INTER-AMERICAN BOARD OF AGRICULTURE - IABA

IICA/JIA/Doc. 289(05)
Original: Spanish
31 Aug.-1 Sept. 2005

DRAFT PAPER ON A HEMISPHERIC PLAN FOR BIOENERGY AND BIOFUELS IN THE HEMISPHERE

Guayaquil, Ecuador

World Oil Consumption

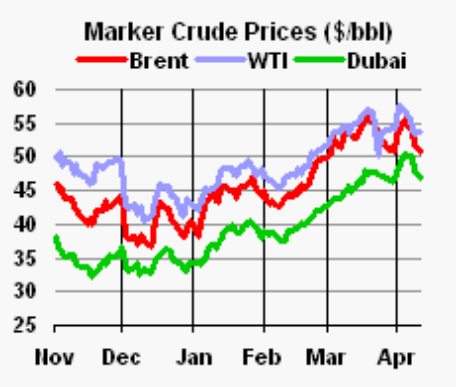
It is estimated that we've already exhausted about half of the original two trillion barrels of oil on earth. And the rest will be burned even faster as China, India and other developing nations develop oil-hungry economies.

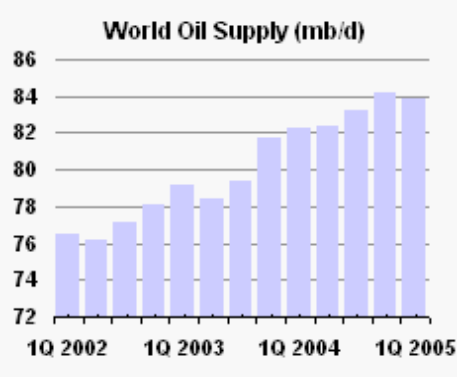
World consumption in 2003 stood at nearly 80 million barrels a day. In North America, the world's largest user, consumed 24,083,000 barrels (over 25% of the total) each day. Almost half of it went into the continent's cars, light trucks and SUV's. Ninety percent of North America's transportation sector depends on an affordable and steady supply of oil.

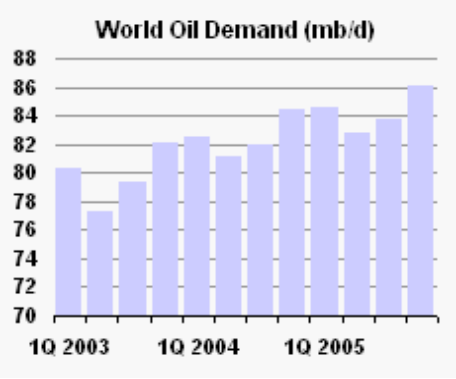
Although North America's appetite for oil is rather stable, in other areas of the world it is growing by leaps and bounds. Last year China overtook Japan as the second largest consumer. Early statistics for 2004 showed another substantial increase over 2003 and the International Energy Agency now describes China as 'the major driver of global demand for oil'.

Experts estimate that the world demand for oil will grow by another 60 million barrels a day by the year 2015.

The figures below show the oil statistics for the first quarter of 2005:







(Source: International Energy Agency, May 2005)

World Supply Diminishing

At the same time production from the world's super-giant and giant oil fields is diminishing by 5% a year. Although new supplies are being discovered in places like Siberia, the Central Asian republics and West Africa, these are not enormous additions to the total output. Most of the 'easy' to recover oil has already been discovered and tapped.

That leaves oil supplies like the tar sands in Western Canada and the oil shale in Venezuela's Orinoco belt. But half as much energy is used extracting this oil as the energy value of the oil produced. The price of oil needs to remain high for these operations to be economically viable. And there's a terrible cost to the environment.

The impact of the oil 'peak'

Oil experts are unsure when the 'peak' in oil production will occur. Some say it could be as soon as 2010 whereas the U.S. Energy Department estimates it won't happen until 2037. In recent literature, however, we can notice an increasing number of articles and papers warning that the peak in oil production is looming.

