domestic market.

6.4 The future can be viewed with cautious optimism; the opportunities before the sector are significant. Apart from sugar which is perennially in demand, ethanol and cogenerated power are clean energy products that are perennial and replace exhaustible sources of energy. The industry has a potent combination of products and a market demand for two products that has no limits. Setting appropriate policies and enabling the sector to come to terms with best practices required to keep all stake holders satisfied are the priorities before the government.

VII. Recommendations of the Expert Group

The Sector comprises four distinct stakeholders - the cultivators of sugarcane, the consumers of sugar, the manufacturers of sugar and the government. The interests of the first three categories of stakeholders are at variance and often adversarial in nature. While the consumers aspire for affordable prices and adequate availability of sugar, the sugar mills look to better revenues on a large production base supported by comfortable availability of sugarcane at low effective rate. The farmers on their part desire high productivity, low cost of production and high prices for the cane. The government as a significant stakeholder wants to balance the interests of cane farmers (remunerative prices), interest of consumers (affordable price for sugar and adequate availability) while at the same time ensure that sugar mill sector remains strong and efficient. In fact the Indian sugar sector has more demands from the state in terms of its functioning and performance. This has led to tight regulation of a number of areas of functioning of the sector from sugarcane production to use of by-products arising from the manufacture of sugar. Some deregulation has taken place, but critical aspects such as cane price, manufacture, trade and marketing as also use of by-products still continue to be regulated. The expert group is acutely conscious of the sensitivities attached to the decisions that would eventually be taken based on the recommendations with regard to deregulation and decontrol of the remaining aspects of functioning of the sector.

One of the significant issues that have been kept in mind is the relative lack of profitability of sugar manufacture and sale[33]. The returns achieved by sugar mills are the lowest in the manufacturing sector. The volatility and the cyclicality that impact the sugar market compound the problems of the sugar mills. The sugar mills do not have the ability to pay high prices for cane as pricing of the finished product – sugar – by the mills on a cost plus basis has not been possible. The cyclicality of high sugar prices being followed by high availability of cane and consequent crash in prices due to excess production of sugar is well established. This creates a situation where the short term dynamics of the market adversely impact long term strategic development of the sector. The state influence on the market and prices for sugar on one side and the role of the state governments in fixing the sugar cane price (often arbitrarily) makes sugar milling a high risk and low profitability proposition. Some of the sharp practices associated with some parts of the industry stem from the need to achieve profits in an otherwise restricted operating environment.

The expert group has considered the problems faced by the different stakeholder segments and also the policy choices that are made by the government in exercising its regulatory powers over the sugar sector. The recommendations are discussed in 4 major parts (1) Protection of farmers' interest and freedom to farmers, (2) Protection of consumer's interests, (3) Flexibility to sugar industry, (4) Policy issues and the need for deregulation and decontrol.

[33] "Assuming an average weighted average cost of capital of 13%, even the large listed companies have failed to generate economic profit in almost all years. The Average Return on Invested Capital (ROIC) for large listed sugar companies was more than the weighted average cost of capital of 13% in 2006, i.e.' one year out of the ten year period 1997-2006. The smaller sugar mills had more problems on the profitability front that the large ones."- The Indian Sugar Industry Sector Roadmap – KPMG 2007.

Protection of farmers' interest and freedom to farmers

7.1 Cane price

In the expert group's assessment, certain non-negotiable norms should underlie cane pricing, regardless of who fixes the price. These principles are:

- The price should not only compensate the farmers for the labour and inputs but also provide a net positive return.
- Further in years when the sugar prices rule high, the price should enable farmer to gain a share of the same.
- The return to the farmer should also take into account the income earning potential of bye-products of sugar such as bagasse and molasses.

Sugar cane in India is priced much higher than in other countries and even with that the farmers realize a lower net return. The returns to farmer are not determined by the price of cane alone, but its productivity as well. Cane varieties with higher sucrose content enhance the ability of mills to pay a higher price to the farmer.

7.2 *The focus on farm incomes should shift from "price per ton of cane" to "return per hectare cultivated".* The scope for stepping up farm productivity is considerable. Further, the sucrose content of Indian cane is low, making high prices for cane uneconomic. Unless the issue of sugar content and yield are sorted out through a well orchestrated cane development programme by every sugar mill (with government support), the contentious issue of adequate remuneration to the farmer cannot be sorted out. The cane pricing mechanism should include incentives for improved yields as also improved varieties.

7.3 *States need to undertake well designed cane development programmes to improve yields.*

7.4 *Apart from determining a price, payment of the same without delay has also to be ensured.* Cane price arrears tend to reduce the returns to the farmers and wean them away towards other crops that do not carry payment problems. Presently the stipulations are that the value of cane supplied by the farmer (at SMP) should be paid within 14 days of supply. Very often this time limit is breached. The mills have several problems such as being unable to arrange for bank credit. The expert group is of the view that the mills should pay 66% of the contracted price or the SMP whichever is higher within 14 days. This must be invariably adhered to and any failure should be penalized. The payment of additional price for sugarcane (Clause 5A of Sugarcane control Order) is usually delayed; this has to be expedited and payment ensured within three months from the end of sugar year[34]. The additional payments (under clause 5A) should take in to account the commercial potential of bye products. Apart from factoring in sale price of sugar during the year, the realizations obtained from use/sale of bye products should also be added in the calculation of surpluses for determining additional payments. As bye product availability is a certainty, the SMP fixation should take in to account its potential value. While the recent notification of the Government outlines the basis for inclusion of raw material value in calculation of additional payments under clause 5A, it would be better to include the same in SMP based on normative values

[34] The CACP has in its report on SMP for 2006-07 stressed this. "The L factor is actual cost of producing one unit of sugar and it is declared, *zone-wise*, by the Directorate of Sugar. Based on the L factor and the accounts of sugar factories, the State Governments determine the liability of each sugar factory to pay the additional cane price. Unfortunately, the Directorate of Sugar could not declare the L factor in time in the past. Government should declare the L factor within three months of the close of a sugar season. Also, the Government should take necessary steps to declare the L factor for 2003-04 sugar-season without any further delay. Further, the Government may get the suggestion of the Government of Tamil Nadu examined to delegate the power to declare L factor to the State Governments"

for bye products. This would ensure that initial price received by the farmer fairly reflects the value of cane.

7.5 *SMP should be the only basis for price fixation and payment across the country.* A significant fact that emerges after analysis of arrears of cane payments is that arrears are low in states that adopt the cooperative model and in states that adopt SMP as the basis of cane price. The case for adoption of SMP seems a realistic and more equitable option for both farmers and millers. It is recommended that SMP should be the only basis of price fixation and payment across the country and the competitive SAP announcements need to be ended through necessary legislative action by the Government.

7.6 The acreage under cane is not merely a function of price paid for cane, but also the alternative crop opportunities available for the farmer. A farmer with reasonable land holdings cultivating multiple crops is guided in cropping decisions by his perception of relative change in expected realizations from the different crops. The rise in wheat and rice procurement prices is likely to affect the decision making of cane farmers across the country. Prices of soybeans and other oilseeds have spiked over the past 12 months and are also likely to cause substantial shifts away from cane, particularly in Maharashtra.

