

# Brazilian Sugar

## Scope

Brazil is the world's largest producer of sugarcane, sugar, and fuel alcohol and one of the most cost efficient producers of sugar. It is also the leading exporter of sugar. Sugar accounts for about 2 percent of the country's gross national product, 17 percent of the country's agricultural product, and employs over one million people. Sugar is the eleventh leading export item following generic categories such as vehicles, aircraft, machinery, iron and steel.

Brazil's sugar industry is closely interconnected to the to the fuel alcohol industry. During the last few years about 50 percent of the sugarcane output was used to produce fuel alcohol and the remaining 50 percent was used to produce sugar. The large area devoted to sugarcane production is due to several factors such as; its favorable returns relative to competing crops, the availability of under-used land that may be planted to cane, expansion programs by mills to increase output, elimination of export taxes, low land prices, and partial harvesting mechanization. Sugarcane has replaced citrus and pasture areas in the State of Sao Paulo, Brazil's leading sugarcane producing state. According to *Agricampus*, a Brazilian Research Company, the investment to plant one hectare of sugarcane (\$855) is approximately 73 and 36 percent lower than investments required to plant one hectare of citrus (\$2,789) and pasture (\$1,172), respectively. In addition, sugarcane profit margins assessed through historical prices are 7.31 percent compared to 6.01 percent for citrus and 3.27 percent for pasture.

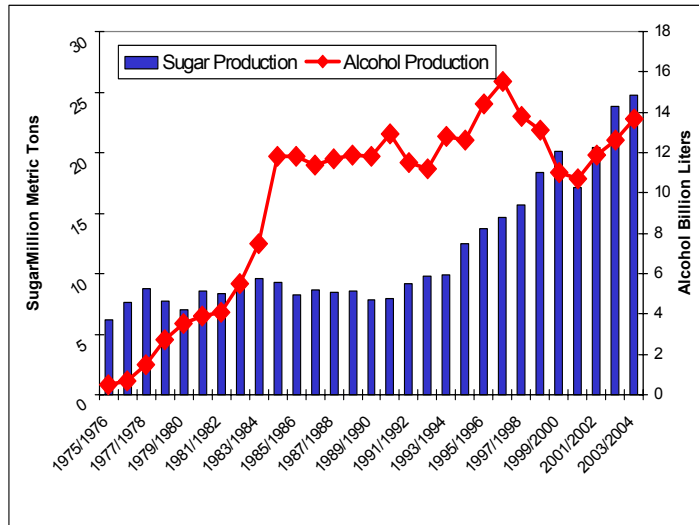
## Production

Sugarcane production began to increase during the late 1970's in response to the artificially created demand for alcohol. The demand for alcohol is the result of several aspects of the government's ethanol program. A central part of the ethanol policy is the mandatory blending of ethanol with gasoline. The government sets the blending rate, bans the use of diesel powered personal vehicles, requires government agencies to buy 100 percent ethanol powered vehicles, offers storage credits to millers, maintains a differential tax break favoring ethanol over gasoline, and finally ensures that imports do not disrupt the domestic program by maintaining a 21.5 percent duty on imports which may only enter under license. At the inception of the ethanol program the government fixed the price of gasoline so that it was higher than the price for ethanol. Although this program no longer exists it helped build ethanol demand.

Beginning in 1985 alcohol production flattened out for a time before peaking in 1998. However, after this period alcohol production fell as ageing alcohol powered cars were scrapped. Alcohol production began to rebound in 2002 in part due to the devaluation of the Brazilian currency and in part to an increase in world oil prices. Sugar prices showed sign of strengthening during this period and it made sense to export higher U.S. dollar

valued sugar. Sugar production bumped around between 8 and 9 million tons until 1992 when it began to increase. During the next ten years, sugar production more than double.

## Brazilian Sugar and Alcohol Production



Poor weather lowered sugarcane crops reduced production of both sugar and alcohol for 2000 and 2001. Sugarcane production set successive record levels in 2002 and 2003.