Much is also said about the increase in oil, stating that the era of cheap oil will soon be over. As the supply begins to diminish the price will go up. If prices rise too steeply there could be a devastating effect on the world's economy. It will cost a lot more to heat our houses, offices and factories and power our cars, trucks and airplanes. Increased transportation costs will drive up prices everywhere from the hardware store to the supermarket.

That is why conservationists argue that we need to reduce the world's dependence on oil today so that supplies can be stretched giving us time to perfect alternate energy sources.

Historical overview of the Brazilian experience[1]

Brazil’s experience in the production of ethanol dates back to the days of the depression, with the fall in international prices including sugar cane exports. As a result, the Brazilian government promoted the production and consumption of ethanol, and made the 5% addition of ethanol to the gasoline used in the country mandatory in 1931.

The growth in ethanol production increased the sugar cane culture in Brazil’s Southeast, especially in São Paolo, and the product gained more ground in the fuel mixture in order to cope with the difficulties of importing oil during WWII.

The promotion of ethanol production increased even further as a result of the 1973 and 1979 oil crises. The production of ethanol exceeded that of sugar from the mid 1980s

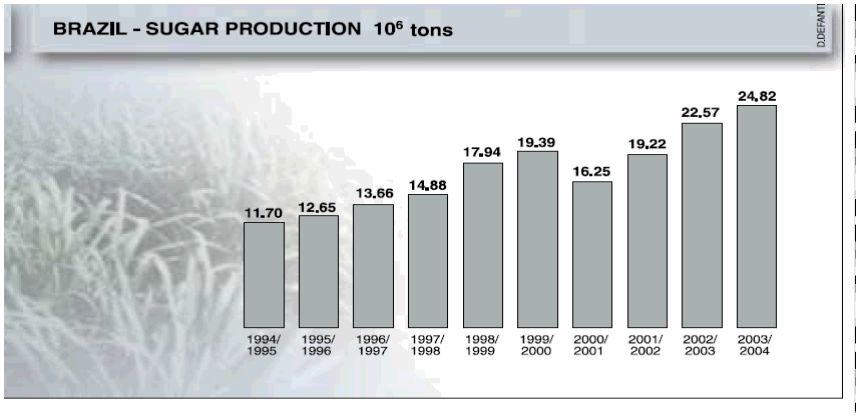
[1] The information on Brazil is largely taken from the publication « Brazil’s Sugar and Ethanol : Energy and Environment Commodities » published by the União da Agroindústria Canavieira de São Paulo (Unica)

until the 1990s. By the end of the 1990s, however, state interference in the production of sugar ended, and self-regulation has been developing since.

Outline of Brazil's national production

Brazil is the world's leading sugar and ethanol producer, with 52% of the sugar cane used in ethanol production, and 48% in sugar production (refined, crystallized, raw). The sugar cane is cultivated in the country's Centre-South and North-Northeast regions in two cropping periods, taking up 2.4% of the arable land, or nearly 5.5 million hectares.

In the North-Northeast region, crops occur between September and March; in the Centre-South region, they are developed between May and November. The production in the Centre-Southeast represents 85% of Brazil's production and the North-Northeast accounts for the remaining 15%.



Employment, jobs and income

Brazil's sugar and ethanol agribusiness creates 1 million direct jobs and shelters 60,000 growers who supply sugar cane. This activity has a strong presence in the economies of over 960 municipalities, which represent around 17 percent of Brazil's total, in a permanent, decentralized job creation and income generation process. The sector directly maintains more than 600 schools, 200 day care units and 300 ambulatory care units throughout Brazil. In addition to its direct social effects, this labour-intensive rural activity causes an obvious positive effect by reducing migratory flows to the cities, as well as the urban population inflation.

The State of São Paulo, which accounts for 60 percent of the country's sugar cane production, is a modernity icon when it comes to employment relationships. Nearly all employees are formally registered and have all of the rights set forth in the labour legislation, and their benefits include medical, dental and pharmaceutical care, life insurance, meals, food and transportation stamps, private pension plans, school aid, breakfast, and access to credit cooperatives.

