

Agribusiness and biofuels: an explosive mixture

Impacts of monoculture
expansion on bioenergy
production in Brazil



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Index

Page 3

Agribusiness and biofuels: an explosive mixture

Impacts of monoculture expansion
on bioenergy production in Brazil

Page 10

Exportation of “virtual water”

Monoculture consumes the
country's most valuable resource:
fresh water

Page 13

Sugar cane

A history of destruction that
began in 1550

Page 16

Soy

The overgrown bean

Page 19

Eucalyptus and pinus

Unwanted “Forests”

Page 21

Good news about biofuels

Initiatives that can change Brazil

Introduction

The end of the petroleum era has been announced. The end of fossil fuel burning is in itself good news for humanity and for the atmosphere of the Earth: an opportunity to reduce global warming. We know that the said greenhouse effect is not, however, the only environmental problem we are facing. Likewise, environmental problems do not constitute the only challenge for Brazil and the world.

Biofuels – sugar cane alcohol, vegetable charcoal, biodiesel derived from castor bean, palm and soy – are an alternative not only cleaner, but also able to generate income for rural workers, promoting social justice. The availability of land and favorable climate makes it possible for Brazil to benefit greatly from the new era of energy's history that has already begun.

Brazil is already a huge producer of alcohol, soy oil and vegetable charcoal. A significant part of this production has been directed, in a growing manner, towards the external market. The monoculture regime under which these goods are cultivated, however, has resulted in great losses for society and the environment in Brazil. The concentration of land ownership, resources and income, the destruction of forests, the contamination of the air, soil and waters, the expulsion of rural populations from their lands are some of the scars that this model of production has been leaving on the territory, throughout our history.

In order for these new sources of energy to be classified as clean, renewable or sustainable, new production and consumption patterns need to be adopted. And, from cultivation to commercialization, family agriculture should play a central role. In contrast with the devastating model of agribusiness, new economic practices both social and environmental are underway. If these practices receive the necessary stimulus, they can be transformed into the fuel for democracy and social justice that Brazil so much needs.

Sergio Schlesinger

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Agribusiness and biofuels: an explosive mixture

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Clean energy! The world is entering a new era when it comes to energy sources. Substances known as biofuels are going to substitute petroleum derivatives. This is good news because the burning of gas or diesel oil causes serious environmental impacts worldwide. Even so, most of the motors today – that are responsible for the functioning of industrial machinery, automobiles, trucks, airplanes, tractors, energy generators etc. – run on petroleum. Petroleum, however, might end before 2040. Since time goes by fast, the world is already getting ready, searching this time for other less pollutant energy sources. The Earth and human beings are thankful for this because they will have much to profit from, but the producing countries might pay a high price, if certain concerns are overlooked.

The consumer will in fact use cleaner energy, but this is the last stage of a long process that starts in the rural areas, where the plants will be cultivated, in turn generating this new energy. We will deal here with this trajectory towards the production of biofuels, because in order to be classified as “clean and renewable”, this energy should not be produced as a result of deforestation and expulsion of family rural workers from their land in order to give place to monocultures in large properties.

Brazil can become one of the main suppliers of bioenergy in the world. The first step in this direction was already taken in the '70s with the development of the Pro-Alcohol Program for the large-scale use of alcohol fuel, that is produced from sugar cane. The product has now made a comeback, being exported to the United States, Japan, Holland, South Korea, among others.

The National Biodiesel Program, launched in 2006 and in the process of implementation, had as its initial goal the production of fuel from oils extracted from plants such as castor bean and palm. The project has a high potential for the creation of jobs, if its production model give preference to small rural farmers. However, the entrance of soy in this context is a red alert sign for it is necessary to evaluate how to transform the country into a great producer and exporter of biofuels without making this new era yet another cycle of exploitation of Brazilian natural resources destined mainly for the external market.

The international market for biofuels is expected to grow due to the high price of petroleum and to the commitment made by the developed countries that signed the Kyoto Protocol to reduce their emission of pollutant gases. The first goals¹ entered into force in 2005

Biofuels

Produced from renewable biomass (see table 1: Biomass generates biofuel).

