LEADING THE WAY IN SUSTAINABLE BIOFUELS: THE BRAZILIAN APPROACH

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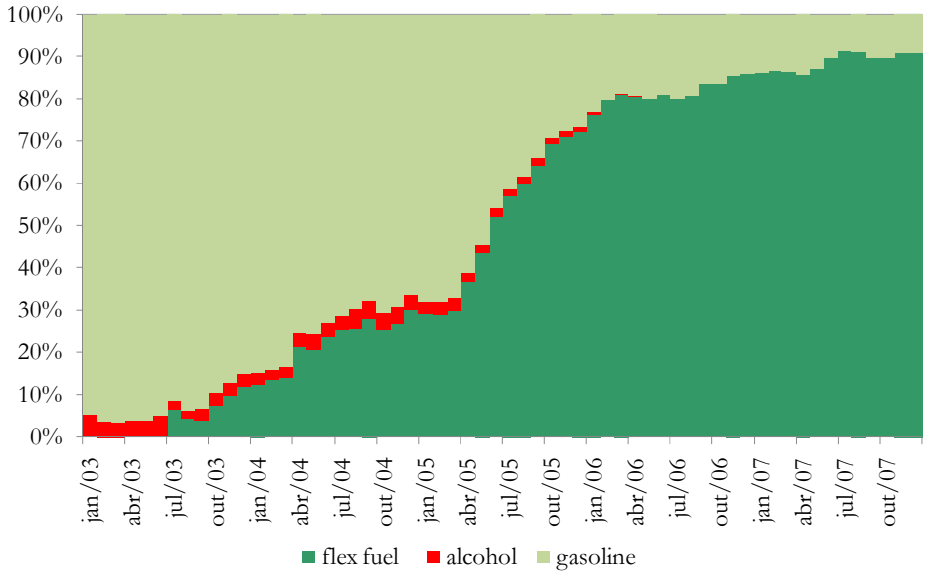
Sugar is an integral part of Brazil's social, political and economic history. Portuguese sailors discovered Brazil in the year 1500 and one of their first decisions was to plant sugarcane. Over 10,000 years after sugarcane's emergence in Southeast Asia, Brazil began harvesting sugarcane and soon producing sugar.

In the last three decades, the sugarcane industry experienced massive investments in science and technology, both from private and public sectors. Today, sugarcane is the basic input not only for sugar but also for an incredibly diverse range of value-added products, particularly ethanol to power our cars and break the stranglehold of fossil fuels on our society.

Today, sugarcane is set for another quantum leap, this time to offer the world a dual source of clean, renewable energy. Beyond sugar and ethanol, sugarcane is now providing electricity, at a time when it is urgently needed to power Brazil's economic growth.

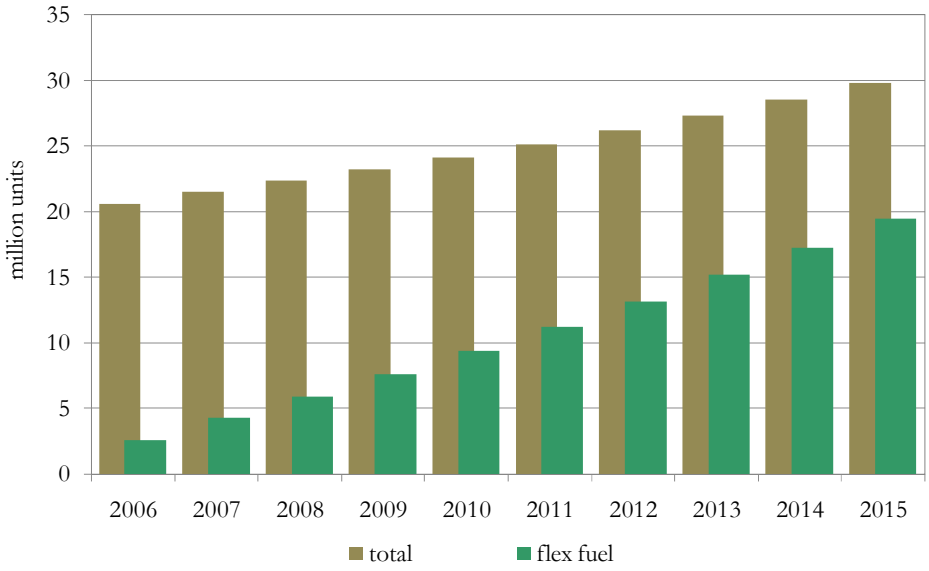
Today, ethanol consumption in Brazil exceeds the use of gasoline. In Brazil, ethanol is consumed in two ways: blended into gasoline (25% mandatory blend) and directly in Flex-Fuel Vehicles that today account for almost 90% of the sales of new vehicles. Ethanol production and use make a significant contribution to reduce greenhouse gas emissions (emissions of 25.8 million tonnes of CO_2 equivalent avoided every year) and fight global warming.