Research and development

The sugar and ethanol industry has been investing around US$ 40 million per year in research & development since 1979.

The São Paulo sugar cane culture is the agricultural activity that features the world's lowest soil and water contamination levels for using the smallest amounts of chemicals in the Americas. Most of the industrial waste is processed and used in culture irrigation and fertilization.

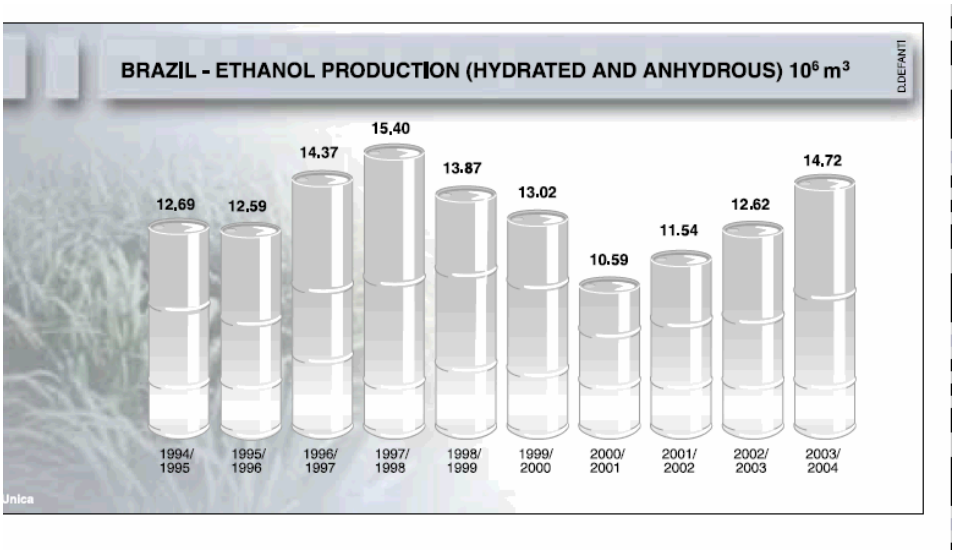
The sugar and ethanol industry participates in the Sugar cane Genome Program, through which more than 150 researchers from several institutions are involved with the task of mapping and characterizing the plant genes, researching more productive species resistant to pests and diseases, that can adapt to the various types of soil and climate.

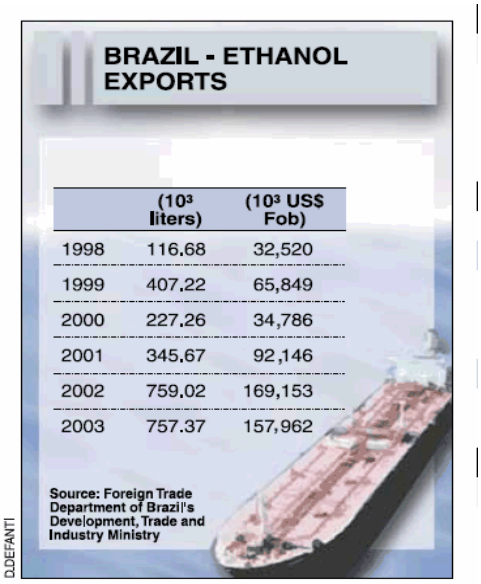
The country uses an advanced satellite image processing software to plan strategic actions, monitor the sugar cane culture and land use, identify potential areas for crop expansion, build new mills, and identify vegetable varieties. It regularly performs in-depth analyses of hydrated or anhydrous ethanol composition for compliance with both Brazilian and international specifications.

The Brazilian researching activities include the development of the biodegradable plastic, or PHB, obtained from sugar, which is already manufactured in industrial scale and enjoys good acceptance in Europe and Asia. Ethanol production from sugar cane waste is also being tested in a program carried out with local primary industries and public institutions. Known as DHR (Dedini Rapid Hydrolysis), the research aims to increase Brazil's ethanol production capacity by taking full advantage of the raw material.

