

INTERNATIONAL SYMPOSIUM ON BIO-FUELS

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Ethanol: Economics, Pricing & Incentives

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Major Uses of Ethanol

- Industrial
- Potable liquor
- Blending with petroleum

Sources of Ethanol

- Vegetative:
 - Grain, corn, tubers like cassava: as starch
 - Sugar cane or sugar beet
 - Trees & bio-mass - cellulosic
- Synthetic:
 - Ethylene

Overall, Sugarcane appears to be the best source in India from the point of renewability, yield per acre & agro climatic conditions. In the long term, however, cellulosic ethanol may become a significant source, once sugarcane acreage / yield reaches its maximum, subject to development of cost-effective technology

Rationale for Ethanol Blending

- Indian demand for Motor spirit is expected to grow from about 7 MMT during 2001-02 to 10 MMT by 2006-07
- Similarly, demand for Diesel is expected to grow from about 40 MMT to 52 MMT
- Crude oil demand would grow from 50 MMT to 85 MMT during the same period with domestic production accounting for barely 22 %

A 5 or 10 % Ethanol Blend would result in a proportionate reduction in motor spirit & hence, crude requirements & forex outgo

Characteristics of Ethanol

- Its potential for production from the vegetative, renewable source
- Non-toxic as compared to oxygenates like MTBE; highly degradable &, hence, environmentally safer
- Indian production is primarily through by product cane molasses & is, hence, cost effective

India

Alcohol Production from molasses and Use

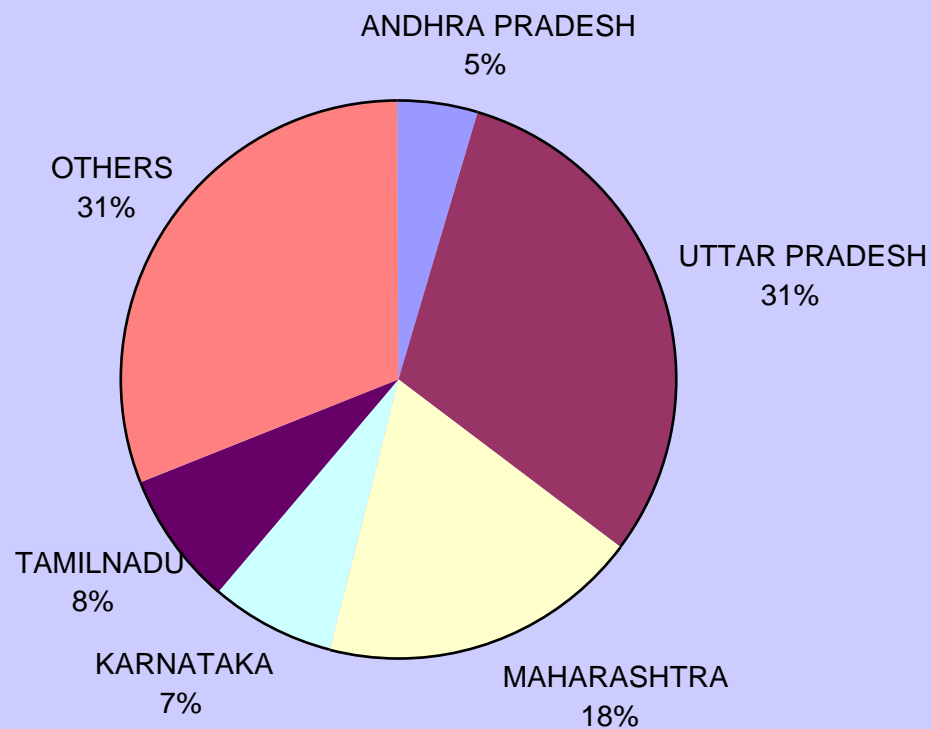
Ethanol Demand and Supply for blending in gasoline