Brazilian light vehicles sales (Otto - Cycle)



Note: Otto-Cycle refers to vehicles running on gasoline, alcohol and FFVs. Vehicles running on diesel are excluded.
Source: ANFAVEA (2007). Data compiled by UNICA.

Brazilian light vehicle fleet evolution



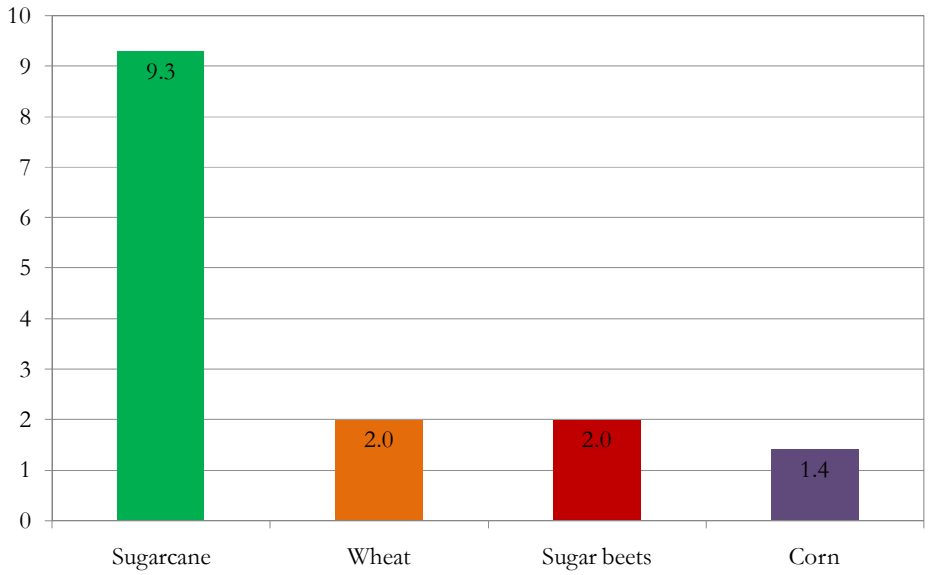
Sources: Copersucar and UNICA.

Without question, sugarcane is by far the most successful and efficient feedstock for the production of biofuels. Several international studies conducted by respected institutions have independently corroborated the environmental and economic benefits of Brazilian sugarcane ethanol. Sugarcane ethanol remains unmatched by any other type of biofuels produced on a commercial scale.

In fact, the energy balance of Brazilian ethanol is 4-and-a-half times better than that of ethanol produced from wheat or sugar beet, and almost seven times better than corn ethanol. As a result, Brazilian ethanol achieves a reduction in greenhouse gas emissions of up to 90% compared to gasoline today. As let's remember, with a finite, if not dwindling, supply of fossil fuels that emit carbon sequestered hundreds of millions of years ago, cutting emissions today is moral obligation of our generation.