Petroleum

Natural fossil fuel resource, therefore not renewable; an oil that is extracted from underground.

Renewable

That can be renewed or recuperated, with or without the interference of the human being, such as plantations, forests, solar light, wind and water.

Kyoto Protocol

International treaty with commitments to reduce gas emissions that provoke the greenhouse effect, considered the cause of global warming.

¹ These countries need to reduce their emissions of carbon dioxide by at least 5% relatively to the 1990 levels. The United States did not sign the document.

and should be met by 2012, being valid for 30 industrialized nations. The substitution of petroleum derivatives for biofuels is one of the alternatives planned by these countries.

The biofuel cycle should take 20 or 30 years, until ethanol production from cellulose and hydrogen – the fuel of the future – becomes commercially feasible. Before this takes place, Brazil should look for means of insertion in this market without repeating its history of social and environmental destruction.

TABLE 1

Biomass generates biofuels

Biomass – Generic name given to organic matter (plants, animal excrements, garbage etc.) that can generate energy. There are three processes of energy production from biomass:

1. Burning – Generates steam that can move a turbine that will produce electricity through a generator. Illegal deforestation for energy purposes, however, has already destroyed many forests worldwide. In order for burning to be considered a renewable source, it needs to be explored in a sustainable way. The ideal situation is to use residues such as biomass from agricultural and forestry wastes, avoiding to the utmost extent the planting of exotic trees, such as the eucalyptus, for this purpose.

2. Decomposition – Generates methane gas, also known as biogas, that can be used for heating purposes. In rural areas, animal excrements are used, especially those from cows and pigs. In urban areas, methane can be captured in urban waste landfills and from the sludge in sewer treatment systems.

3. Extraction and transformation – Process involving the extraction of oil or the obtaining of alcohol from some kind of plant. There are three types:

- **Hydrated alcohol** (hydrated ethylic alcohol fuel – AEHC) – Obtained from sugar cane, it is a perfect substitute for gasoline and diesel, once the motor is adapted. This Brazilian technology was encouraged by the government with the launching of the Pro-Alcohol Program, in the '70s. *Flex* modern motors (bi-fueled) already come from the factory adapted to run on alcohol and gasoline. Not to be mistaken with anhydrous alcohol (ethylic anhydrous alcohol fuel – AEAC) that is currently added to gasoline in Brazil in a proportion of 25%. Countries such as the United States, Japan and Korea are also promoting this addition.

- **Biodiesel** – Oils generated by plants such as castor bean, palm, sunflower, soy, jatropha, peanut etc. that can be used in pure form (*in natura*) as fuel in adapted motors; or transformed into biodiesel – through a process of “transesterification” – to be mixed with diesel derived from petroleum. This mixture can come in any proportion. From 2008 on, a mixture of 2% biodiesel² and diesel oil will be mandatory in Brazil; and from 2013 on, the mandatory percentage will increase to 5%. In small proportions, this mixed fuel does not require the motor to be adapted. Through the abbreviation found on the product, it is possible to know the biodiesel concentration existent in the petroleum: B2, B5 and B20, for example, indicate a biodiesel concentration of 2%, 5%, 20%, respectively. B100 means pure biodiesel.

Transesterification

Separation process of glycerine from vegetable oil; this is one of the stages of biodiesel production.