Alcohol Year	Molasses Production MMT	Production of Alcohol (Mln. Ltr)	Industrial Use (Mln. Ltr)	Potable Use (Mln. Ltr)	Other Uses (Mln Ltr)	Surplus availability of alcohol (Mln. Ltr)
1998-99	7.00	1496.3	534.4	584.0	55.2	322.7
1999-00	8.02	1714.2	518.9	622.7	57.6	515.0
2000-01	7.8	1667.2	529.3	635.1	58.8	444.0
2001-02	8.1	1731.3	539.8	647.8	59.9	483.8
2002-03	8.9	1902.4	550.5	660.7	61.0	630.2
2003-04	5.9	1261.1	578.0	693.7	70.0	(-)80.6
2004-05	5.5	1175.6	606.9	728.3	73.5	(-)233.1
2005-06	8.3	1783.0	415.0	746.5	77.2	340.7
2006-07	14.0	2993.0	631.4	765.2	81.0	1515.4

Actual production of molasses.

In 2004-05 due to drought condition sugar and molasses production declined and there was import of ethanol.

Installed Distillation Capacity, Selected States, 2005



Source: Planning Commission Draft Excise Policy for Alcoholic Beverages & Alcohol.

Potential for Ethanol from Cane

	2005-06	2006-07@	2007-08@
Sugar production (lakh tonnes)	192	280	300
Molasses Production (lakh tonnes)	83.40	140	150