Ethanol production

Brazil produces two types of ethyl alcohol or ethanol: hydrated and anhydrous. Hydrated ethanol (with a 4% water addition) is used to power alcohol and "flex fuel" vehicles. The anhydrous type, absolute and water-free, serves as a gasoline oxygenator in several countries, as an alternative to highly pollutant additives, such as tetraethyl lead and the MTBE (Methyl Tertiary-Butyl Ether), an oil derivative.



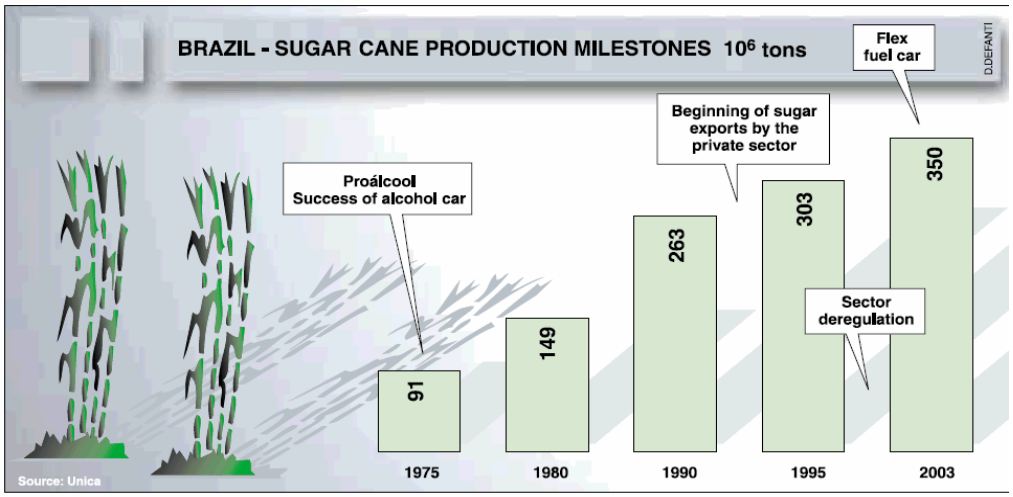


Brazil, a pioneer in the use of ethanol

Having pioneered the large-scale use of ethanol, Brazil is recognized for its responses to the oil shortage or price crises. In 1975, the country developed the National Alcohol Program (Proálcool). The operating solution consisted of devising procedures, incentives and services that could allow, at an earlier stage, the ethanol addition to the gasoline consumed in Brazil, and later rely almost exclusively on this product to fuel the national light vehicle fleet.

In 1979 came the Brazilian alcohol-powered car along with the roots of a production base the installed capacity of which amounted 18 billion litres of fuel ethanol per year, which

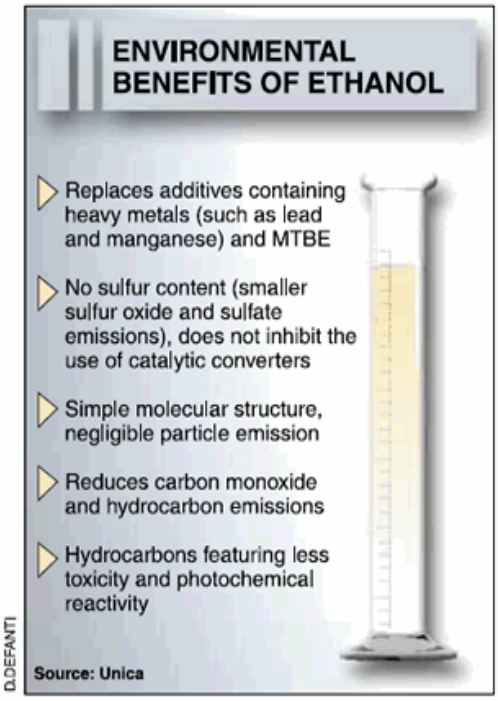
are equivalent to 100 million gasoline drums. By the late 1980s, ethanol-powered vehicles represented as much 85 percent of the country's light vehicle fleet.