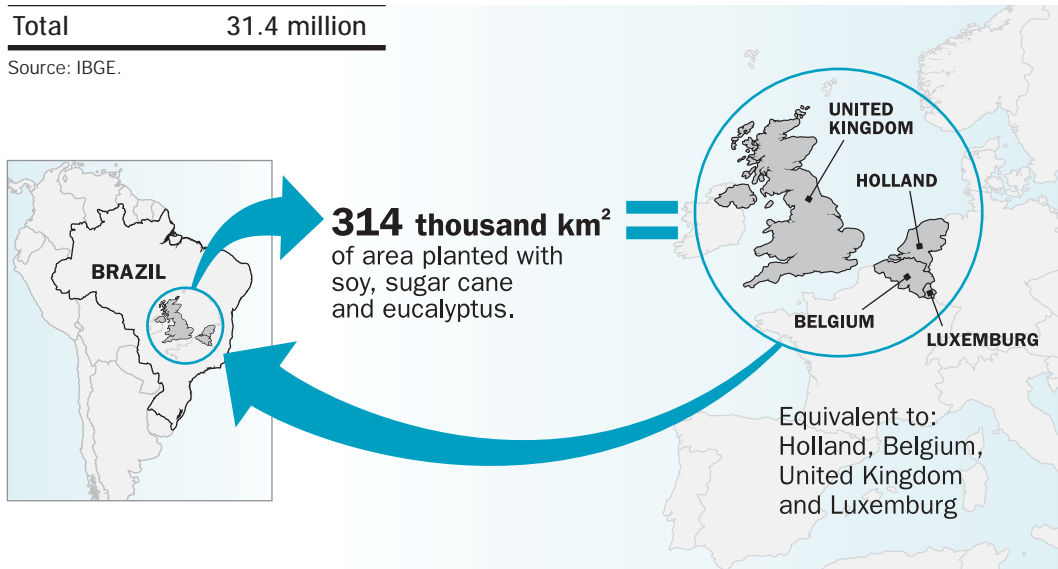
- **H-Bio** – Newest fuel developed by Petrobras in Brazil, to be launched in the market in 2007. It is different from biodiesel due to its production process, but both bring a percentage of vegetal oil added to petroleum diesel. In this first moment, the state company chose soy oil due to its high production and availability in the country, around 5.6 million tons per year, in contrast with less than 200 thousand tons per year of oils derived from other products or grains such as the castor bean, that is much richer in oil content than soy.

² This will call for a production of about 840 million liters of biodiesel per year.

Current cultivated area (ha)

Soy	22.2 million
Sugar cane	6.2 million
Eucalyptus	3.0 million
Total	31.4 million

Source: IBGE.



Main impacts

There is a lot to worry about. Since the clear-cutting of *pau-brasil* (brazilwood) in the 16th century, Brazil has been exploiting its natural resources to an utmost extreme, in order to sell them to foreign countries. In the case of biofuels, two rising “stars” – sugar cane and soy – are currently being cultivated in a regime of monoculture in huge properties.

Eucalyptus is also included in this debate since part of its production is transformed into vegetable charcoal, that is used as engine fuel by many companies. The iron and steel sector is the biggest consumer of vegetable charcoal. Much like soy and sugar cane plantations, eucalyptus cultivation is mainly done through monoculture systems in huge properties.

The impacts of monoculture have multiplied over the last years:

- illegal deforestation in order to make place for new sugar cane, soy plantations, or eucalyptus forests;
- expulsion³ of small farmers from their land, sometimes through the use of violence⁴, generating rural conflicts;
- land concentration⁵ in the hands of *latifundio* owners, in some cases in areas donated by the government;

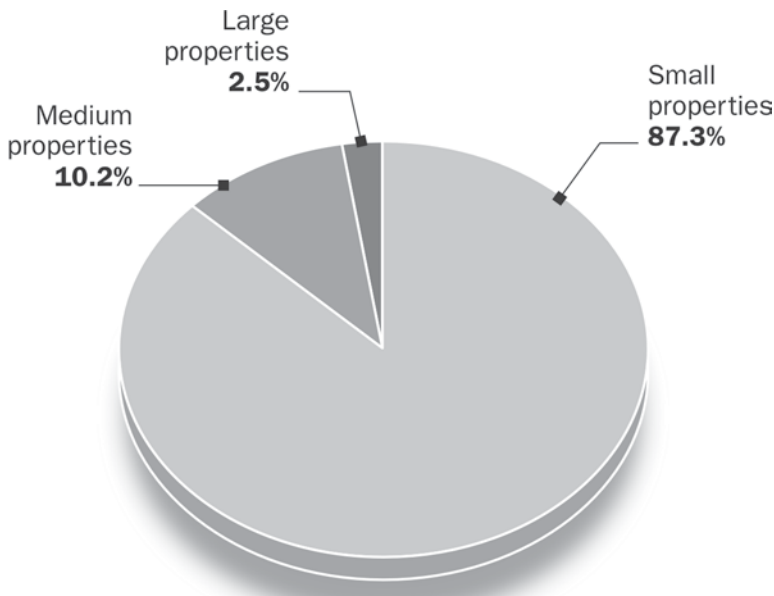
3 Between 1999 and 2001, 5.3 million people abandoned the rural areas, according to the Instituto Brasileiro de Geografia e Estatística (IBGE), that also detected the closing of 941 thousand rural establishments between 1985 and 1996, 96% of them with an area inferior to 100 hectares.