Molasses utilized for distillation purposes (95%) Lac tonnes	79.23	133	142.5
Potential Alcohol Production (Mil. Litres)	1783	2993	3206
Actual usage of ethanol “	200	550	1100
Projected requirement of alcohol for :			
Potable purposes	824	846	950
Industrial purposes	612	634	650
Potential surplus (Mill. L)	347	962.5	506.25

Usage assumes 5 % & 10 % blending across India during the last two periods. It is clear that the only limiting factors would be diversion of cane to other uses & availability of adequate Mfg. Capacities

Ethanol Demand/Supply Balance 2006-17

Ethanol Demand and Supply for blending in gasoline

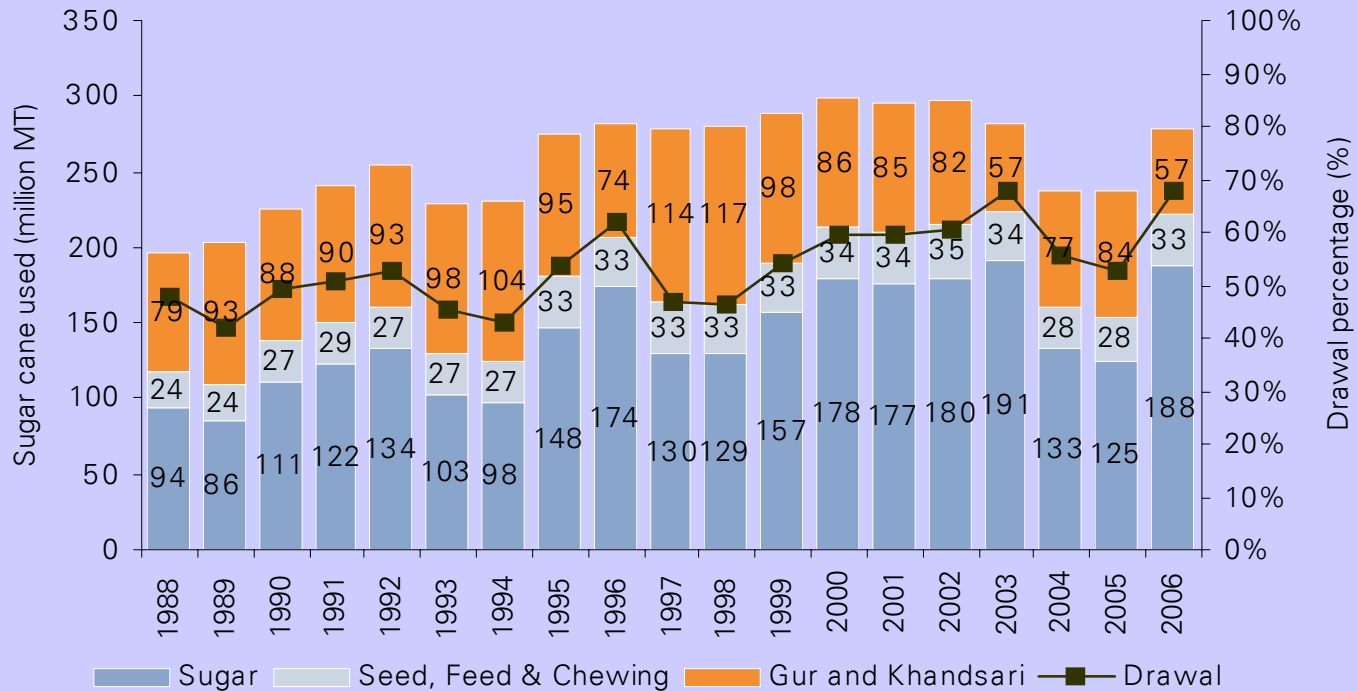
Year	Gasoline demand MMT	Ethanol demand Th KL	Molasses Prod. MMT	Ethanol Production			Utilization of Ethanol		
				Molasses Th KL	Cane Th KL	Total Th KL	Potable Th KL	Industry Th KL	Balance After Ethanol Demand Th KL
2001-02	7.07	Neg.	8.1	1731	0	1731	648	600	483
2006-07	10.07	550	14.0	2993	0	2993	765	711	967
2011-12	12.85	1500*	14.6	3120	880	4000	887	844	769
2016-17	16.4	1800*	16.2	3463	1037	4500	1028	1003	669

