

Ethanol production from Sugar Cane in Brazil

Review of potential for social- and environmental
labelling of ethanol production from sugar cane



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Gröna Bilister
www.gronabilister.se
info@gronabilister.se

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Production: Non Commercial, Stockholm

Original and prepress: Pastellrepro AB, Stockholm

Cover photo: Jakob Lagercrantz.

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Report from fact finding trip on Brazilian ethanol production.
Jakob Lagercrantz, the Swedish Association of Green motorists.
March 2006

Background

The past few years have seen a rapid increase in the number of clean vehicles in Sweden, albeit not the record development of Brazil. The most important non-fossil fuel in Sweden is now ethanol, used in a mixture with gasoline with 85% ethanol (called E85). All gasoline now have a 5% ethanol mix.

The monthly average of clean vehicles sold is steadily increasing, and is currently at 13% of all sold cars (Feb 2006).

There is a limited Swedish production of ethanol for fuel in Sweden, mostly produced from crops, but promising research and development is carried out to make ethanol from a cellulose base.

Fact finding trip

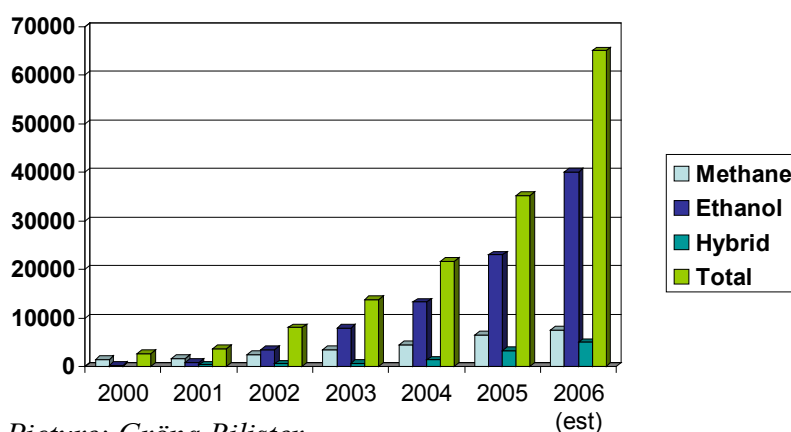
The visit took place from February 28th to March 7th 2006. Gröna Bilister (the Swedish Association of Green Motorists) was invited to take part of a fact finding trip organised by the Green Party of Sweden. The objective of the trip from my point of view was to review ethanol production, and investigate possibilities for ecolabelling of ethanol production.

The Swedish embassy in Brazil and the Green Party of Sao Paulo organized all meetings prior to our arrival.

Meetings were held with the Brazilian National Biofuel Programme, with Imaflo, Ibama, the Swedish Trade Council, The Swedish Embassy, Friends of the Earth, Instituto Socioambiental, SCA Trading, Volkswagen Brazil and the Green Party of Brazil.

Sales of clean vehicles in Sweden

(approx the Swedish Road Administration definition)



Picture: Gröna Bilister

The interest for clean vehicles continues to grow, and customers are at the same time demanding more detailed information about production methods of the different fuels. An often quoted belief about Brazilian ethanol is that the cultivation of sugar cane pushes soy bean cultivation and extensive beef farming into the Amazon area.