4 Between 1990 and 2002, the Comissão Pastoral da Terra (CPT) registered 16 assassinations connected to the sugar cane industry.

5 According with the Atlas Fundiário do Instituto Nacional de Colonização e Reforma Agrária (Incra), 3% of the rural properties in the country are latifundios (that is, have more than a thousand hectares) and take up 56.7% of the lands destined for agriculture in Brazil.

- intensive use of agrottoxics and other agrochemicals, threatening the health of farmers and the population of nearby areas, mainly when pulverization by air-planes takes place;
- contamination of the soil, rivers, subterranean and spring waters, due to deforestation and the high quantity of chemical products used in monoculture areas, as well as *vinhaca* (sugar cane industry liquid waste) disposal in soil and rivers;
- rural and urban poverty, because besides the expulsion of small farmers from their lands, monoculture hardly creates jobs⁶. With no option, many rural workers move to the periphery of the cities.

Creating jobs in rural areas



Source: Ariovaldo Umbelino, taken from "A OMC e os efeitos destrutivos da indústria da cana no Brasil" Cadernos de Formação 2. April 2006. Rede Social de Justiça e Direitos Humanos e Comissão Pastoral da Terra.

Jobs in the main agribusiness activities in Brazil. Ratio of man/year, for each 100 hectares, in 2000.

Activity	Number of jobs	Activity	Number of jobs
Cattle for meat	0.24	Orange	16
Eucalyptus*	1	Castor bean	24
Soy	2	Potato	29
Corn	8	Manioc	38
Sugar cane	10	Coffee	49
Bean	11	Onion	52
Rice	16	Tomato	245

Source: Fundação Seade/Sensor Rural, cited by Sachs (2004).

According to Laschefski (2005), one person for each 100 to 150 hectares, forestry activities and charcoaling of wood included.

⁶ The rural activities that least generate jobs are: sugar cane, corn, soy, eucalyptus and cattle raising, precisely those that happen most of the time in great properties.

These are the impacts that have already been detected due to the growth of agribusiness in Brazil. Biofuels come in as one more demand that can worsen the situation. Through a monoculture regime, it is not possible to promote the sustainable development of Brazil.

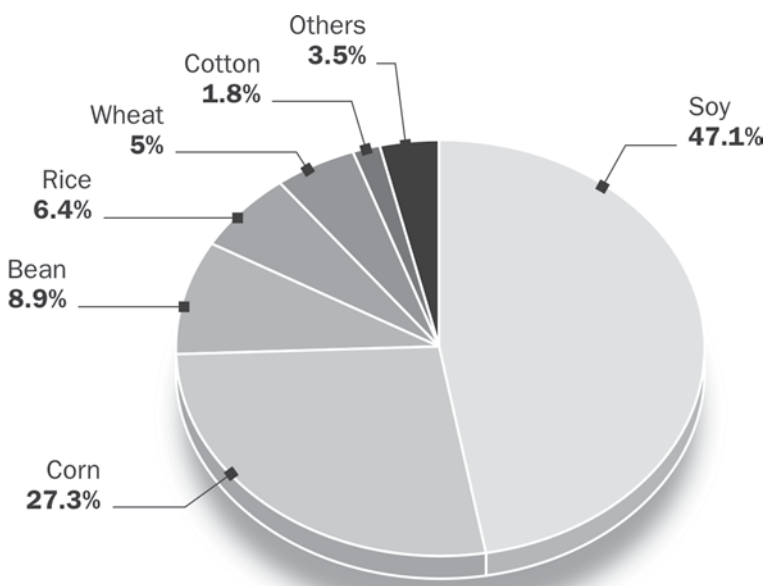
Economic growth in the richer countries has as its main focus the development of technology, the exact opposite of commodities, that bring less financial return as time goes by. That is, each year Brazil needs to exploit more of its natural resources in order to obtain the same revenue – contrary to developed countries, that obtain more return as they launch new products in the international market. Brazil nonetheless stimulates agribusiness as a form of increasing its exportations.