Apart from other measures, maintaining parity on income realization with competing crops is necessary to retain cane acreage and raw material supply. The process of fixing SMP should include conscious consideration of parity with market prices of other competing crops.

7.7 *Need for better collaboration between farmers and mills in cane price fixation.* A long term goal on the cane pricing issue is to let the buyer and seller determine the same without external intervention as in the case of many other agricultural produce. External intervention in price fixation

renders the primary stakeholders less responsible and leads to extreme reactions as well vexatious and time consuming litigation. The mills and cane farmers should settle prices and terms of raw material supply through negotiations. The basic framework of price determination could be provided by the government from its experience of fixing SMP. The State stepping out of price fixing role would make it necessary for the mills and farmers to strike up a more collaborative attitude and move away from the present adversarial positions in some states. Since State ends up as a party in any litigation that ensues (practically every year), the necessity of state withdrawing from price determination role needs no emphasis.

7.8 *The expert Group recommends that over the long term, government should withdraw from fixing the price of sugar cane.* Government would be able to withdraw when the mills and farmers mature under controlled conditions to respect a norm based price that protects the interests of the farmers. The government should :

- Determine the norms for pricing of cane and declare the same to all stakeholders.
- Declare a uniform price for cane that rewards the farmers in terms of the uniform norms without allowing State governments to fix their own price.
- Stipulate a 14 day period for initial payment of cane price and a three month period from end of the sugar year for final payment and enforce the same with penal action where needed.
- Create a dispute redressal mechanism on the lines of Lok Adalat that would take care of contract performance issues.

7.9 Cane reservation

Government should consider allowing sugarcane growers to supply sugarcane to any sugar factory of their choice and the factory wise reservation of cane area may be scrapped. The SMP based price varied from factory to factory depending upon recovery rate of the individual factories. The sugarcane growers in the reserved area of a factory with low recovery received lesser price notwithstanding the quality of sugarcane supplied. The sugarcane growers of high recovery sugar factories get higher price and vice versa. There is a need to encourage sugar factories to improve their recovery rates so that sugarcane growers get higher cane price. Many sugar factories continue to have recovery rates even below 8.5 percent mainly due to their obsolete plant and machinery. They have not gone for upgradation/modernization despite availability of assistance from SDF.

The expert group recommends that factory wise reservation of cane area may be scrapped. The mills should command loyalty of farmers through cane development programmes, fair practices in cane procurement, reasonable prices on account of efficient working and prompt payment of price.

The problem of excess crushing capacity within given local area cannot be solved by cane reservation. Either the mills must infuse confidence in farmers to cultivate sugarcane (which is also determined soils and irrigation) or suffer a shortage of cane. Reservation cannot augment cane supplies, but can distribute the shortfall across mills. Allocation of cane among mills is a function better performed by the market and hence cane reservation as a policy exercise of the state must be given up.

7.10 Intermediate organizations of farmers

It is recommended that the mills should source cane directly from farmers and any intermediary structures should be avoided through legislative action. One of the questions that have been agitating the minds of farmers especially in Uttar Pradesh is the presence of intermediary structures cane societies that handle the sugar cane supply to the factory from farmers and payments from the factory to the farmers. Intermediation by the societies has not been liked by the farming community on account of several problems faced in hassle free cane procurement as also settlement of payments. Some of the cane societies have reportedly engaged in rent seeking behaviour. In order to impart a greater measure of freedom to farmers and to ensure that their linkage with the sugar factories remains strong, it is necessary that the intermediating agencies do not become powerful. The farmers should be in a position to take decisions and ensure performance of contract terms by the mills instead of having to rely on intermediaries[35]. The expert group feels that removal of intermediary societies where the farming community does not support the same (the opinion of farmer members using each such organization should be ascertained through a poll) should be carried out over a 3 year period.

7.11 Contract documentation, enforcement and dispute settlement

Appropriate structures and mechanisms which promote adherence to contracts by the mills as well as farmers and a suitable dispute settlement mechanism need to be immediately introduced. Enforcement of contracts of supply of cane as also the payment of price including interest, if any for delayed payment of cane price has been a continuing issue. Presently the terms of supply of cane are difficult to enforce both on the part of

[35] The experience in Pakistan where the intermediating societies were removed was that the mills had to appoint agents for aggregating and procuring cane. Some aspects of this development were not positive. But the agents bind the company for their acts of omission or commission, whereas the cane societies supposedly intermediate on behalf of the farmers leaving them limited options in case of grievances.

mills and on the part of the farming community. The farmers in times of cane scarcity tend to breach their contract with the mills and divert the cane to the highest bidder. Similarly in times of excess availability of cane, the factories do not procure the entire cane supplied by the contracted farmers. This two way breach of contract terms has to be dealt with in a mature and equitable manner so that continuing loyalty of farmers to the mills is ensured. This has a direct bearing on the issues relating to area reservation referred to earlier.

The documentation of price contract and procedure for settlement of disputes is also an area of farmers' concern. Standard documents could be developed as a onetime measure and circulated among the farmer's organizations and the sugar mills by the State Governments. While mills should be required to issue long term contracts say of five years for purchase of cane, the price contracts should be issued each year based on the prices agreed upon at the beginning of the cane planting season. Very often the farmers find it difficult to enforce contract terms including that of price and timely payment. A good functioning mechanism for enforcement of contract on both sides would render area reservation requirements unnecessary. There is a need to set up localised mechanisms on the lines of Lok Adalats/Nyay Panchayats that would be able to arbitrate between farmers and mills and settle disputes quickly. Local persons with credibility who enjoy the confidence of both farmers and the sugar factory may be identified to head such dispute settlement mechanisms to arbitrate on the disputes.

7.12 Cane productivity and optimal input use

Mills need to undertake comprehensive cane development programmes and substantially raise the awareness and skills of farmers. At present cane productivity is poor in many leading states. Suitable varieties with

adequate sugar content are not grown in many farms with adverse effect on sugar recovery. This leads to low profitability of the mills and importantly low realization for the farmers. The mills have to take up comprehensive cane development programmes that ensure cultivation of suitable varieties, with appropriate inputs and optimal irrigation methods such as micro-irrigation. In the interest of ensuring stable cane supplies, mills have to undertake farmer awareness and skill development programmes. The government could provide initial funding support to develop information packages for dissemination and part cost of first three years effort at comprehensive cane development. However this support should be on a reimbursement basis on demonstrated improvements in changed varieties and increased sugar recovery. The expert group is of the view that the sugar cane research institutes should be involved by the industry closely in this effort.

7.13 Though the sugar content and recovery is high in Maharashtra and the price paid per ton of cane higher than in Tamil Nadu, per hectare income is higher in Tamil Nadu. States like Maharashtra have to improve yields through well designed cane development programmes. Protection of farm incomes is better secured through interventions in productivity and quality of cane rather than through price interventions that reduce mill profitability.