Gröna Bilister

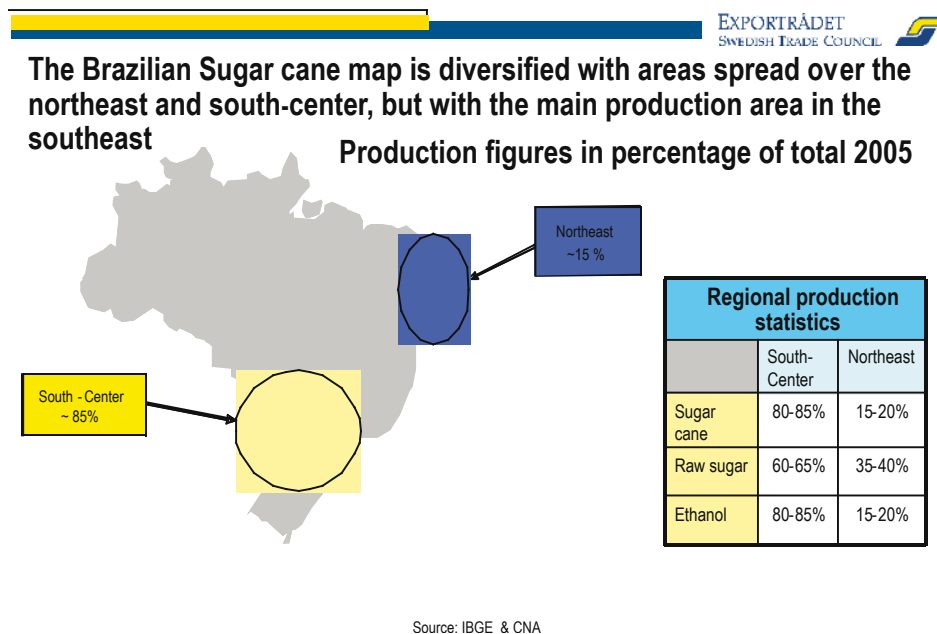
The Swedish Association of Green Motorists is the only Swedish environment driven motorist organisation. It represents a growing interest in environmentally adapted cars and driving, expressed among other ways in the demand for non fossil fuels.

Gröna Bilister is an independent NGO, founded in 1994. It does research, investigations and promotes a clean vehicle agenda.

Sugar cane production

Ethanol is made from sugar cane, in factories that to a varying degree, also make sugar.

Sugar cane is grown mostly in the south east of the country, with some 60% of the yearly production taking place in the Sao Paulo district in the south east of Brazil.



Picture courtesy Johan Fager, Swedish Trade Council

The sugarcane is grown on lands that, at least in the south east, used to host coffee and fruit plantations. Originally part of that area, towards the Atlantic, was part of the Atlantic Rainforest. Today only 7% of that forest remains.

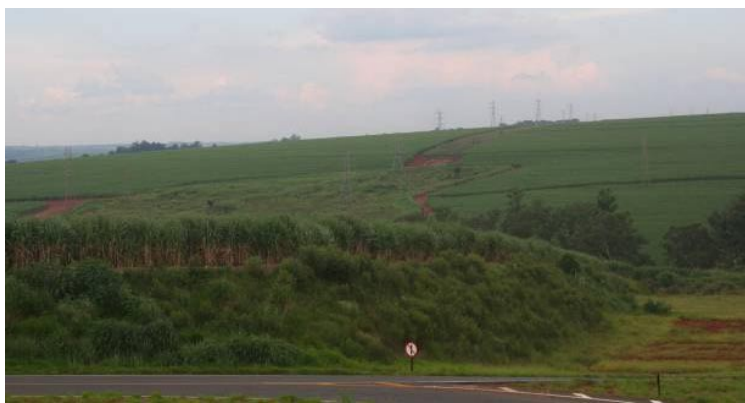
The sugarcane is harvested after one year to 18 months of growing, normally starting in April each year. The harvest season tends to be more and more prolonged, giving a longer production period.

The cane is still harvested by hand, but more mechanized harvesting is being introduced.

Environmental aspects

There are a number of identified problems with the growing of sugar cane, although the overall environmental impact cannot be said to be much larger than other produce. However, there is room for improvement:

- Burning the cane pre harvesting. This is to get rid of dry leaves and biomass not needed in the production. The smoke creates a health problem, and the fire risks to spread into remaining Atlantic Rainforests. The soot and other emission from the burning is probably an environmental problem. The energy in the biomass is not used for either fertilizing the earth, or for energy production.
- Pesticides and herbicides have not been mentioned as a larger problem by anyone. Apparently it is used sparingly.
- The Brazilian environmental law requires that a corridor close to rivers is left uncultivated. This is often not the case, and there is much room for improvement.



Green sugar cane field all around us. Photo: Lagercrantz.