As of 2003, Brazil has enough capacity to produce 30 million tons of sugar and 18 billion liters of alcohol.

Sugarcane is grown in two principal regions, the Northeast and the Center-South. The Northeast accounts for only about 16 percent of production (2003/04 crop). The cane is replanted about every six years in both of these regions. Thus, about 16 percent of the cultivated area is renewed each year. The production yields in Northeast region are low and the costs are high due to growing conditions. The Center-South region is highly productive because both the soils and climate are excellent. This region is regarded as one of the lowest cost producing areas in the world. The cost of producing raw sugar is generally estimated at 5 to 5.5 cents per pound for the Center –South.

The Brazilian sugar-marketing year begins in May and ends in April. The actual harvesting begins in April and could be even anticipated to March for the center-southern producing states and given sufficient quantities of cane, may extend into January. The crushing season for the north –northeastern states begins in August and extends through February. Brazil produces raw sugar and two types of refined sugar, crystalline (granulated) and amorphous (powdered colored sugar). Only the raw and crystalline sugars are exported.

### Growth Potential

According to the Ministry of Agriculture, Brazil has about 320 million hectares of land suitable for cultivation. Currently only 53 million hectares are under production. Sugarcane accounts for only 5.6 million hectares or less than 10 percent of the total

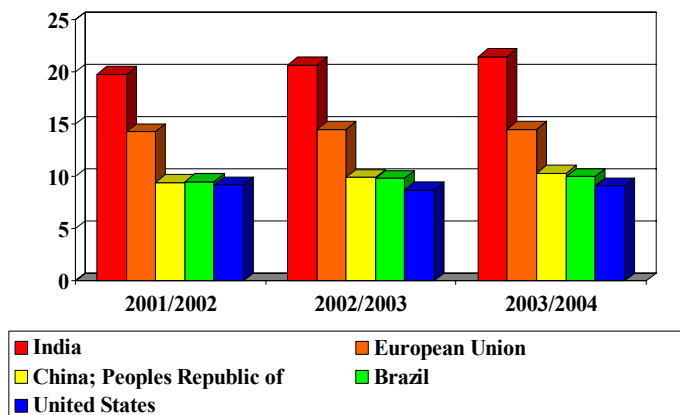
cultivated area. These data closely correspond with a Foreign Agricultural Service study, *Brazil: Future Agricultural Expansion Potential Underrated* - Jan. 2003 ([http://www.fas.usda.gov/pecad2/highlights/2003/01/Ag\\_expansion/index.htm](http://www.fas.usda.gov/pecad2/highlights/2003/01/Ag_expansion/index.htm)) by the Production Estimates and Crop Assessment Division. This study estimates that Brazil has about 358 million hectares of cultivatable land of which about 42 million hectares are under production. The area planted to sugarcane is substantially less than that planted to other crops such as soybeans, corn and rice. The major problem of expansion into new potential producing areas is the cost of development and the transportation of the products to the markets. Some of the family-owned sugar/alcohol groups have moved from the Northeast to the Center-South region where new lands are being brought into production and where sugar mills better coordinate their logistical systems to improve efficiency.

## Domestic Consumption

Brazil has the sixth largest population in the world and is now one of the world's largest consumers of sugar. Demand in Brazil is said to be price inelastic, which is to say that