7.14 Varieties of sugarcane that have been rejected on account of poor quality continue to be cultivated with state government support. States should not fix a price such rejected varieties and actively discourage their cultivation. If such cane is accepted by mills, the price would be determined by the sugar recovery rates of such cane separately and not on par with other cane procured from farmers.

7.15 The extension mechanism should be strengthened to provide the best technologies and cultural practices to cane farmers. The linkage

between research institutes, mills and farmers should be strengthened for efficient transfer of appropriate technology in cane cultivation. Each sugar mill should be equipped with a dedicated cane development wing with qualified personnel, adequate infrastructure and capability for on field demonstration of techniques supported by audio-visual aids. The extension mechanism could be used effectively used for dealing with seasonal and varietal planting, use of quality seed, integrated nutrient management, irrigation optimization, reclamation of problem soils, mechanization, ratoon management and plant protection.

Protection of consumer's interest

7.16.1 The Government should abolish the levy mechanism and the sugar requirement for PDS should be met through open market purchase / tendering from mills. The issue of protecting consumers' interest in the sugar sector is addressed by the government through influencing the supply of sugar in the market, altering the tariffs on export and import of sugar, stocking and selling sugar through a combination of levy, controlled market releases and other arrangements and making available sugar through the public distribution system to the target group of narrowly defined poor people. The action taken by the government in trying to influence the availability of sugar in the market through introducing a levy system as also operating a mechanism of market releases of sugar has been effective in dealing with price and availability issue, but not the profitability and sustainability of the enterprises. The expert group totally endorses the policy view that the consumers belonging to the poorer sections should be protected through a targeted public distribution system in which sugar may be supplied at reasonable rates. Barring this section of consumers all other consumers do not need any kind of price based protection. The sugar required for PDS could be procured from the market without resorting to levy and similar other

mechanisms. The levy system could, therefore, be abolished. This would also result in increasing the remuneration to farmers.

7.17 *The expert group feels that maintenance of strategic stock for managing prices is not a legitimate role for the government.* Government's active involvement in managing stocks would tend to take focus away from managing the risks in the sector and optimizing its performance. As stated earlier the interest of poor consumers could be protected by a targeted programme that supplies sugar through the existing PDS to the existing clients of PDS.

7.18 *It is recommended that sugar be removed from the list of essential commodities and its weight in the wholesale price index be reduced.* Sugar has been placed under the essential commodities Act in view of its mass consumption measure. Sugar, based on the consumption patterns and its criticality to the people does not seem to be a fit case for continuation in the essential commodities list.

Another issue that has been raised is the weight given to sugar in the consumer price index and the wholesale price index. The weight given to sugar is more than the weight of rice and wheat! This needs to be reduced as most of the consumption is by industrial units engaged in confectionary, bakery, soft drink manufacturers and the like. If sugar is removed both from essential commodities Act and also its weightage reduced from the price indices then the present focus on control over price of sugar with all the attendant consequences could be avoided.

The expert group recommends that sugar should be taken out of the list of essential commodities, while retaining sugar cane therein. Retaining sugar cane in the essential commodities list would provide the government with necessary powers for securing the interests of cane

farmers, who cannot escape dealing with large corporates for sale of their produce. The Essential commodities cover would enable fixing of fair price for cane, ensuring payments to the farmers and checking wayward behaviour of mills in cane procurement. The EG recommends that the entry under item (xi) (e) of section 2 of Essential Commodities Act 1955, may be deleted (to remove sugar from the list of essential commodities). The timing of removal of sugar from list of essential commodities should be aligned to the phased dismantling of levy and market release mechanisms.

Flexibility to sugar industry

7.19 The Expert Group recommends complete deregulation of manufacture of sugar and bye products.

There are variety of aspects of sugar mills which are controlled or regulated by the government and other authorities. Several of these aspects need a review. The first is that the flexibility available to the factories to produce sugar, ethanol or other products. The recent changes in regulation permit sugar mills to produce ethanol directly from sugarcane juice, but not other alcohol and derivatives. No ethanol unit can be set up without a sugar manufacturing plant. This in effect means that extra investment costs are loaded on to an entrepreneur who would like to produce only ethanol or its derivatives. A critical question here is of ensuring food security when it comes to production and availability of sugar. The fear that when the permission is given for standalone ethanol units many of the existing players might opt out of making sugar especially in the years when profitability of sugar is low. The maximum demand on cane for direct manufacture of ethanol from cane juice has been estimated at less than 10% of cane production. In any case

excessive diversion of cane for direct manufacture of ethanol takes place at any point of time it would be a short term phenomenon, as the ensuing shortage of sugar (with resultant high sugar prices) would tend to bring mills back to sugar manufacture. It is necessary that the entrepreneurs should (1) be made free to produce sugar, ethanol or other products from out of their plant and (2) be allowed to set up stand alone units producing only ethanol or other derivatives directly from sugarcane juice.

7.20 *The role of price stability and strategic stockholding should shift from Government to the mill sector.* There have been suggestions that the industry should be supported to operate a strategic stockholding in sugar which could release sugar in to the market during times of higher prices and procure sugar for stocking during times of low prices. If the industry feels that it is feasible, then it should undertake this through the different associations (ISMA, NFCSF) that are in place. The expert group does not envisage any major role for the Government in what is clearly an industry level initiative for maintaining price stability.

7.21 *The mill sector should be completely free to expand and diversify so as to achieve maximum economies of scale and scope.* One of the questions that have been asked is that of limits of capacity expansion; whether the factories should be allowed to expand to any extent. In India large capacity mills are less than desirable from a policy view; mills with capacities in excess of 10000 TCD are denied some of the benefits available to others. International experience shows that some of the larger units have been more profitable and can withstand the fluctuations in international commodity prices better. They are able to invest in better technology as also a flexible manufacturing arrangement that can switch from sugar to ethanol and its derivatives. The movement from small 'sugar-alone' factories to sugar complexes which manufacture

a wide variety of sugar and ethanol based derivatives should be encouraged. The expert group is thus inclined to recommend that the factories should be allowed to not only expand but also encouraged to diversify in to the different possible derivatives and products arising from sugar and its by-products.

7.22 Molasses

State Governments need to reduce controls on movement of molasses as well as taxes thereon. Ethanol and molasses have been the subject of discussion in relation to the desirability and extent of control and taxation by the State Governments. The states have to be persuaded to be reasonable in controlling the movement of molasses and also in taxing ethanol and its derivatives. This is required in order to standardize the terms of the market and ensure that the factories do not arbitrage between the variable regulatory and fiscal frameworks prevalent in different states.

As explained in an earlier paragraph stand alone units of ethanol should be permitted in the interest of energy security. Further the following need to be incorporated in to the policy framework.

1. Excise duty waiver on Molasses.
2. Uniform Sales Tax across states and on Interstate sale.

7.23 Ethanol

Ethanol needs to be given a strategic role in the energy security of the country. Special incentives for flexi vehicles and ethanol blended petrol need to be provided. Further the percentage of mandatory blending

ethanol needs to be increased a higher level consistent with production capacities. Further, the following need to be ensured:

1. Encouragement to manufacture of flexi fuel vehicles that could run on ethanol as well other conventional fuel.
2. Special incentive to ethanol blended petrol on par with Compressed Natural Gas (CNG).
3. The buyers of ethanol (e.g.: petroleum companies) should not determine pricing of ethanol.