But this path has no future because competitiveness is based on technological innovation. Of biofuels produced in the country, only alcohol and H-Bio derive from national technology.

Moreover, the increase in this type of plantation affects the production of food for human consumption, threatening locally Brazilian population's food security. Family farmers, that are responsible for most of the food production (60%) in Brazil, are suffering expulsion from rural areas due to the increase of monocultures.

Brazil will therefore will have to choose at some point between feeding its population, or cars and machines worldwide. The estimated agriculture production rates for the state of São Paulo in the 2005/06 harvests point to a reduction in the cultivation of tomatoes, peanuts and oranges, that are being substituted by sugar cane, according to the Institute of Agricultural Economy of São Paulo state (IEA). Estimates from the Companhia Nacional de Abastecimento (Conab) for the coffee harvest indicate a cultivated area reduction of 2.63% in Minas Gerais, 4.15% in Espírito Santo and 7.66% in São Paulo, as a result of the increase in sugar cane production in the Southeast region.

Distribution of grain cultivated area in Brazil



Source: Conab (July circular, 2006).

Agribusiness

This denomination includes all sectors related to cattle raising and agriculture, such as transport, goods, industry and distribution.

Sustainable development

Development that is sustainable, bringing long-term benefits to the population as a whole, based on the balanced use of natural resources and on the improvement of human life quality, with the guarantee of conserving these conditions for future generations.

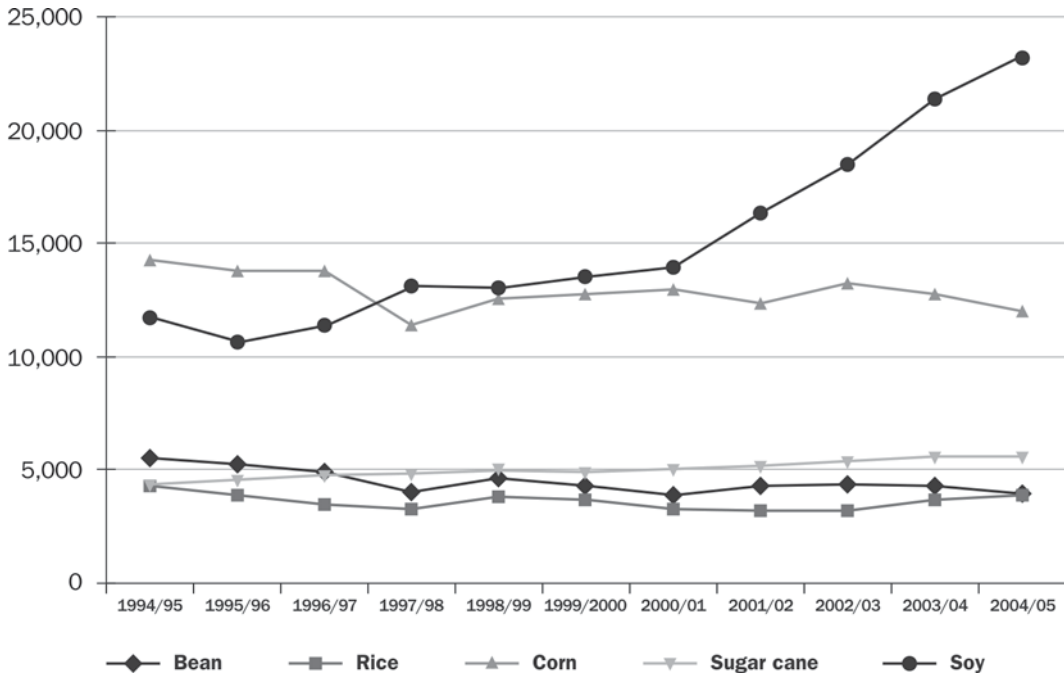
Commodities

All goods in a raw state or with very little level of industrialization, negotiated through international commercial transactions. This includes agricultural (soy and sugar cane) mineral (steel) and forestry (eucalyptus) goods.