- Fertilization with vinasse (energy- and mineral rich remains from ethanol production) has been known to create problems with eutrofication when the vinasse runs off the fields and into the surrounding rivers. It seems, however, that after the district of Sao Paulo has allowed the mills to export surplus electric energy, more mills are burning the remains from the process for energy (and electricity). This may in the future lead to requirements for re-fertilising the ground with organic manure.
- The energy used in the factories comes from their own produce.
- A final and often quoted environmental risk is that the increased sugar cane production moves into cattle and soy bean land, thus pushing this production into pristine Savannah (known in Brazil as the *Cerrado*) or Amazon areas. However, there seems to be available land without having to do this.

Land use in Brazil	Hectares (millions)
Land in Brazil	800
Arable land (excl Amazonas, nature reserves or indigenous lands)	320
Extensive cattle feed	Approx 120
Farmed area	60
(of which sugar cane)	(5,8)

Table 1.

In order to ensure that sugar cane plantations do not have this indirect effect on virgin land, the issue needs to be closely monitored.

Social aspects

- The harvest is carried out to a high degree by migrant workers, from the north of Brazil. They concentrate in the south east for the harvesting period, and tend to remain, without work after harvest is finished.
- The work is dangerous, especially if the cane is not burned (thus getting rid of leaves). Burning enables the workers to see snakes and other perils, and the absence of leaves means less cuts from leaves on hands and arms. A cleaner cane field also generally decreases the risk for accidental cuts from the machete.
- It is seasonal work (see above).



Sugar Cane harvest, Piracicaba March 2006. Photo: Lagercrantz.

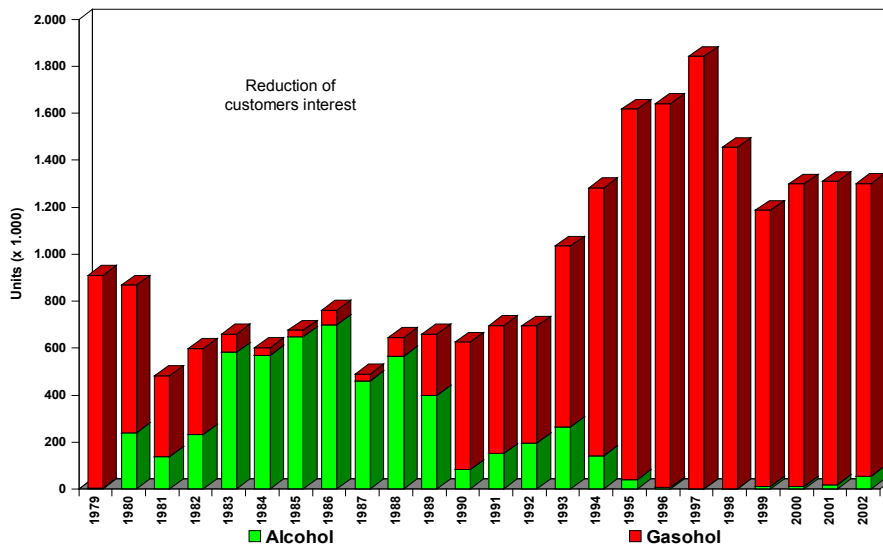
Ethanol production for vehicles in Brazil.

The Brazilian ethanol production for fuel dates back to the early 1900's, with the first ethanol cars produced 1927, but started in earnest with the Government sponsored Proalcohol program in 1975. The programme aimed at getting rid of the oil dependency of Brazil, and included a number of subsidies and advantages for the ethanol industry.

Ethanol production increased rapidly, but domestic demand did so even faster resulting in a lack of ethanol in the 1990's. Simultaneously, cheaper and smaller gasoline cars were launched, and the public turned their back on ethanol.