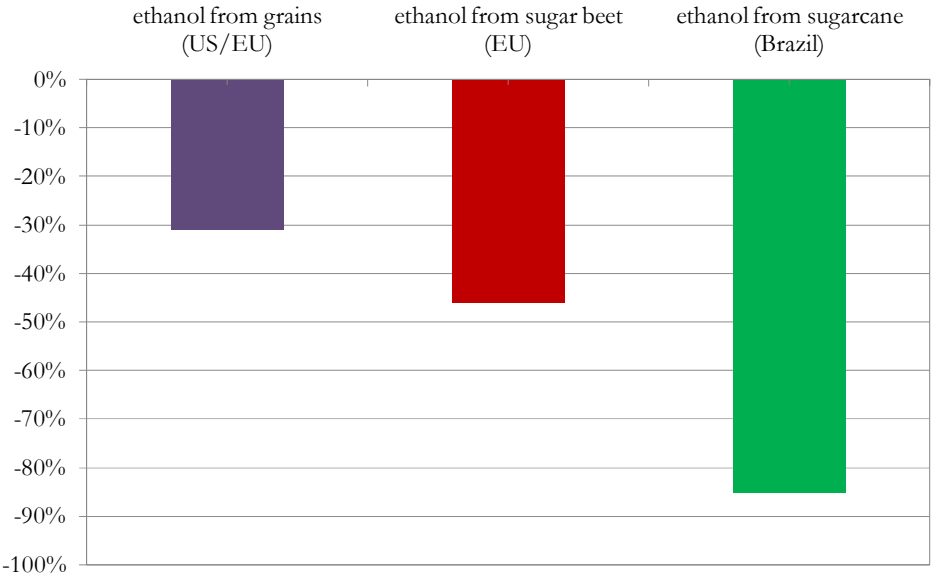
Ethanol from sugarcane also offers higher productivity than other alternatives. We already produce 7,000 liters of ethanol per hectare on average. New varieties of sugarcane developed for Brazil and processing techniques will double yields. Let me put it another way: without any increases in land use, Brazilian sugarcane can be improved to produce twice as much energy as we produce today.

Ethanol energy balance.
(units of renewable fuels obtained per each unit of fossil fuel used)



Sources: World Watch Institute (2006) and Macedo *et al.* (2008). Data compiled by Icone and UNICA.

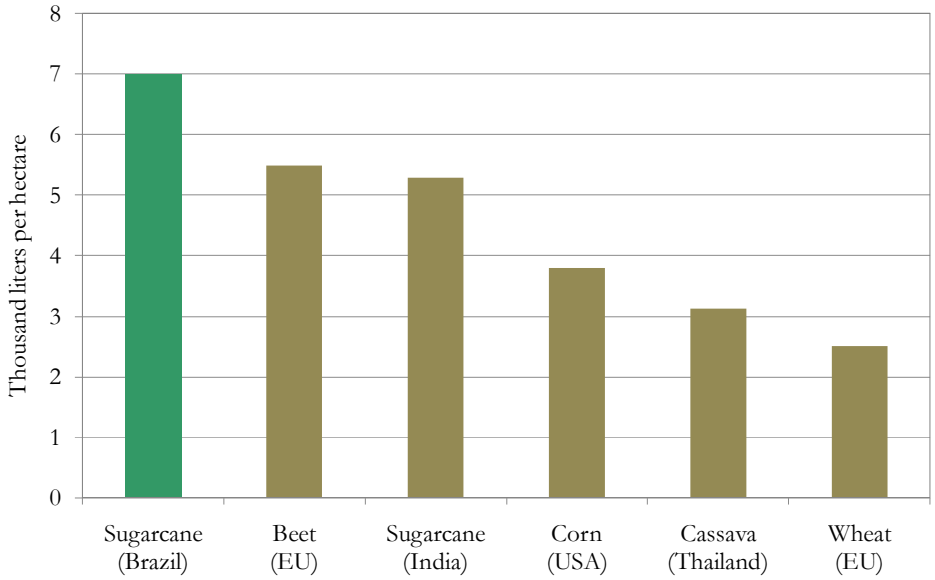
Average greenhouse gases (GHG) balance on a life-cycle basis.
Emissions avoided with ethanol replacing gasoline.



Note: reductions in well-to-wheel CO_2 equivalent GHG emissions per km, from bioethanol compared to gasoline, calculated on a life-cycle basis.
Sources: International Energy Agency (2004). Data compiled by Icone and UNICA.

Today, sugarcane occupies just 2.2% of Brazil's total arable land. Half of that acreage is dedicated to the production of ethanol. Again, let me put it another way: With about 1% of Brazil's arable land (3.4 million hectares), we have displaced more than half of our gasoline consumption.

Ethanol yields considering different feedstocks



. Sources: International Energy Agency (2005), MTEC and UNICA. Elaboration: UNICA.