Notes: * At 10% ethanol blending with petrol

1. Area under sugarcane cultivation is expected to increase from 4.36 mha in 2001-02 to 4.96 in 2006-07 which would add additional cane production of around 50 MMT.
2. About 30% of cane goes for making gur and khandsari and seed purposes
3. The present disillery capacity is 3785 Th KL of ethanol and looks to be sufficient for 5% blend till 12 th plan
4. A growth of 3% in potable use and a 3.5% in chemical and other use has been assumed (Plg Comm. Bio Fuel Committee estimates.)

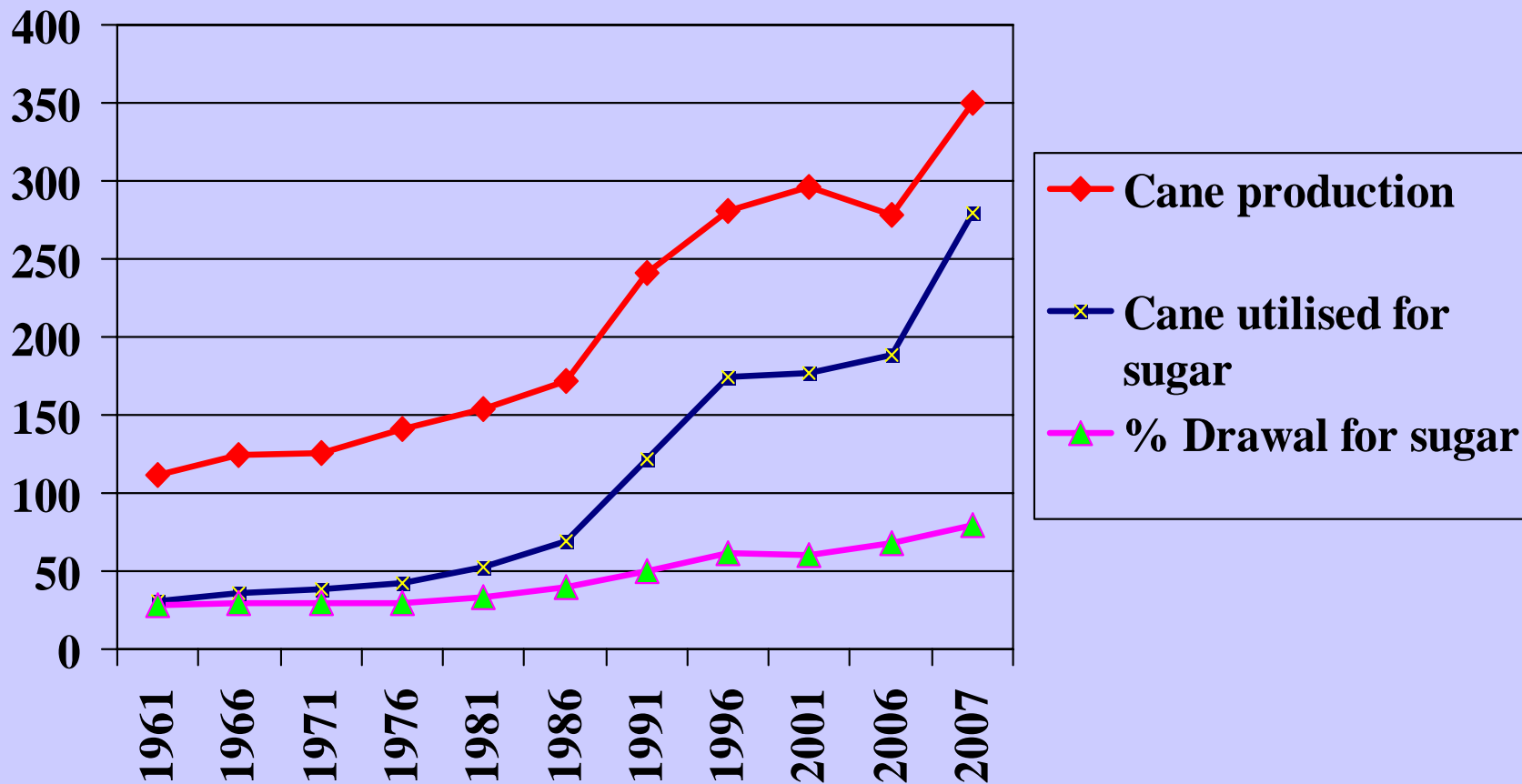
Ethanol would be adequate for 10% blending, despite cane diversion to Gur / Khandsari, with some production directly out of cane juice.