7.24 Cogeneration of power

The committee feels that investments in cogeneration capacities would accelerate only if the norms for power purchase by the power utilities is codified and implemented uniformly across the country. Due to its nature, power has to be sold to a monopoly buyer, who in the absence of well set norms and enforcement by government might not honour agreements with the sugar mills. Taking into account the problems in cogeneration investments and sale of power, the committee recommends that:

1. SEB's/utilities should be mandated to purchase power to the extent of 10% of their total generation/supplies from non-conventional sources such as cogeneration units (as has been done in countries like USA).
2. Policy for wheeling, banking and third party sales should be uniformly set as per MNRE guidelines.
3. Grid connectivity to cogeneration units should be provided by SERC & Electricity Boards.
4. Preferential tariff structure for power generated by sugar mills to avoid diversion of bagasse for other purposes.
5. Transmission cost to be borne entirely by the utility grid.

6. The seasonal nature of cogeneration units make the payback period of investment long. This deters sugar mills from investing in cogeneration units. Part costs of setting up such units could be subsidized either in a capital form or as interest subsidy for the duration of the gestation period. The SDF could be well used for this purpose.

7.25 Marketing of sugar

The market release mechanism should be completely done away with in a phased manner. While there are views that the levy and market release mechanisms should be abolished, some feel that these need to be refined. But it is difficult to control the price of both raw material and finished goods, especially when done by different authorities with differing objectives. Marketing is an enterprise function and is best left to the sugar mills as they are accountable to their shareholders for profits. As indicated earlier, sugar sector has been a low profit industry; if it remains so it would find it difficult to raise new capital for modernization, expansion and investments in distillery and cogeneration capacities. The only element of public policy in controlling marketing of sugar is the protection of customer from unaffordable price or scarcity of sugar. These issues are best dealt with through public distribution system for those customers who are poor and economically disadvantaged (as explained earlier in the section on customer protection). The withdrawal of market release mechanism would provide more flexibility to mills for raising cash to meet payment of cane arrears, repayment of loans and reduce interest costs and improve their ability to leverage equity for investment loans. The Expert Group recommends that the market release mechanism may be completely done away with in a phased manner. In the first phase, during the first year mills maybe permitted to market 25% of their stocks at the end of crushing season (or

end March) freely during the next one year as per their commercial judgment. The balance 75 % may be subjected to release mechanism. In the second year the mills may be permitted to market 60% of the stock freely without any controls the balance 40% subjected to market release mechanism. In the third year the market release mechanism may be entirely withdrawn.

7.26 Distance criteria for setting up of new mills

The Expert Group recommends that the minimum distance between two mills should be maintained at 25 kms with certain exceptions. The Tuteja committee had recommended that the distance between the two sugar mills should be at least 25 km. This was advocated to ensure that the sugar mills have an adequate cane command area. There have also been demands from a section of the industry that this distance restriction must be removed.

Even a 25 km. diameter cane command is not likely to assure availability of adequate cane to the mills. One of the problems that would remain unsolved is the extent which farmers would be ready to cultivate cane and supply to the sugar mills[36]. The Expert Group recommends that the minimum distance between two mills should be kept at 25 km. in the criterion should be relaxed and new mills allowed to enter in areas where the existing mills are not functioning well and are not serving the farmer clients optimally.

7.27 Sugar Packaging

[36] Please see annex 3. The competitiveness of cane in terms of income is not sound compared to other crops. Given the delays in payment and the arrears that run for months, farmers might well turn to other crops. The volatility in cultivated acreage under cane is clear proof of this.

The sugar packaging order should be withdrawn to provide flexibility to the mills to take suitable decisions in the matter. The sugar packaging marketing order has outlived its useful life. The insistence on using jute as a packaging material is not justified on account of the inherent potential for spillage and spoilage of food stuff. The ILO convention that manually handled goods should not exceed 50kg per pack is not adhered to in view of extra costs involved in replacing 100 kg bags with two 50 bags made of jute.

7.28 Bank loans

Banks should be free to determine their terms and criteria for finance. The Banking sector would be attracted if the economies of the mill sector are substantially improved. There have been representations for raising the loan value of sugar to 100% from the present 85% of collateral. Given the fluctuations in the price of sugar and prudential requirements to be followed by banks, the Expert Group feels that loan terms should be left to the banks and borrowers. Going by the spirit of deregulation, the banks should not be given an external mandate on business decisions that they need to take through negotiations with their clients. The requirements of modernisation, expansion and creation of cogeneration /ethanol capacities over the next years are huge. Cogeneration alone is expected to demand an investment of Rs 37000 crores in the form of long term of loans. Banks should be encouraged to allocate resources and design fast track appraisal procedures for meeting these requirements.

7.29 Payment of cane arrears by mills

The frequency of build-up of arrears of cane payments should decline once the manufacturing and marketing flexibilities are introduced. With sale of sugar decontrolled, it should be possible for mills to generate liquidity from sugar stocks to meet payments. However the mills should

recognize the cyclical nature of the industry and ensure that they create adequate reserves during the "high-profit" years for utilization during the down turn of the sugar cycle for managing cane payments and working capital shortfalls. The government should incentivize creation of such reserves through appropriate allowances in computation of taxable income under the Income Tax Act. Further, bank credit towards working capital should reckon the creation of reserves during "high Profit" years as a key criterion for determining the size of credit limits. Government support of any nature to the sugar mills such as out of SDF, export subsidies, etc, should be contingent on mills having created such reserve funds.

Policy issues

7.30 Decontrol and deregulation

In case of sugar, as indicated earlier, the almost total control has limited the industry's ability to innovate, invest and improve its efficiency. The sector's future depends on its ability to diversify into bio-fuel and power generation as these have the ability to add as much as 30 to 50% to the value of sugar produced. Large sized sugar complexes would perhaps be able to function with cost economies of scale and manage their market risks through manufacturing flexibilities and exports. Such large complexes would be facilitated by merger of existing mills as well as investments in new mills. Such investments would be forthcoming only if the government provides autonomy and a stable policy regime which makes returns on investments more certain.