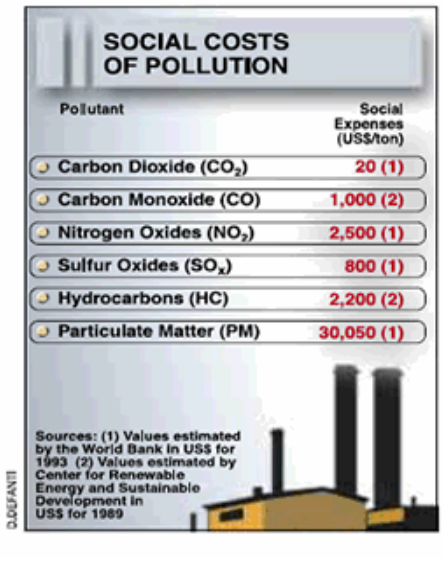


Environmentally-friendly gasoline

The falling oil prices and the economic setbacks facing Brazil during the last quarter of last century gave rise to significant changes in the governmental policy that discouraged the production and consumption of hydrated ethanol and vehicles powered by this fuel. The growing market for oil derivatives, however, pushed the production and use of anhydrous ethanol as an additive, at the rate of 25 percent, to the gasoline consumed in Brazil.

Over the 1990s, the market for sugar cane, sugar and ethanol was gradually deregulated. The political crises in the Middle East — the region that accounts for most known oil reserves — and the development of the multi-fuel vehicle represent a new stage for the Brazil's ethanol-powered car.





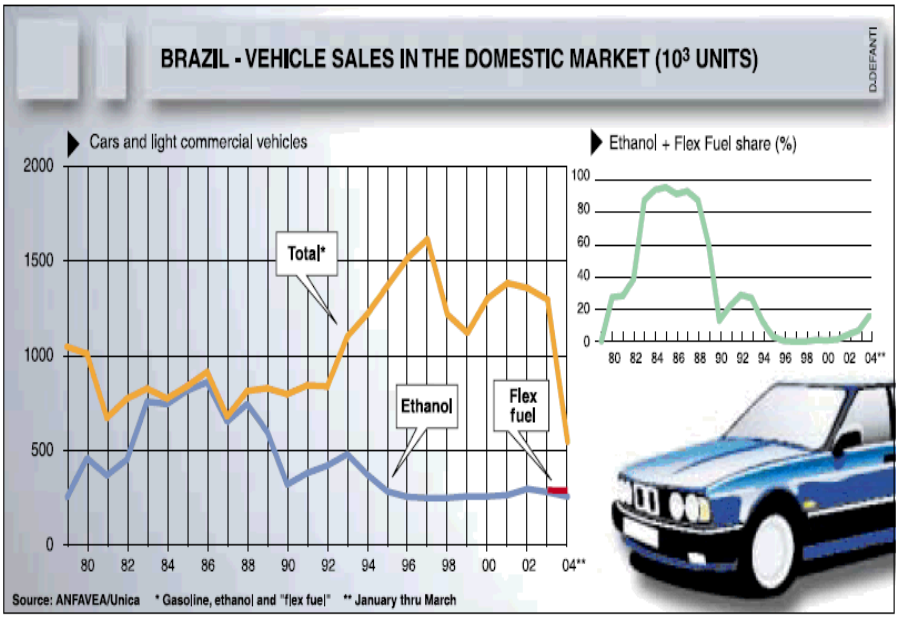
Flex-Fuel cars

Since March 2003, new vehicles have been appearing on the streets of Brazilian cities. Their originality lies in the fact that they work either with hydrated ethanol or gasoline, or any combination of both, with equal performance to the gasoline-powered vehicles.

The "flex fuel" cars have sensors that recognize the contents of the mixture and automatically adjust the engine operation to the most favorable use conditions. This technology has added intelligence to the standard gasoline engine.

Brazil stands out as the only country in the world where "flex fuel" cars can be tested and marketed in large-scale for any economic utilization profile of the two fuels. The new vehicles have restored the Brazilians' taste for ethanol, which is a less pollutant, performance-enhancing fuel that even contributes to extend the duration of a vehicle. In addition, with the "flex fuel" technology the consumer has the choice to use ethanol or gasoline, according to retail prices or their own supply logistics. In the event of shortage or increase in ethanol prices, gasoline is an option to choose from.