### Principal Sugar Consuming Countries

Million Metric Tons



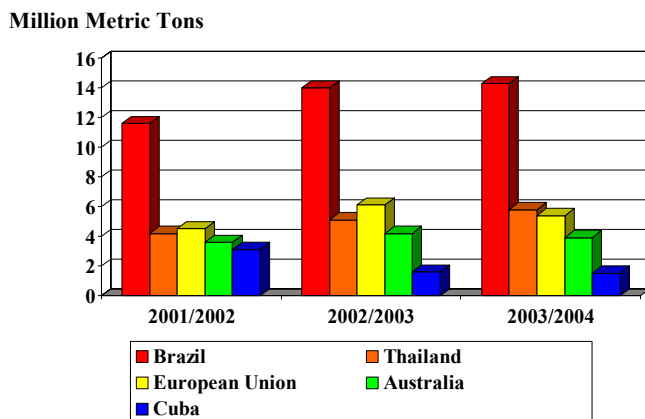
people will consume the same amount of sugar without too much respect to price. This means the quantity of sugar consumed within the country is driven by population growth, and sufficient income to afford more sugar containing products. Per capita domestic consumption of sugar grew from 49.9 kg in 1991 to over 57 kg by the

end of the decade. Industrial uses of sugar in soft drinks and candy bars, etc. exceeds 45 percent of total consumption.

A few sugar mills have made investments to add liquid sugar to their product lines and one mill has launched an effort to promoting “diet” sugar in the retail market. Diet sugar has 50 percent fewer calories than traditional sugar. Until about six years ago Brazil was the only major sugar producing country that consumed more product than it exported. However, even though domestic sugar consumption has steadily increased over the last decade, exports have risen at a faster rate, and currently exceed the quantity consumed domestically. The reasons for this are, the rise in the world price for sugar during 1998 to 2002, the devaluation of the real, and a softening of domestic alcohol prices.

## Exports

### Principal Sugar Exporting Countries



Brazil exports between 45 and 55 percent of its sugar; depending on supplies and market conditions. It is the world's largest exporter, averaging, in the last three years, around 13.3 million tons and accounting for about 30 percent of total world exports. The EU is the second largest exporter, averaging around 6 million tons. In contrast to the EU,

which exports only white or refined sugar, Brazil exports raw sugar to markets with refining capacity to manufacture white sugar as well as exporting domestically produced refined sugar. Primary markets for Brazil's raw sugar are Russia, Egypt, Iran, and the United Arab Emirates. The primary markets for the refined sugar are Egypt, Nigeria, India, Sri Lanka and Yemen. Although Brazil owns a portion of the EU sugar quota and a portion of the U.S. raw import quota, exports to these two markets are relatively small.

### Sugar and Fuel Alcohol

Brazilian sugar production and the production for fuel alcohol are closely linked by policies and market factors. Brazil no longer directly supports or subsidizes the production of sugar.

The only subsidy still in effect is R\$5.07/mt of sugarcane which may be paid out to Northeast sugarcane producers to equalize the cost of the production differential between the Central South and the Northeast mills. However it should be noted that this subsidy has been allocated but not paid out for the last few years.

### Background

Historically, Brazil intervened in the sugar market through production quotas, production subsidies, export control, and the management of export terminals. However, the various oil price crises in 1970's and the ever-escalating cost of importing oil created a climate for creating policies to reduce the need for imported oil. These events prompted the development of programs for promoting the production of sugarcane for the manufacture of alcohol to replace gasoline. The result of this effort was the formulation of the National Alcohol Program, known as "*Proalcool*". Initially, the program reduced the country's energy need by mandating the use of mixtures of anhydrous alcohol with

gasoline. By 1979, the program was expanded to promote the use of hydrous alcohol as a gasoline substitute. This second phase necessitated the introduction of alcohol-fueled cars. To make the use of the alcohol-fueled cars attractive, the Government assisted purchase of these cars through tax incentives and subsidized fuel prices. Eventually, alcohol fueled cars accounted for more than 90 percent of total auto sales between 1983 and 1988. By 1994 Brazil had more than 4.6 million cars powered totally by alcohol. However, as oil prices began to decline in late 1980's the government reduced the subsidies and thus reduced the production of alcohol. By the end of the 1990's the sales of alcohol-fueled cars amounted to less than 1 percent of total annual auto sales.