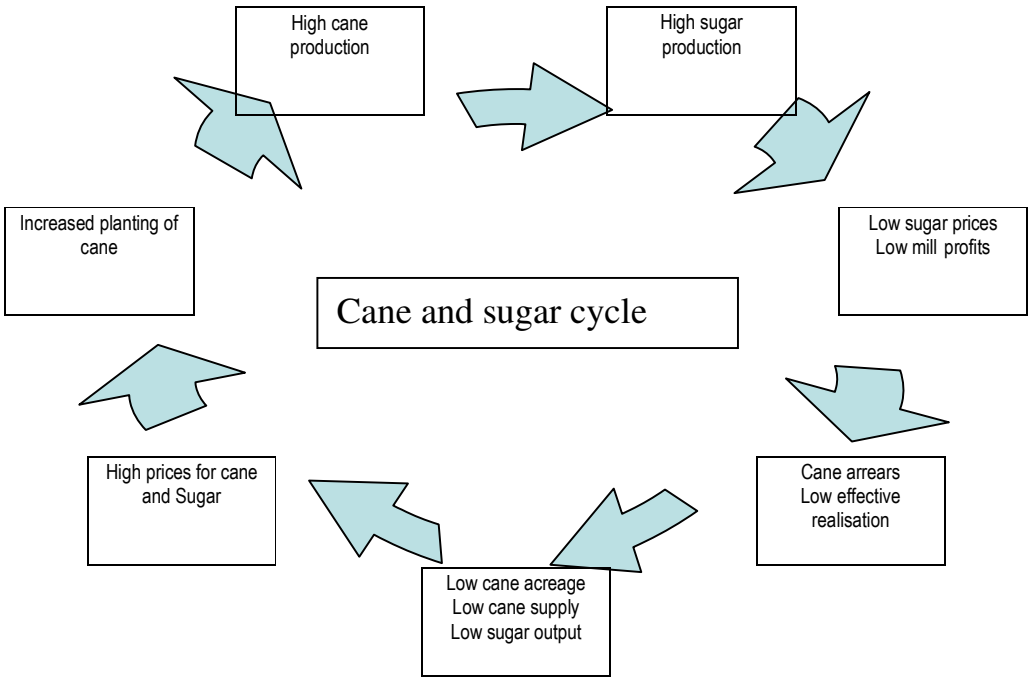
As stated earlier one of the more urgent measures is to consider removing sugar from the list of essential commodities and take care of interest of small consumers through the PDS.

The industry should be given a 3 to 5 years time frame in which the measures for decontrol are to be taken. Without such a calibrated mechanism of decontrol it is difficult to envisage the sugar sector marching towards a sound future where it is internationally competitive. Some specific aspects of deregulation are discussed in the following paragraphs.

7.31 Cyclicality in production and price of sugarcane

The Expert Group recommends that with appropriate policies, the Government should promote appropriate measures to reduce the cyclicality in sugar and cane production and their prices, by offering full flexibility to sugar mills in manufacturing any product from cane. Price of sugar rules high in a year in which cane production is low and resultant sugar output is low. The high price of sugar raises expectations that in the next season sugar cane will fetch a high price and leads to increased planting of cane over a larger area. The higher production of cane, leads to a glut in the market and high sugar output which brings down the prices. The crop being a long duration one and immediacy of sugar consumption needs do not lend for short term responses which could facilitate farmers to benefit immediately from supply deficits and higher prices. The cycle is perpetuated on account of alternating peaks and troughs in supply of cane. A combination of actions is required to lend stability to cane supplies through reducing volatilities in cane price. The present use of cane only for manufacture of sugar tends to feed the cycle based on sugar price movements. In a season when sugar prices are low, if cane could be directly diverted to manufacture ethanol, sugar production and stocks would remain stagnant thereby improving the price sentiment during a sugar glut. Cane would be able to get a due price on account of ethanol and cogeneration revenues which are not

impacted by cycles in commodity sugar. While cogeneration would always remain a remunerative activity on account of power shortage as well as the focus on renewable energy, ethanol is subject to a different commodity cycle – that of crude oil. Even here ethanol's status as a green alternative should find it a ready market, with the government's commitment for a minimum percentage blending.



If the cane production above a threshold could be directly converted to products other than sugar, then low sugar prices and low mill profitability could be avoided. Here the flexibility to the mills for switching from sugar to ethanol or vice versa would ensure that cane is put to the most profitable use and sustain the mills ability to pay an appropriate price to the farmer on time. The second merit of this flexibility is that mills do not have to wait for sugar stock to be disposed

off for making cane payments, but dispose of ethanol/ alcohol and power to generate funds for paying the farmers. Maintaining cane payments current prevents erosion of farm incomes and ensures that next season's cane planting does not suffer.

The shifting of the decision on appropriate cane use to the mills would decentralize the same and break down a large problem in to several small enterprise decision situations. For this anti-cyclical measure to work, mills should be encouraged to ramp up their ethanol manufacturing capacity quickly. New stand alone ethanol manufacturing units with multiple raw material (Cane, Molasses, corn, beet, sweet sorghum) capability should also be encouraged. *In the expert group's view, the desired policy response for stabilization of cane and sugar production and their prices thus comprises offering full flexibility to sugar mills in manufacturing of any product from cane, support to investment in new capacities for direct production of alcohol, ethanol and derivatives from cane, permission for setting up stand alone ethanol units, creation of cogeneration capacities and dismantling the market release mechanism for sugar.*

7.32 Trade policy

It is recommended that the Exim policy with respect to sugar should be stable and provide a reasonable assurance to all stakeholders for a given period of time. The policy on import and export of sugar has been geared to protect the domestic consumer rather than develop the sugar industry as leading player in the global market. The inconsistency in export import policy and the ad hoc nature of ban and permission for export of sugar have made the Indian sugar an unreliable commodity in the international market. Sellers of sugar from India do not enjoy credibility

in the international market on account of the frequent changes in government's policies. The expert group recommends that the export import policy in relation to this sector should also provide some assurance that it would remain so for a given period of time. Investments made in manufacturing capacities require a stable policy environment which includes the exim policy as well. The investments required to produce internationally acceptable quality would not be made without a favourable trade policy regime. A long-term and stable exim policy would facilitate the private sector sugar mills to make appropriate investments; otherwise they might refrain from making high technology investment required to produce high quality of sugar and derivatives.

7.33 Sugar Development Fund

The sugar development fund loans should continue in their present form and promote energy conservation, pollution control, R & D, alternate raw material development, cane development and process improvements. The plea made out for using SDF to provide capital subsidy as in the case of the textile upgradation scheme does not seem to merit serious consideration. Capital subsidies are targeted towards those activities which are in the public interest but which are not viable without some form of support. It is nobody's case that production and marketing of sugar is not a commercial activity nor a case is made out that it is unviable. The mere fact that the commodity cycles impart a measure of volatility to the prices should not lead to a capital subsidy being offered for setting up of sugar mills. Already the installed capacity of sugar mills is in excess of the available sugarcane. Capital subsidy for setting up more idle capacity that would ease out some of the existing mills is not a sound proposition. However, for carrying out measures which are in interest of environmental conservation and pollution mitigation where the costs cannot be easily absorbed by the existing functional mills, SDF

may consider some kind of subsidy under a very clearly articulated policy. The committee recommends that SDF may provide low interest loans to sugar mills for:

- Setting up cogeneration units, expansion of such units.
- Investments in environment conservation and pollution mitigation plant and equipment.
- Investments in balancing equipment to take in alternative raw material such as sugar beet, sweet sorghum, etc.
- Research and development in agronomy of sugarcane cultivation for improving yield and reducing costs.
- Action research in collaboration with industry for application of available technologies which have advantages, but not used currently.
- Pilots on critical areas of importance such as reducing power, steam consumption and reducing moisture in bagasse.
- Comprehensive cane development programmes by sugar mills.