From March 2003 to March 2004, around 94,000 units were produced and sold, or three times as many as the ethanol-powered cars on the Brazilian market in 2003. At the end of the first quarter of 2004, one of Brazil's leading car makers reported that "flex fuel" cars accounted for over 35 percent of its sales of Otto Cycle vehicles for the period, and anticipated that this number can go as high as 85 percent by the end of the year. Automotive market experts are unanimous in saying that the days of one-fuel cars are numbered.



Biomass energy

Sugar cane is composed on 1/3rd of juice and 2/3rds of biomass (straw and bagasse). The juice is used in sugar and ethanol production, in large quantities and in a competitive way. The remaining portion has potential as a raw material that is just starting to be explored.

For the 2003/2004 crop, Brazil ground 358 million tons of sugar cane, which correspond to 429.6 million oil barrels. If the energy potential of ethanol and the sugar cane bagasse

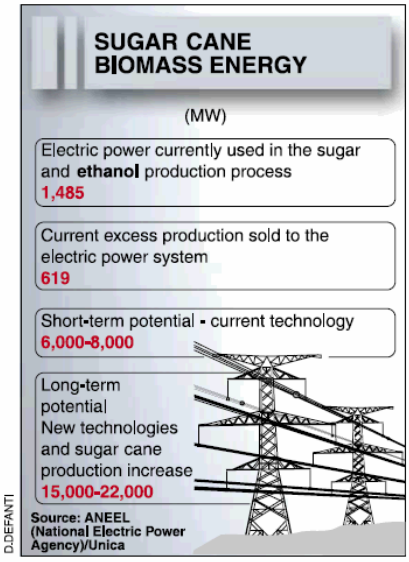
and straw are taken into account, the amount corresponds to a production of 1.17 million oil barrels a day.

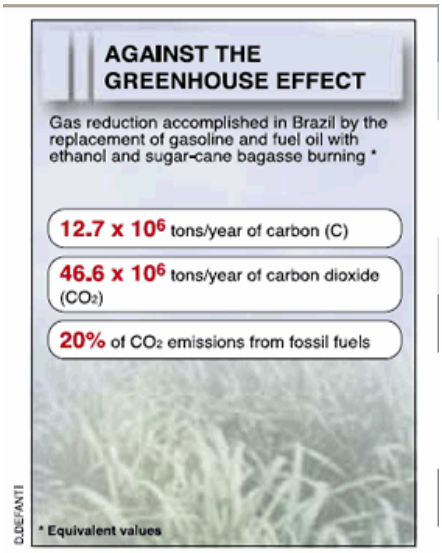
An important differentiation of ethanol production from sugar cane is the minimal dependence on fossil energy sources of the process. The energy used in sugar and ethanol production is generated by the burning of sugar cane waste in boilers, which give out the steam that produces heat or moves the electric power generators required in industrial processes.

This production cycle provides a high-yield operating energy balance which contributes to Brazil's competitiveness and leadership in sugar and ethanol production.

The large-scale fuel ethanol utilization experience now tends to be reproduced in energy co-generation, as energy is already considered the sector's third product, and to further increase productivity in the country's sugar and ethanol industry towards the full use of sugar cane.

The Brazilian mills and distilleries generate 1,485 MW of electric power for their own consumption, and further 619 MW of excess energy that are sold to electric power utilities and used as a complement in order to meet the demands of the country's energy base, contributing to make it one of the cleanest in the world.





Sustainability indicators

By producing sugar and alcohol, Brazil saves around US$ 4.2 billion per year, US$ 2 billion of which are from sugar exports and US$ 2.2 billion by not importing the oil equivalent to the gasoline production.

The use of fuel alcohol in Brazil had provided foreign currency savings of around US$ 55 billion over 28 years, from 1975 until the end of 2003. If interests on the foreign debt are

considered, the amounts increase to US$ 118 billion. This is a significant figure when compared to Brazil's mid- and long-term foreign debt of US$ 187.5 billion.