Food security

When people are guaranteed physical and economic access to a sufficiently nutritious diet in order to promote an active and healthy life (FAO definition).

**Cultivated area in Brazil between the harvests of 1994/95 and 2004/05
(in thousands of hectares)**



Source: Conab.

Public policies

As we will see further, Brazil can choose a path that is environmentally and economically fair, capable of promoting social inclusion and improving the life quality of the population. There are good examples of this, but Brazilian governments and financial institutions generally support businessmen, owners of large-scale properties and multinational corporations, instead of family farmers.

This happened, for instance, with the large-scale cultivation of sugar cane from the '70s on, after the creation of Pro-Alcohol, and it seems to be already happening with the Biodiesel Program, according to the Movimento dos Pequenos Agricultores. In a circular published in June, 2006, the entity affirms that the Brasil Ecodiesel⁷ company, one of the pioneers in this sector, is proposing an integration system similar to tobacco, a model that makes farmers dependent on the industry. In this system, the company finances the various stages of cultivation, supplying the necessary goods – seeds, chemical products and others – in exchange for preference to buy the harvest. In August of 2005, the company implemented a castor bean biodiesel factory in Piauí. Although it is not mandatory yet, biodiesel B2 is already being commercialized in some petrol stations such as BR Distribuidora, that belongs to Petrobras.

When it was launched, the Biodiesel National Program expected a participation of 100 thousand families by the end of 2006, a good part being involved with the cultivation of castor bean, palm and other plants appropriate for small properties. In order to promote

⁷ Since 2005, Ecogreen Solution, a German company run in the United States and controlled by the Ecogreen fund, of the Deutsche Bank (German Bank), holds 50% of Brasil Ecodiesel's preferential capital and 45% of its voting capital.

this inclusion, the Ministry of Agriculture Development emits the “Social Fuel Label⁸” and offers various economic advantages⁹ to biodiesel producers that buy their raw material (oil or grains) from family farmers.

According to the company Brasil Ecodiesel, without these incentives, no businessman in “his right mind” would buy the product from North or Northeast family farmers.

“These advantages are absolutely essential because in their absence no businessman in his right mind would hesitate a second between using ten tractors in the South or Midwest in order to produce soy oil or signing joint venture contracts with a thousand settled families in the Northeast to produce the same volume of castor bean oil.”

Brasil Ecodiesel, extracted from www.brasilecodiesel.com.br

The commentary above makes it clear that if soy cultivation is granted the same advantages, family agriculture will be set aside, threatening the social aspect of the National Biodiesel Program. Soy producers have been pressing the federal government to extend the incentives to large-scale production.

“We are not against the support that is given to family agriculture, we understand it to be necessary, but we cannot accept the creation of privileged casts in this or that segment of the productive chain.”

Antônio Ernesto de Salvo, president of the Confederação da Agricultura e da Pecuária do Brasil (CNA), cited by “Biodiesel já nasce polêmico”, by Humberto Azevedo, extracted from http://www.bndes.gov.br/conhecimento/seminario/Biodiesel_granol.pdf

Ernesto de Salvo (above) forgot to mention that the rural elite is granted innumerable advantages by the federal, state and municipal governments. One of them is historical: the way the acquisition of public land, responsible for the creation of immense properties in the Midwest region was facilitated. This part of Brazilian history helps explain the origin of land concentration and national income distribution.

One of the examples comes from the state of Tocantins. Helped by a decree established in 1997, José Wilson Siqueira Campos, state governor at the time, disappropriated and donated 105 thousand hectares of land situated in the Campos Lindos municipality to people that were well related to the public power. Among the beneficiaries were the ex-president of Infraero Adyr da Silva and the ex-minister of agriculture Dejandir Dalpasquale. Almost all of the families that lived on these lands, some for over 50 years, were forced to leave.