7.34 The two institutes engaged in capacity building, research and extension in sugar sector (the VSI and NSI) should be made autonomous and supported with funds by the government. The institutes should be run with participation of industry in the PPP mode.

7.35 The EG recommends the set up of the Technology Mission on Sugarcane, which should address the issues relating to the sector from a techno-economic knowledge base. The mission would follow the best practices of the other technology missions and target farm productivity and incomes as it mandate.

7.36 Regulation of the sector

The Expert Group recommends that the Government set up a Sugar Regulatory Authority (SRA) through an Act of Parliament and confer upon it suitable powers for regulation and growth of the sector. As in other sectors where direct controls have given way to an independent regulator, in sugar sector too, an arbiter with statutory powers would be needed. A Sugar Regulation Authority that could draw powers under the sugar and sugar cane control regulations should be set up. The role of the regulator would be to evolve norms relating to market behaviour of farmers and mills, contracting between farmers and mills, conflict resolution between mills and stake holders, ensuring orderly growth of the sector, carrying out sector studies and providing policy inputs to government.

Annexure 1

Sugar cane productivity and quality

India's cane yield has steadily increased but this growth has tapered in the last 10 years. Since 1950's yield has consistently increased by more than 10% every decade. In the last decade, however, yield has dropped partly due to climatic conditions like droughts etc. At the state level, Tamil Nadu has increased its yield by more than 10% during the last seven years. However, yield in other states have not seen similar improvements. Given the historical trend in yield improvement, India can aspire to increase the yield 10% over next 10 years to an all-India average yield of 72.2 MT per hectare.

Farm practices can play a key role in increasing farm productivity. The key focus areas for farm practices are pre-cultivation, cultivation and harvesting. In pre-harvesting stage land preparation techniques can have an impact on productivity. In land preparation technique to begin with soil analysis is most important. The soil analysis will determine the existing level of fertility and help in deciding the fertilizer application programme to raise good crop.

In cane cultivation, the method of plantation (such as set planting or tissue culture, inter row planting, pit planting) and inter cropping pattern are critical variables. Adoption of best practices for integrated

nutrient management and insect control has been proven to improve yields. Sugarcane is a water intensive crop and water management plays a key role in containing costs and maintaining soil quality. Irrigation is currently being done through traditional method leading to a significant wastage of water. The adoption of advanced techniques like drip irrigation can address this constraint. The drip irrigation infrastructure requires investment in order to encourage the technique. Incentive through Government financing or through farmer-miller relationship would need to be provided.

Productivity can also be significantly increased through better ratoon management. Harvesting efficiency is also a critical variable. No doubt, automation leads to better results. The extent of automation that is possible in India is limited due to small land holdings. Small and semi automation mechanical implements can be used for improving the harvesting efficiency. Premature harvesting has been the practice in some states as it enables the farmers to generate an additional crop between two successive plantings. This has a negative impact on both the yield and recovery. The reduction in transportation loss can also play a critical role. The system of harvesting and transport as practiced in Gujarat and Maharashtra can serve as a model for other states.

Cane Varieties Development

One of the key outputs of R&D is cane variety development. It is noted with concern that the development of new variety has reduced over the last two decades. Seed development is currently restricted to few institutes including Sugarcane Breeding Institute, Coimbatore, VSI, Pune, IISR, Lucknow and U.P. Sugarcane Research Institute, Shahjahanpur, Haryana Agriculture University etc. The variety of the seeds that are developed are tested in individual states and notified for use by the State Governments. Mills are responsible for further propagation in their command area. The development of new seed

varieties by the research institutes has been declining which is further aggravated by the limited role of the sugar industry and there being no direct linkage between all the three stakeholders i.e. the research institute, industry and the farmers which is a common practice adopted in other sugar producing countries. World-wide R&D activities are carried out in Universities with the sugar industry. In Australia, the Sugar Research Development Corporation promotes innovation in the sugar industry. This is done through targeted investment in R&D. SRDC works in partnership with the industry, Government R&D partners and associated farmer's community. SRDC is funded through levies paid by the sugar industry and matching funds from the Australian Government. On an average the Australian sugar industry spends 2% of its annual revenue on research and development. From Government side in 2005-06, an investment of AUD 9 million was made on such activities.

In Brazil, there is a national programme for seed research which involves the Government Industry and Universities. It has successfully been able to release varieties in 6 to 7 years as against a typical duration of 10-12 years. In India, Government funding for agriculture is stagnated. Overall investment in agriculture has remained at 1.9% of the total GDP. Also the share of private investment in agriculture is reduced since 2002. Low industry investment in cane research is evident from the fact that the amount of funds disbursed from SDF towards research has been 0.8% of the total funds. Industry would have to play a major role in funding research activities.

Annexure 2

Sugar Development Fund

1. The Sugar Development Fund was under the Sugar Development Fund Act, 1982 for financing the activities for development of sugar industry.

2. The fund is financed by transfer of proceeds of sugar cess levied (Rs. 24 at present) and corrected under Sugar Cess Act, 1982 on sugar produced in the country.

3. The Sugar Development Fund has been set up to help financially weak and old sugar undertakings for facilitating duly rehabilitation and modernization of any and for undertaking any scheme for sugarcane in the area of any sugar factory. The funds also provide for payment of grants to the established institutions connected with sugar industry for carrying out research.

4. The Sugar Development Act, 1982 was amended in 2002 to enable the fund being utilized for making loans to sugar factories for bagasse based cogeneration power projects and production of ethanol with a view to improving the viability of the sugar factories. Also, the amendment was made in 2001 to provide subsidy towards maintenance of buffer stock of sugar by the factories.

5. Further, through another amendment in the SDF (2nd amendment) Rules, 2004, the rate of interest among all the outstanding loans was reduced to 2% below bank rate prevailing. It also provides defraying expenditure on internal transport and freight charges to the sugar factories on export shipment of sugar.

6. In the sugar season 2003-04, huge cane price arrears have accumulated and the State Governments were allowed to take loans from the sugar development fund to help the sugar factories in clearing all the cane price arrears. After discussions with the stakeholders, the Committee feels that SDF assistance should besides the existing activities cover the following activities so as to improve the viability of the sugar factories.

i. For availing financial assistance from SDF there should be a gap on the capacity of the plant i.e. 10,000 TCD so as more number of weaker units are accommodated to avail the benefit. For cane development schemes, there is a limit of Rs. 3 crores on the financial assistance. This should be abolished or suitably raised. The duration of the cane development schemes from the present 3 years needs to be reduced to 2 years and consequently the release of the installments should also be reduced to two.

ii. Factories may be allowed to submit their applications for cane development loan to SDF in advance with a copy to State Government. However, the disbursement may be made after receipt of recommendations of the State Government. A nodal agency may be notified to monitor impact assessment on the cane development activities of the sugar factories availing the loans.

iii. Additional schemes proposed to be included.