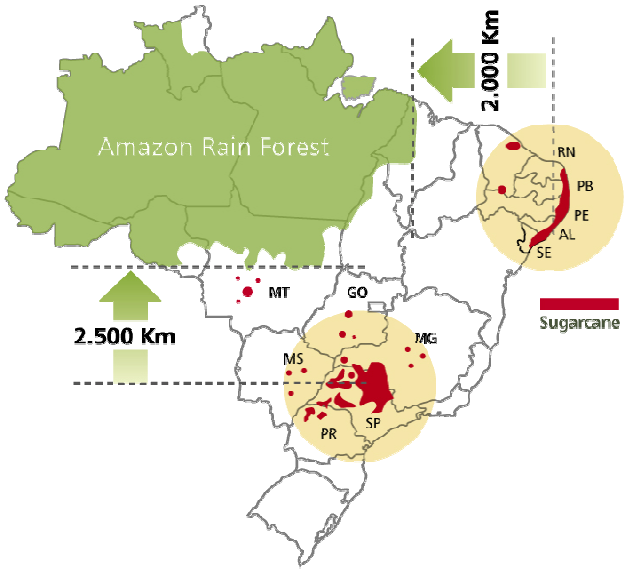
Availability of arable land in Brazil.

Million hectares (2007 - estimative)		% of total land	% of arable land
BRAZIL	**851**		
TOTAL ARABLE LAND	**354.8**		
1. Crop land– total	**76.7**	**9.0%**	**21.6%**
Soybean	20.6	2.4%	5.8%
Corn	14.0	1.6%	3.9%
Sugarcane	7.8	0.9%	2.2%
Sugarcane for ethanol	**3.4**	**0.4%**	**1.0%**
Orange	0.9	0.1%	0.3%
2. Pastures	**172.3**	**20.2%**	**48.6%**
3. Available area [Available area -(crop land + pastures)]	**105.8**	**12.4%**	**29.8%**

Source: IBGE. Elaboration: UNICA.

Brazil is a big country — larger than the continental United States. 87% of all the sugarcane grown is harvested in south-central region (where it was originally introduced in the 1500s) while the remaining 13% from the northeast coast, both areas well over from the Amazon rainforest. Future expansion of sugarcane production will occur in south-central Brazil, particularly on degraded pastures, further improving our efforts to reduce greenhouse gas emissions.

Sugarcane producing regions in Brazil



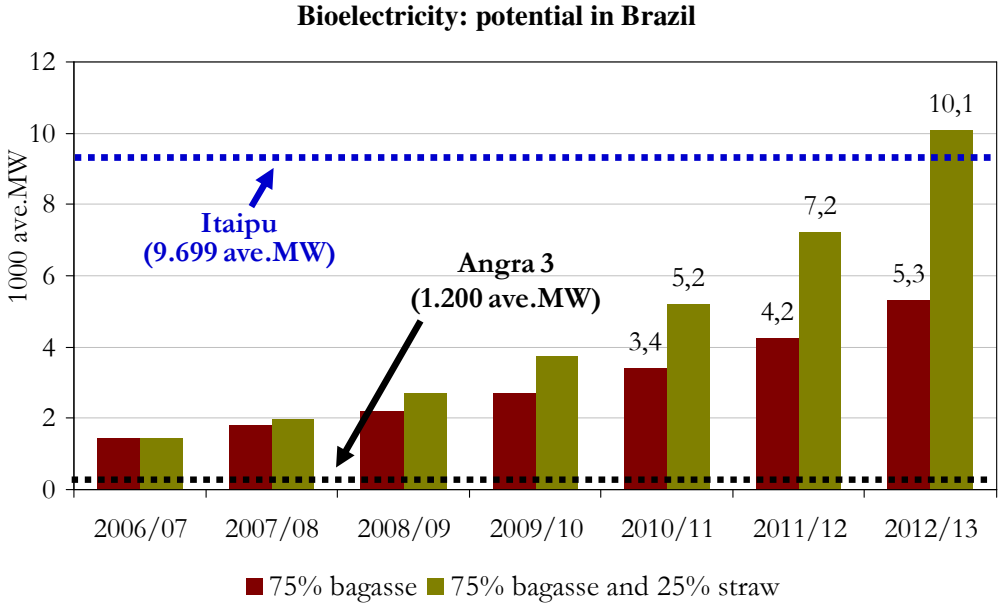
Sources: NIPE-Unicamp, IBGE and CTC.