The trend is clearly away from cars operating totally on alcohol and moving toward more the use of vehicles equipped with flex-fueled engines. Technology now allows engines to run equally efficiently on the either gasoline, hydrated alcohol or any mixture of the two. The degree to which this new engine technology will affect the demand for alcohol is unknown. Nevertheless new car sales in Brazil run at about 1.2 million a year. This year Volkswagen will sell between 20 to 35 thousand flex-fueled engines cars sales between March and September 2003 reached 13,992 cars. Within a short period all of the automotive companies currently assembling cars in Brazil will produce models with flex-fueled engines in the near future.

### **Liberalization**

During the 1990's Brazil's sugar export market was opened to private enterprise and sugar price controls were eliminated. By 1999 Government decreed producer prices for sugarcane were eliminated. The result of this liberalization, inefficient operators were winnowed out and the industry restructured and consolidated.

Petro, the Government's monopoly on the exploration and refining of petroleum was eliminated in 1997. Prices for anhydrous alcohol were liberalized in 1997 and hydrous alcohol in 1999. As a result, the prices for alcohol declined as producers and distributors negotiated new arrangements. Prices for anhydrous alcohol are market driven, but from time to time the Government intervenes to purchase and sell the commodity at market prices to hold strategic /regulatory stocks. The Government also operates an Alcohol Storage Program to support producers holding alcohol stocks. Approximately US\$ 172.5 million are available for millers at 11.5 percent interest for the 2003/04 marketing year. Alcohol sales also benefit from a favorable excise tax break. Gasoline is taxed at R\$0.5709/L where as anhydrous alcohol is taxed at R\$0.06/L and hydrous alcohol is taxed at R\$0.0485/L.

### **Alcohol, Gasoline and Sugar**

Currently, it now appears that sugarcane is not produced so much for the production of alcohol as for the manufacture of sugar. The ratio of the output of sugar against that of alcohol is rising due to a complicated mix of factors including the world price of sugar, the world price of oil, the currency exchange rate, and the efficiency of producing both sugar and fuel alcohol.

According to some analysts, the costs of producing a barrel of alcohol in center-south Brazil is now about U.S. \$24 to \$25 compared to the cost of gasoline at U.S. \$27 to \$30. For the price of alcohol and gasoline to be equal the price of a barrel of crude oil would have to be U.S. \$20 per barrel. The OPEC target price range for oil is around U.S. \$24 to U.S. \$32 per barrel. Over the long term, the cost of oil may well continue to be problematic.

The introduction of the new flex-fueled engine introduces an added element of uncertainty into the world sugar supply and demand situation. The trade off between sugar and alcohol is one million tons of sugar equals 579 million liters of hydrated alcohol. Assuming each car would use only alcohol and consume 2,880 liters of a per year then one million cars would consume about 2.9 to 3 billion liters of alcohol which would be equal to 5 million tons of sugar. Theoretically, given sufficient crushing and distilling capacity, Brazil could use all of its current sugarcane production just to power a fleet of 5 million autos or it could produce just sugar and swamp the world market.

Clearly there is a cost/benefit ratio to producing both alcohol and sugar. Each year the Brazilian Government sets the percentage of ethanol that must be used in gasoline. Because Brazil accounts for 30 percent of world exports any change in policies that affect that supply will have some effect on world price. (See *Brazil's Domination of the World Sugar Market* from Arizona State University at [http://www.east.asu.edu/msabr/research/workingpapers/msabr0207\\_brazilsugar.pdf](http://www.east.asu.edu/msabr/research/workingpapers/msabr0207_brazilsugar.pdf)).

How much enthusiasm Brazilian motorists will have for flex-fuel cars is a big question. As is how much enthusiasm the Brazilian Government has for the alcohol program. In the 1980's Brazil imported about 80 percent of its oil. However, in the past few years the country has become increasingly self sufficient in oil production. The interplay between world prices for oil, and sugar mixed with world demand for environmentally safer biofuels may become increasingly complex.

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