Establishment of bio fertilizer units

Integrated nutrient management system for improving soil fertilizers, vermin-composed production, bio technology labs

Modernisation/expansion of plant and machinery

a) Schemes for reduction of steam and energy consumption should be given priority.
b) The modernization and expansion of the factories below 5000 TCD may be given priority.
c) Schemes for production of sulphur free sugar, raw sugar and refined sugar by the existing sugar factories to provide for the flexible products, production should also b e eligible for financial assistance.
d) The specialty sugar like liquid sugar vitamin fortified sugar should also be eligible under financial assistance from SDF.
e) There may be a nodal agency to make impact assessment of the financial assistance availed by the factories from SDF. This may comprise of experts from NSI, VSI.
f) A scheme for value addition to press mud being produced by the sugar factories for production of bio gas etc.
g) Creation of facilities for number of ethanol from sugarcane juice/heavy molasses.

7. **Details of loan disbursed since inception from Sugar Development Fund under the various heads as on 31.3. 2009**

(Rs. in crores)

Purpose	**Amount disbursed**

Modernisation/rehabilitation	**1787.1998**
Cane development	**536.6976**
Bagasse based cogeneration	**645.2286**
Production of ethanol	**97.3475**
Grants in aid to Research Institute	**24.8526**

Application and sanction process

At present, it takes about six months to one year for sanction of loans from Sugar Development Fund though most of the expansion projects are to be completed within one year. The factories resort to take bridge loan from the Financial Institutions / banks which increase the cost of funds.

Application for loans from SDF should be cleared within 60 days on receipt of application. For this purpose some staff with knowledge from banking sector may be provided.

Under present SDF norms, the cane development loan applications are routed through the respective State Governments which take long time to forward them to Sugar Directorate, Government of India. After the approval of the loan, the tripartite agreement between SDF, Government of India, State Government and the sugar undertakings also take long time, as some time the State Government representatives take a long time to complete the whole process. Therefore, the applications for modernization, expansion, co-generation and ethanol etc., may be allowed to be directly submitted to the SDF. First charge *pari passu* or exclusive second charge on assets of the sugar undertaking be considered as security for loans for cane development instead of bank/State Government Guarantee as in modernization and expansion cases.

The Government of India had in response to NFCSF's persistent demand for a body like BIFR, amended the Sugar Development Fund (SDF) Rules in August, 2002 by inserting Rules No. 21 for rehabilitating potentially viable sick sugar factories. As per this rule, SDF loans can be provided for rehabilitation schemes for potentially sick sugar factories, if the same are recommended by BIFR or a Committee for rehabilitation. Unfortunately, no cooperative sugar factory has been able to avail the benefit of the scheme albeit the number of the cooperative sugar factories turning sick is on the increase. It has been given to understand that this is because the factories application for revival does not get cleared at the financial institution level itself. In view of this it is recommended that the sick cooperative sugar factories be allowed to submit the applications directly to the Committee of Rehabilitation. According to the Tuteja Committee the Committee for Rehabilitation "is neither backed by legislation nor does it have 'teeth' to undertake this task". We feel that the Committee of Rehabilitation should be empowered like BIFR so that it can then, like the BIFR, prepare the projects for making the negative net worth cooperative sugar factories to positive net worth. "The financial restructuring of cooperative sugar factories under rehabilitation package may generally comprise the following components:

- Conversion of full/part of outstanding State Government loans into equity.
- Infusion of additional equity by the State Governments/members of the society.
- Reschedulement of outstanding loans of banks & financial institutions and waivers/concessions in interest on outstanding loans of cooperative sugar mills".

The Tuteja Committee had also recommended appointing NCDC as the nodal agency for preparing the rehabilitation packages for sick cooperative sugar factories.

Priority should be given for loan from SDF for technological upgradation in the following fields under modernization:-

a) Electric drive (A.C. VVVF) at mills for energy conservation and co-generation and to reduce power consumption.

b) Installation of high pressure boiler for sugar factories for bagasse and steam saving.

c) Introducing extensive vapour bleeding, flash recovery system and introduction of efficient evaporator system to bring down the steam consumption.

d) Introduction of process modification to improve quality of sugar below 100 ICUMSA.

It has been observed that the present repayment period of SDF loan for the co-generation & ethanol projects is quite short and needs to be increased, so as to make the projects more viable.

Under rule 25, second charge on their assets has not been allowed for the projects sanctioned and approved up to March'07. They should also be allowed to provide second charge as security hence forth.

Annexure 3

Thrust Areas of R & D in Sugarcane Agriculture

a) **Crop improvement**

1. Development of sugarcane genotypes through Conventional Breeding, Molecular Biology and Genetic Engineering and Tissue Culture technique for
   - Higher yield and sucrose content.
   - Tolerance to drought, salinity, pest and disease
2. Strengthening Sugarcane Breeding Research Centers in India
3. Evaluation of new, promising and pre-released sugarcane varieties in different agro-climatic zones
4. Establishment of Tissue Culture laboratories for Micropropagation of elite sugarcane varieties and rapid seed multiplication.

b) Crop production

1. Development of Agrotechnology for newly developed genotypes in different agro-climatic zones
2. Sustainable sugarcane production through site specific and variety specific integrated nutrient management system (INMS)
3. Reclamation of problematic soils through sub-surface drainage and soil reclaiments
4. Identification, screening and utilization of efficient bio-inoculants to increase nutrient mobility, nitrogen fixation and fertilizer use efficiency.
5. Increasing land, water and fertilizer use efficiency through Micro irrigation techniques.
6. Design, development and evaluation of farm implements in sugarcane agriculture.
7. Design, development and evaluation of sugarcane cutter, planter, multipurpose interculturing equipment and sugarcane harvester.
8. Development of agro-technology for better ratoon management

9. Development of package of practices under abnormal physiological conditions like drought, flowering, nutrient stress and low sugar recovery.

10. Socio-economic impact of improved cane cultivation technologies and their adoption at field level.

c) Crop protection

1. Development of forewarning and forecasting module for infestation of insect pests and diseases.
2. Screening of newly developed genotypes for their resistance to insect pests and diseases.
3. Biocontrol of insect pests and diseases.
4. Development of Integrated Pests and Disease Management module.

Annexure 4

Themes for action research

The following processes technologies, systems need to be evaluated for their adaptation by Indian sugar factories:

i) Cane and/or bagasse diffusion process for extraction of juice in replacement of conventional mills

ii) Membrane separation technology for cane juice clarification.

iii) Single stage process for production of refined sugar developed in Brazil.

iv) Various process options for production of refined sugar such as carbonation, melt carbonation need to be evaluated for technical /commercial viability.

v) Gasification of bagasse to run gas turbines.

vi) Drying of mill wet bagasse using flue gas from boiler furnace

vii) Manufacture of chemical derivative of sucrose or bagasse cellulose.

viii) Lactic acid from molasses/sugarcane juice further polymerization of lactic acid to produce biodegradable plastics.

ix) Molasses/sugarcane juice based other fermentation products such as Itaconic acid, Citric acid etc.

x) Bagasse (Cellulose) and press-mud based bio-methanation technology to produce CNG.

xi) Conversion of sucrose to Hydroxymethylfurfural and DMF by a hybrid of bio-chemical and thermo-chemical reactions.

xii) Developing a suitable system for fly ash disposal

xiii) Production of PHA(ploy hydroxy-alkonate) by bacterial fermentation

Annexure 5

Technology Options for improving steam and power efficiency

1. AC/DC drive to be used for energy conservation.
2. High pressure boilers with modern heat recovery units to be installed for improving thermal efficiency.
3. Extensive vapour bleeding to be used by modifying the configuration of evaporators and flash vapour recovery system
4. Single entry condensers consuming low power at the injection station should be introduced.
5. DC/AC driven centrifugal machines of higher capacity should be introduced to improve quality of sugar and energy conservation.
6. Energy saving devices such as AC Variable Voltage and Variable Frequency (VVVF) for various equipment drives, planetary gear boxes for mills, crystallizers, etc.
7. Two roller mills be adopted for reducing moisture content bagasse and improving extraction along with reduction in power.
8. Continuous pans for A,B,C massecuites to get better quality of sugar and for energy conservation.