Sugar cane usage



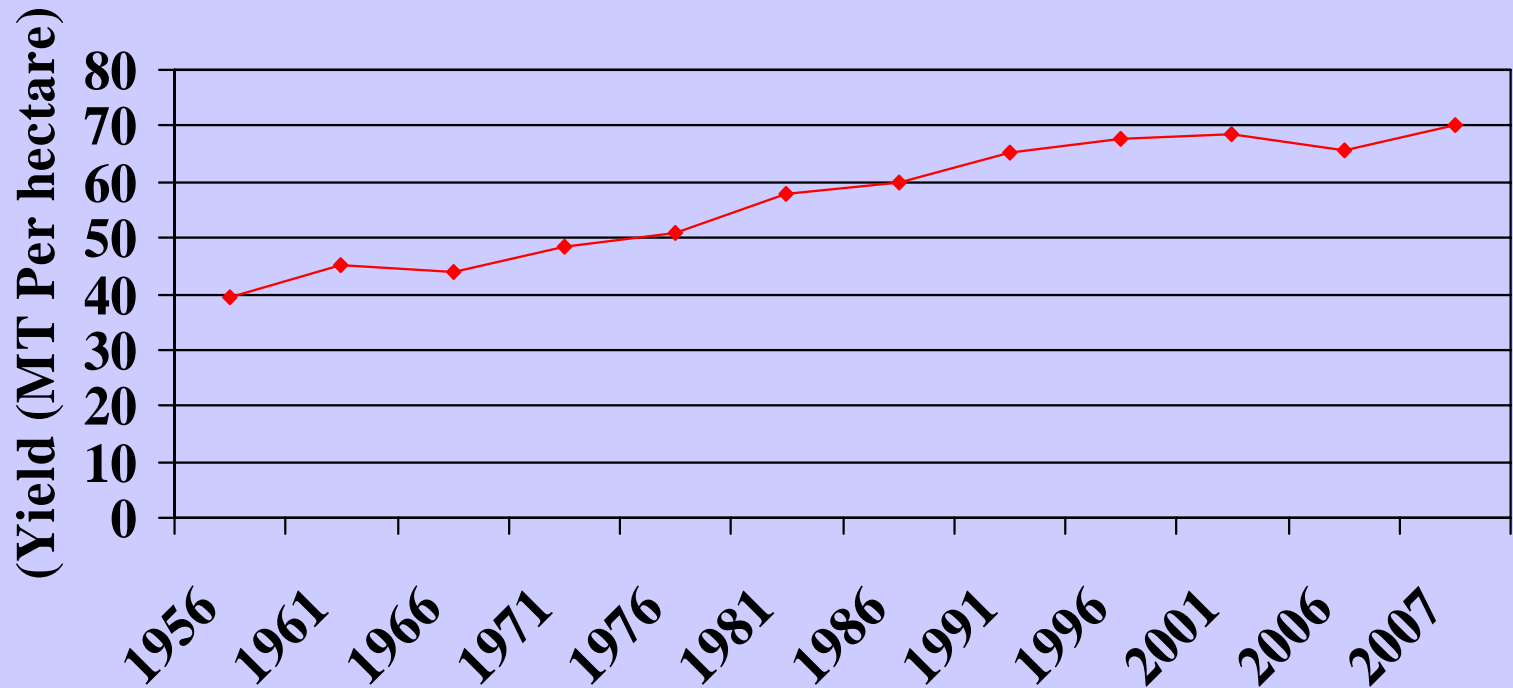
With the large investments in sugar plants & distilleries, particularly in UP, the diversion to other uses is expected to gradually reduce

Cane Utilisation



Drawal rates for conversion into sugar are steadily increasing & diversion reducing

Trends in Sugarcane Yield



Yields, too, have been on an upward trend

Comparative Realisation

	Effective Realisation for Distillery (Rs./litre)
Fuel Ethanol (Molasses based)	21.5
Rectified Spirit	23.00
Extra Neutral Alcohol	25.00

Economics, Pricing Non-Issues

- Both Petroleum Companies and Sugar Mills while determining the price for Ethanol keeping the cost of crude price and cane price at the back of their minds. Pricing also depends on import parity and availability
- The other issues would be more in terms of:
 - Pro-active Government Policy
 - Appropriate legislation to mandate use of Ethanol
 - Development of adequate capacity / infrastructure
 - Minimizing cyclicity of the sugarcane crop – inter / intra state
 - Removing obstacles – for movement.

Government Initiatives Required

- Need for mandating 5 % &, gradually, 10 % Ethanol Blending in Petrol and Diesel in due course of time.
- Overcoming State Govt. restrictions on manufacture / movement of fuel ethanol
- Rationalizing sales tax structure to permit free movement of ethanol between producing surplus States & deficit States by declaring Ethanol as a 'Declared good' under CST
- Creating a Strategic Reserve for Sugar thus minimizing the volatility of the sugar industry and make availability / supply of Ethanol consistently (except for reason of nature)

Govt. Support

- State Government to encourage setting up of a Distilleries to convert all available molasses to alcohol
- Liberal funding of Distillery projects through the SDF mechanism and speedy clearance from MOEF / State Pollution Control Board.
- Assured long term off-take at firm prices by Oil Marketing Companies
- Reducing import duties on imported industrial alcohol to remove any perceived threat of availability to the chemical industry

ISMA is happy to inform that the Government has been responding favorably & pro-actively to its representations

“India is competing
to meet its own growing demand
to make the country
Greener & Safer”

- Acknowledgements / Data Sources
 - KPMG report
 - Bio Fuels Committee Report of the Planning Commission 2003
 - ISMA Data

Thank you