Brazilian sugarcane ethanol is not only economically profitable, but it is also environmentally sound. Because of efficiency gains, the current price of ethanol in Brazil is just 30% of what it was three decades ago, when the country decided on its large-scale use. Today, Brazilian ethanol is competitive with gasoline when the price of oil is at $40 dollars a barrel or higher, making it viable without any government subsidies.

In addition to ethanol, bioelectricity is now being produced from sugarcane, a solution that might well spark another revolution on the scale of ethanol. Bioelectricity is produced by burning sugarcane's byproduct, bagasse and straw, in steam boilers. The power generated from this process not only makes our processing mills 100% self-sufficient but they also sell surplus electricity into the national electricity grid.

Until recently, about two-thirds of the sugarcane's energy potential, contained in the bagasse and straw, went un-harnessed. But this is changing dramatically. Sugar and ethanol plants in Brazil already have the potential to generate 1,800 average megawatts in surplus electricity, which is equivalent to 3% of Brazil's overall needs today. With increased use of biomass from sugarcane and the use of high efficiency boilers, it is estimated that generation capacity could rise to as much as 15,000 average megawatts by 2020. That is enough electricity to supply 15% of the country's electricity needs, or the equivalent consumption of entire countries such as Sweden or the Netherlands.

For all of these reasons, we believe sugarcane ethanol stands head and shoulders above ethanol made from other feedstock in terms of energy balance, environmental efficiency, productivity and cost-effectiveness. This is why its production should be expanded, and its international trade encouraged.



Note: ave.MW = MW firm capacity. Assumptions: a) 2006/2007 - harvested area; b) 2012/13 harvest - prediction based on the following values: 1 ton of sugar cane produces 250 kg of bagasse e 204 kg de straw, 1 ton of cane (only bagasse) generates 85.6 KWh for exporting, 1 ton of cane (bagasse + straw) generates 199,9 KWh for exporting, the straw inferior calorific value = 1,7 bagasse inferior calorific value, capacity factor = 0,5.
Sources: Cogen, UNICA. Elaboration: UNICA.

Sugarcane ethanol and bioelectricity are not merely a Brazilian solution. More than 100 countries grow sugarcane around the world, most of them emerging nations in tropical and sub-tropical regions. Adopting sugarcane ethanol instead of gasoline would increase their energy independence and provide energy security for countries that import ethanol, because the number of suppliers would be greatly increased and diversified.

In this scenario, 100 developing countries could supply biofuels to the world, instead of the 20 oil producing countries that do so now, most of them located in troubled regions. Sugarcane can make a significant contribution to development by turning many of these countries into producers and exporters of ethanol.

Sugarcane ethanol has all the prerequisites to become a global commodity, but for this to happen developed countries must put aside the distorted logic now in place that taxes biofuels, while fossil fuels are allowed to move freely around the globe, unobstructed by trade or any other barriers. Unfortunately, some developed countries continue to raise high tariff and non-tariff barriers against the most efficient biofuels produced in developing countries.

The Brazilian experience shows that sugarcane ethanol can be produced efficiently and sustainably in developing countries, without causing market disruptions or affecting food supply and prices. In fact, sugar prices decreased by almost 20% last year while Brazil substantially increased its ethanol production. Brazilian successful experience shows ethanol as part of an integrated agri-food system which generates competitive food, feed, fibers and bioenergy.

The development of a cost-effective bioenergy sector in developing countries can make a very positive contribution to development by reducing the oil import bill in these countries, while supplying electricity to rural areas not yet connected to national grids, providing new jobs and export opportunities and fostering the efficient use of ecosystems.

In spite of its very positive environmental, energy and economic records, sugarcane ethanol still faces varying degrees of skepticism. Criticisms have recently emerged regarding the potential loss of carbon stocks that could result from land use changes. This is clearly a legitimate concern. The use of biofuels would be of no interest if their production released more carbon in the atmosphere than the CO_2 emissions they avoid by replacing fossil fuels.