Ethanol Vehicles in the Brazilian Market

Light Vehicles Sales: 1979 to 2004



Picture courtesy of Henry Joseph Jr, VW Brazil

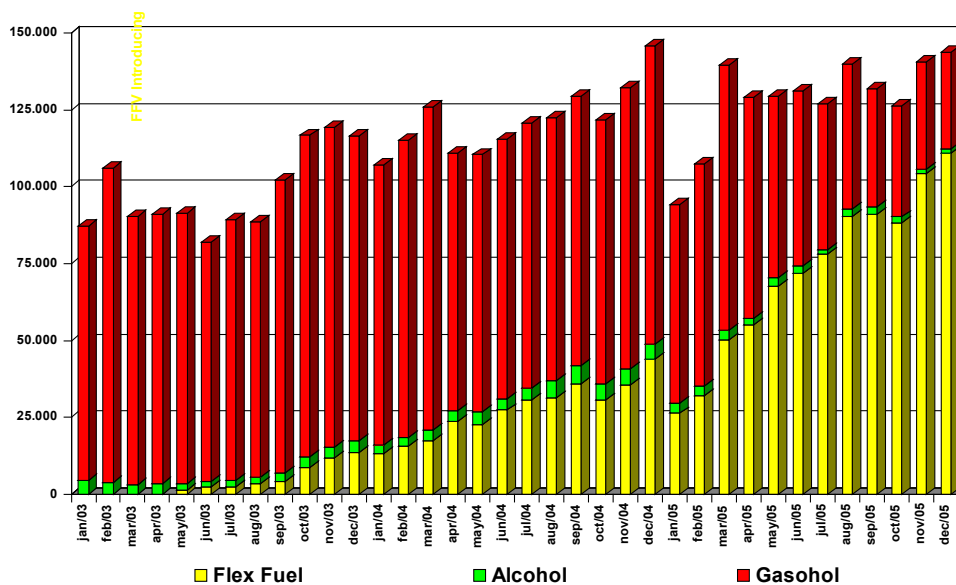
Through a combination of technical development, the Kyoto protocol with more interest in CO₂ reduction and increased oil prices, the second ethanol boom started in 2003.

It was started off by the development and sale in March 2003 of a flexifuel car that could run on both pure alcohol and pure gasoline and any mix of the two.

Now sales of flexifuel cars started in earnest, and spurred a renewed interest in domestic ethanol. Currently (feb 2006) almost 80% of all new cars sold are flexifuel cars.

FFV in the Brazilian Market

January 2003 to December 2005



Picture courtesy of Henry Joseph Jr, VW Brazil

All cars in Brazil run on pure or mixed alcohol. The Government has ruled that gasoline must include a 20-26% mixture of ethanol. Of the approximately 20 million light vehicles in Brazil, 15 million of them run on a mixture of ethanol and gasoline, and some 2,2 million run on pure ethanol.



Ford Ecosport, another Flexifuel vehicle not currently available in Europe

Ethanol exports

Brazil is a world leader in ethanol production and exports. Currently the production is about 17 million m³, with exports of around 2 million m³. The exports have doubled over the past few years.

EXPORTRÅDET
SWEDISH TRADE COUNCIL 

Brazilian ethanol is attracting considerable interest in the international market due to the environmental benefits when used as a fuel and energy

Main Brazilian ethanol export's destination in 03/04 – by country

Country	2003		2004	
	US\$ in millions	M ³ in millions	US\$ in millions	M ³ in millions
INDIA	3.9	19.2	92.9	382.9
USA	9.7	35.6	80.4	339.7
SOUTH KOREA	11.7	44.7	56.0	222.7
SWEDEN	21.4	79.5	46.2	154.7
JAPAN	18.9	72.3	44.3	178.5
NETHERLANDS	18.4	67.8	36.4	133.5
JAMAICA	17.2	82.4	27.2	107.5
NIGERIA	11.4	38.2	23.8	86.4
COSTA RICA	5.4	25.7	23.2	93.4
MEXICO	8.7	32.4	18.3	71.4
OTHERS	31.2	108.	49.0	155.9
TOTAL	157.9	605.9	497.7	1 926.6