Today's 25 percent addition of anhydrous ethanol to gasoline has eliminated all environment-poisoning additives from the Brazilian fuel base and significantly contributes to the reduction of pollutants like ozone in Brazil's large urban centers, especially in the city of São Paulo.

The Brazilian hydrated ethanol, which moves the country with a fleet of approximately 2.4 million vehicles and also feeds the new "flex fuel" cars, is a proven contribution towards reducing local pollution, since the engines powered by this fuel are potentially 20 percent less pollutant, while their technological efficiency is similar to that of gasoline-powered engines.

Brazil's sugar and alcohol sector has proved to play a decisive role in reducing carbon dioxide (CO2) emissions in the atmosphere of the Earth. CO2 is one of the most important gases that cause the heating of the planet — known as Greenhouse Effect — and is basically generated by the burning of organic compounds, and especially by the large-scale use of oil-derivative fuels or natural gas.

The sugar and ethanol industry basically generates and recuperates energy: the energy of sugar, as a food, and of ethanol, as a fuel for vehicles, as well as the electric power obtained from the burning of sugar cane bagasse. Brazil has demonstrated its sustainable development tradition and experience by combining an environmentally responsible activity with energy security, local economic opportunities, decentralized job creation and income generation.

Unica – União da Agroindústria Canavieira de São Paulo (São Paulo Sugar-Cane Agribusiness Union)

Unica is Brazil's sugar and ethanol industry's leading institutional representation entity which constantly holds conversation with the unions and associations of the country's sugar cane producing states.

Unica was formally established in 1997 as a result of the convergence of several São Paulo-based sectorial associated organizations, and its membership comprises 95 producing units who accounted for 57 percent of the Brazilian production in the 2003/2004 crop, having processed a total of 170.3 million tons of sugar cane.

The entity also shelters the São Paulo-based sugar and ethanol producers' unions, totaling 134 members whose production in the same crop period amounted to 207.8 million tons of sugar cane.

The institution has a Council composed of industry representatives and a board of directors consisting of dedicated professionals and supported by a team of consultants

specialized in environmental, technological, international trade, social responsibility, legal, union and communication issues.

Unica's activities are guided by the following principles:

- ✓ Improvement of the sugar cane agribusiness self-management system in a free market;
- ✓ Care for the ethanol and sugar competitive conditions;
- ✓ Expansion of the free market for sugar and struggle against protectionist barriers;
- ✓ Dissemination of fuel ethanol production and use worldwide aiming to turn the product into an environmental commodity;
- ✓ Opening of market for ethanol for both addition to gasoline and direct use in vehicles;
- ✓ Support to production diversification in sugar cane producing countries through the inclusion of ethanol in the production cycle;
- ✓ Defense of the sugar and ethanol characteristics, which contemplate public health and environmental quality improvements;
- ✓ Characterization of biomass energy as a real alternative to fossil energy sources. Its environmental properties reduce local pollution, by making the air cleaner in large urban centers, as well as global damages, fighting against the greenhouse effect. Its social extent allows job creation and income generation in a decentralized manner so as to diminish inequalities. Its economic contribution reduces the Brazilian dependence on oil, the production of which is concentrated in regions of the Planet that are marked by great political instability. As a renewable energy source, it enhances both security and independence in the nations where it is used.

Brazil, a role model for the Americas

Brazil has proven to be a leader not only in the production of ethanol from sugar cane, but also as a leader in research and innovation for the use of bioenergy as an alternative to crude oil.
The latest increases in oil prices and the ever increasing number of research articles cautioning readers on the imminent oil production peak, prove that Brazil's vision is bearing fruit, and that non-oil producing countries should learn from Brazil's experience and knowledge.

The majority of Latin American and Caribbean countries cultivate sugar, in varying quantities. In light of the declining commodity price for sugar, it would be of benefit to these countries to look into the possibility of using sugar cane or other crops to produce alternative sources of energy, thereby reducing the need to rely on oil imports, and contributing to a higher return for sugar exports.