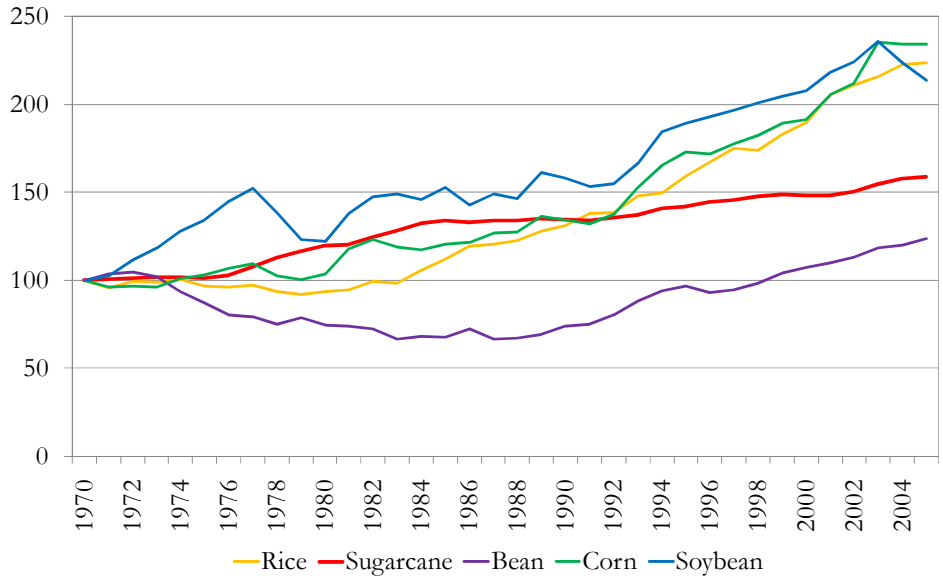
If reducing greenhouse gas emissions is to be our goal, then no production of any feedstock, for biofuels or any other use, should take place in areas where carbon stocks are substantial. However, before banning the use of specific areas, sound scientific studies should measure the quantity of carbon that is stocked in each of the current and potential production areas.

This will help establish the carbon balance that would result if these areas were used for the production of feedstock. Such comprehensive calculations do not currently exist, so it cannot be taken for granted that land conversion will in fact create a "carbon debt" or that agricultural expansion will necessarily take place in sensitive areas.

Outside the Amazon, Brazil has 172 million hectares of under-utilized pasture land, much of it degraded. Recent scientific, independent research showed that the use of degraded pastures for sugarcane production in Brazil generates a "carbon credit," because sugarcane captures larger amounts of carbon than the quantities stocked in this type of land.

The alleged negative effects of biofuels production because of land use changes have also been extended to indirect land use change. None of the available models today provide a sound assessment of changes in agricultural production that might be taking place in the world as a result of expanded feedstock production in major biofuels producing countries.

Yields evolution for main agricultural products in Brazil.
Moving average for 3 years. Base 100 in 1970.



Source: IBGE (2007).

The models used in recent studies to support this theory present numerous fallacies. For instance, they ignore the huge improvements in yields that occur in modern agriculture. They also incorrectly assume that any crop production that is displaced by another — for biofuels or otherwise — will be unavoidably reallocated in high biodiversity areas.

These are simplistic assumptions that are not validated by scientific evidence. As noted, 172 million hectares are currently dedicated to pastures. Average productivity is 1 head per hectare. An increase of 40% in productivity, which is already happening in the most productive regions such as São Paulo, would free up around 60 million hectares for the production of food and agroenergy. That area is equivalent to the entire area dedicated to agriculture in Brazil today.

Biofuels are not a miraculous solution, and such solutions do not exist.

Do we want to spend years, perhaps decades, looking for a hypothetical "perfect cure," creating sustainability expectations and criteria that no renewable fuel could meet, while continuing to encourage dependence on fossil fuels that are socially unfair and environmentally aggressive, by guaranteeing free, unobstructed global trade for oil?

Or, should we recognize that global warming and energy security demand immediate answers that must be global, and that any solution, even if not perfect, that contributes at some level to fight global warming should be promoted?

It is one minute to midnight in the world of climate change, and we will only make things more difficult if we don't face up to our responsibilities. The sooner, the better.