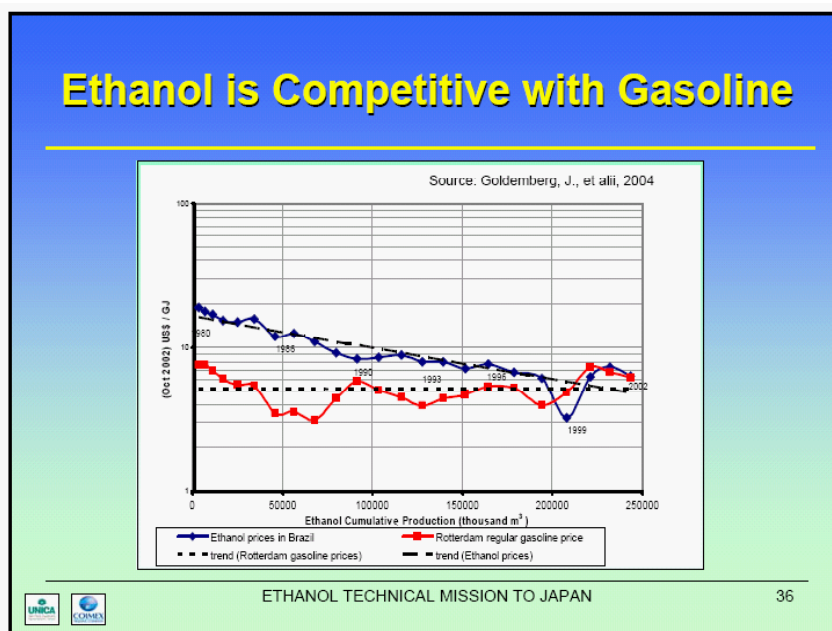
Source: Análise das Informações de Comércio Exterior–ALICE

Picture courtesy Johan Fager, Swedish Trade Council

There is an increasing demand of ethanol in Sweden, an interest to mix ethanol into gasoline in Japan, a potentially large interest from other European countries and there is a growing American interest for mixing sugar cane ethanol into gasoline. Would the latter take place, an American demand of 5 million m³ per year has been indicated.

The domestic growth in ethanol consumption grew last year by approximately 10%, while exports in the same time period grew by 270%! This is a clear indication of the increased external pressure on the sugar cane products.

The production cost of Brazilian sugarcane alcohol remains very competitive. Today, with current oil prices, the spot market prices for petroleum based fuels and sugar cane alcohol can be compared to the favour of ethanol.



Picture courtesy of Henry Joseph Jr, VW Brazil

Eco-labelling

The exports of organic products have grown rapidly in the 2000's, albeit from a low level. There are several organizations involved in eco-labelling, and one of the worlds' largest fair for ecological products is held every year in Sao Paolo.

Some sugar farms, also producing ethanol, are today producing organic sugar. Forest Stewardship council (FSC) is present in Brazil, with some 3 million Ha certified forest production.

There is general agreement that environmental and social demand in the sugarcane industry could be developed, providing there is a demand for such work from the international importers.

The discussion of such demands would have to include Brazilian NGO's, as well as the sugarcane industry and representatives of the social aspects of the industry. This divide in three stakeholder groups is what set up Forest Stewardship Council (FSC) and other eco-labelling schemes.

Friends of the Earth Brazil have drafted plans for such a project, and representatives of the industry have expressed a clear interest.

Conclusion

There is no time like the present to develop social- and environmental criteria for sugar cane production. The industry is in the midst of a rapid development phase and growth of demand for Brazilian ethanol. Exports are doubling yearly, and there are ambitious plans for expansion in Brazil

There is openness for and an interest in including environmental and social requirements for exported ethanol.

This work would need to be done now. To delay would make introduction more difficult, and result in a much delayed environmental and social control of the sugarcane industry.

The work will have to be done by Brazilian stakeholders, but in close contact with international parties.

Positive pressure can be brought from importing countries to catalyze the process. I believe Gröna Bilister is in a unique position to do this, in close cooperation with our Brazilian colleagues.

All in all, the sugar cane production is a very suitable crop to introduce environmental-and social demand:

- The environmental effects are manageable
- The social effects are more difficult, but can be dealt with.
- The industry is positive to the process, and in the beginning of rapid development
- There is both know-how and experienced organisations in place to coordinate the process in Brazil
- There is a strong interest in consumer countries.

What we don't see, at the present, is a focussed and co-ordinated demand for eco-labelling from purchasers in Europe. With eco-labelling being developed by Brazilians NGO's, together with the industry and social movements, ethanol from sugar cane strengthens its position as the strategically most important non fossil fuel in Sweden.

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Kungsgatan 16, 1tr 753 32 Uppsala • Telefon 018-320 220
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