Annexure 6

Special Problems of Cooperative Sugar Mills

Cooperative sugar mills have equity contributed by the sugarcane farmers and others. State governments have also provided part of the equity. Most cooperative mills suffer from low level of equity and very small net worth. These mills find it difficult to raise loans from banks on account of their inability bring in margin and own stake for both investment loans as well as working capital. Taking advantage of the cooperative laws, the cooperative mills have been distributing the entire surplus, at times not providing for unmet costs and depreciation. Since there are no surpluses, reserves and funds are not created out of profits even in years when the sugar prices rule high. The resultant financial position is very weak and it affects the mills during years in which the sugar prices are low.

Since the mills are member owned organizations, the members should contribute to its equity so that the mills is able to procure over the long term. The capital contributions could be made over a three to five year period as a proportion of cane supplied. The mills should be encouraged to declare a dividend on the equity capital in order to reward the members. This would drive the mills towards retaining some part of the profits in reserves before declaring dividends. Over the long term, the owned funds of the sugar factories should be about 20 to 30% of the loans required from the banks.

In Maharashtra, the farmers in many mills have to absorb high harvest and transport costs. The arrangements are centrally made by the mill and costs are charged to the farmers and deducted from the cane price. The costs vary widely from mill to mill. During 2006-07 the most efficient mill incurred Rs 191 per ton of cane as the harvest and transport cost while the most inefficient mill incurred Rs 334 per ton of cane. The farmers could have realized higher prices for cane if the

arrangements had been made more efficiently. Similar is the case with conversion costs. Being member driven institutions, cooperative mills must be acutely cost conscious as the money saved would go to the farmers.

Annexure 7
Alternate feed stock for production of sugar / ethanol

1. India has been solely depending on sugarcane for production of sugar. Sugar beet has also been a raw material for production of sugar. Sugar beet till recently has been an exclusive crop of sub-tropical countries and therefore, it was not considered to be an alternative to sugarcane till recently except that some pilot scale trials for manufacture of sugar from sugar beet was first conducted in India by National Institute of Sugar, Kanpur in mid 60s. Subsequently, a 600 ton diffuser was also installed in Srigangangar Sugar Factory Rajasthan for beet processing. However, cost competitiveness of sugar beet vis-a-vis other crops diminished and farmers lost interest in sugar beet cultivation and the sugar beet processing plant was dismantled.

2. Tropical sugar beet varieties have been developed and the cultivation trials have been carried out in some parts of Maharashtra under the guidance of VSI and the results are reported to be encouraging. The processing trials are also being undertaken to extend the crushing season of the factories by processing sugar beet and sugar cane juice mixed together towards the better parts of the season. Besides, sugar beet can also be a good feed stock for production of ethanol. The Committee feels that the work should continue to develop sugar beet as an alternate feed stock.

3. Sweet sorghum is also a potential feed stock. While the sorghum grains are used for their food/feed value, the stalks of sweet sorghum can be used as raw material for ethanol on account of the sucrose content. Work has already been initiated by National Centre for Research on Sorghum, Hyderabad for its cultivation in different regions of the country. The processing trials were carried out on a pilot scale at NSI, Kanpur in 2005 and it was revealed that due to low sugar content and high starch, it was not a suitable alternate feed stock for manufacture of sugar, however, it holds good potential for manufacture of ethanol.

4. Cassava is also a tuber root which is utilised in some of the countries for manufacture of ethanol. In India also in tropical regions its cultivation is being done on a modest scale. However, its economic viability from production of ethanol has not been established as yet.

The comparative features of the above alternate feed stock indicate that these have their own merits and demerits and, therefore, a combination of these can effectively solve the problem of adequate availability of raw material for success of sugar complex.

Annexure 8
Terms of Reference of the Expert Group

Annexure 9
List of members of the Expert Group and the special invitees

References

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List of organizations/persons that submitted responses to the Group of Experts

1. Secretary cum Commissioner, Government of NCT of Delhi
2. Commissioner of sugar and cane, government of Andhra Pradesh
3. Cane commissioner, Government of Punjab
4. Cane and sugar Board, Ministry of Industry, Government of Thailand
5. Bihar Sugar Mills Association
6. Paul Joseph, Principal Advisor, Planning Commission, Government of India
7. Principal Secretary, Sugar cane Industry Department, Government of Bihar
8. Riga Sugar Company Ltd, Kolkata
9. Commissioner of sugar, Government of TamilNadu
10. Director, Ministry of commerce and Industry, Government of India
11. Joint Secretary, Ministry of Chemicals and fertilizers, Government of India
12. South India Sugar Mills Association
13. The Economic and Commercial Counselor's Office, People's Republic of China
14. Principal Secretary, Government of Madhya Pradesh
15. Director, Ministry of New and Renewable Energy, Government of India
16. Director, National Sugar Institute, Kanpur
17. Gujarat State Federation of Cooperative Sugar Factories
18. Bharatiya Kisan Sangh
19. Vasantdada Sugar Institute, Pune
20. Kishan Cooperative Sugar Mill, Madhya Pradesh
21. Western India Sugar Mills Association

22. Bhartiya Kisan Union
23. Kisan Sahakari Chini Mills, Uttarakhand
24. Rashtriya Kisan Morcha, Uttar Pradesh
25. Pradeep Rastogi, Uttarakhand
26. Raghunath Patil, Maharashtra
27. Cane Commissioner, Government of Uttar Pradesh
28. Director General, All India Distillers Association
29. Saraswathi Sugar Mills, Haryana
30. PHD Chamber of Commerce and Industry
31. Cane Commissioner, Government of Punjab
32. MD, Sugar Federation, Haryana
33. UP sugar Mills Association
34. Sugarfed, Punjab
35. Australian High commission, New Delhi
36. Indian Sugar Mills Association
37. National Federation of Cooperative Sugar Factories
38. Federation of Tamil Nadu Coop and Public Sector Sugar Mills Cane Growers Associations
39. Haryana Agricultural University
40. Sugarcane Breeding Institute, TamilNadu
41. Indian council of Agricultural Research
42. Punjab Agricultural University
43. Shri Amar Singh, MP
44. Maharashtra Rajya Sahakari Sakhar Karkhana Sangh Limited
45. Commissioner of Sugar, Government of Maharashtra

List of meetings held by the Committee