The advantages of using agriculture to produce alternative sources of energy, however, extend beyond the economic benefits. They also have great positive repercussions on the social fabric by creating employment and reducing rural poverty, along with protecting the environment from the pollutants caused by gasoline.

This win-win situation has been recognized by the Ministers of Agriculture of the Americas, who have requested that IICA take a leading role in serving as a platform for disseminating the Brazilian experience to the rest of Member States.

IICA's potential role

IICA, with it 34 offices in each of its Member States, is ideally placed to serve as the bridge between Brazil and those countries interested in learning more and benefiting from the Brazilian experience.

At its last Inter-American Board of Agriculture, the Ministers of Agriculture gave IICA the mandate to develop a Hemispheric Plan for Bioenergy and Biofuels.

In this regard, it also requested that IICA create a task force to facilitate the dissemination of the Brazilian expertise and knowledge on the transformation of sugar cane into ethanol production.

IICA therefore recommends that the task force be composed of IICA technical specialists/representatives, selected members of Unica and representatives from the Member State wishing to pursue a national ethanol program in their country of origin.

It is recommended that the task force be specifically oriented to addressing the conditions of each individual country, and therefore, that each task force be focused on the interested party. Should there be countries with similar socio-economic conditions (eg certain Caribbean or Central American countries), and agricultural environment they could team up for a more effective use of time and resources.

Next steps

It is proposed that as the next steps, **IICA** commit to the following:

- That the IICA Representative in Brazil begin negotiations with the Minister of Agriculture or officials from his Ministry on who, within Brazil, would be interested in imparting their knowledge with the other Member States.

- That each IICA Representative introduce the Brazilian experience to national authorities promoting the benefits from introducing the use of ethanol in their country, and supporting the creation of a task force for national specialists to learn and eventually replicate the Brazilian technology. It is important to note that in this dissemination exercise, the Representatives should not only consult the respective Ministries of Agriculture, but also the Ministries of Energy, the private sector (sugar industries) and the academic sector.

- Once the negotiations bear fruit, that IICA take an active role in convening the interested parties and providing the logistical support for the series of meetings/internships required for the training.

Should a **Member State** express interest in taking part in this learning exercise, it should commit to the following:

- Cover the costs involved in the training, including travel and accommodation.
- Commit to purchasing a negotiated amount of anhydrous ethanol from Brazil, pending its own ability to build the infrastructure required for its own production.
- In the event that the country is interested in the production of hydrated ethanol, it is suggested that it enter in negotiation with Brazil to import "flex fuel" cars for use in the country.

Should **Brazil** be interested in imparting its knowledge and experience to an interested Member States, it should commit to the following:

- Provide the expertise "free of charge", except for any travel and accommodation that may be required.

Why is this a win-win situation?

There are a number of reasons why the countries of the Americas, including Brazil, could benefit from this initiative:

1. **Environmental sustainability**: the case has been proven that the use of ethanol in conventional vehicles helps to reduce the pollutants caused by gasoline, and therefore contribute to the implementation of the Kyoto Protocol

2. **Poverty reduction**: learning from Brazil's experience would contribute to employment creation, thereby reducing rural poverty and the rural-urban migration.

3. **Economic benefits**: In the short to medium term, Brazil would benefit economically from entering into an agreement with those Member States interested in producing ethanol, as they would negotiate anhydrous ethanol exports to the country.

4. **More economic benefits**: In the longer term, each country interested in this new technology would obviously benefit from it as it would decrease its dependence on oil imports.

5. **Yet more economic benefits**: by reducing the production of sugar, and increasing the production of ethanol, the price of sugar exports would

likely increase as the demand will continue to grow, but the supply will decline.

6. **A win-win situation:** Obviously this is a long term initiative. However, should it be pursued by the countries of the Americas, the potential benefits are immeasurable. As we have seen, there are undeniable environmental, social and economic benefits to the use of ethanol. Moreover, as a hemisphere, it would set a precedent for a unified continent, led by Brazil, in the fight against poverty and environmental degradation.

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