Another historical facilitator is the easy access to rural credit. According to the ex-minister of Agricultural Development Miguel Rosseto, patronal agriculture consumes R\$ 3.00 of every R\$ 4.00 of loans granted by public organs. That is, it is left to small-scale agriculture only R\$ 1.00 of each R\$ 4.00 available. ●

⁸ Organizations such as CUT, Contag, Fetrat and MST affirm that the seal reduces the role of family farmers to that of mere suppliers of seeds; it does not look to promote productive organization in cooperatives in order for the families to act effectively in the sector.

⁹ Fiscal and tributary benefits, such as the reduction of PIS/Pasep and Cofins percentages; access to better financing conditions from official banks such as Banco do Brasil, Banco do Nordeste, Banco da Amazônia, BNDES; and right to participate in the auctions of the Agência Nacional do Petróleo (ANP) in order to sell their production.

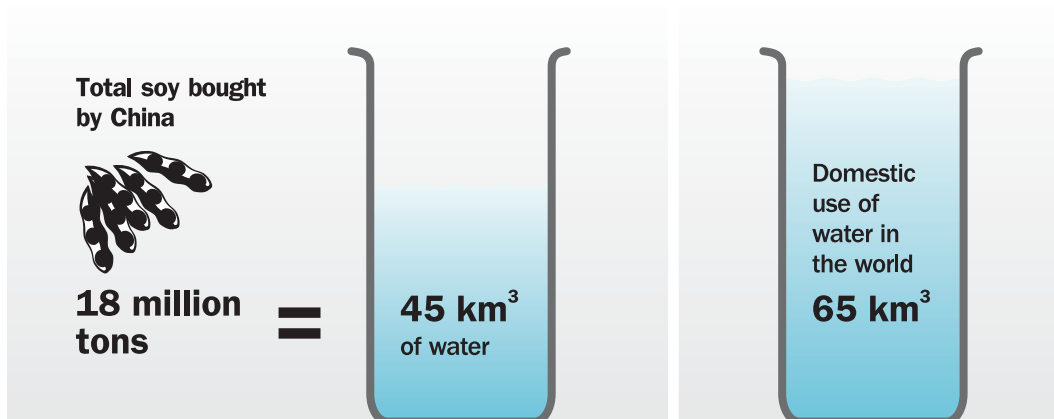
Exportation of “virtual water”

Monoculture consumes the country’s most valuable resource: fresh water

One of the factors that stimulates agribusiness in Brazil – that is now making a comeback in the production of biodiesel – is the “availability” of fresh water in the country. This expensive resource is in extinction in the developed countries and also in China¹⁰, where rivers and groundwater are so contaminated that they do not allow the growth of local agriculture. But the misuse of hydro resources in soy, sugar cane and eucalyptus plantations, for instance, endangers the future supply of water in Brazil as well, especially due to the expansion of monoculture.

According to the United Nations (UN), in the year 2025, one out of three countries in the world will have its development hampered by lack of water. Brazil needs to take care of itself, because it has one of the highest rates of water wastage in the world.

In order to give an idea of the volume of water indirectly exported along with monoculture products, let us take China as an example. This Asian giant bought 18 million tons of soy in 2004, not only from Brazil. In order for this quantity to be harvested, the producing countries used in their plantations around 45 km³ of fresh water¹¹. This way, China indirectly “bought” this quantity of water contained in the soy.



Source: “Água virtual: a água que consumimos sem ver”. Vânia Rodrigues, www.aesabesp.com.br/artigos_agua_virtual.htm.

In Brazil, the problem affects rural populations first, since more than 80% of them derive the water directly from rivers or groundwater. Some regions in the country already suffer the contamination of water with chemical products used in the plantations, while others face the problem of the disappearance of springs. In Santarém and Belterra, two cities that are leaders of soy production in the state of Pará, North of Brazil, the population talks about the disappearance of many small rivers after the arrival of large-scale farmers.

¹⁰ Country that most imports soy worldwide, followed by the European Union and Japan. Between 1994 and 2005, its demand for soy meal increased by 15% per year.

¹¹ This quantity is equal to two thirds of all water used for human consumption in the whole world.

“Many important small rivers have disappeared, actually these water courses are very important for cattle raising and also for the survival of the families that lived on the margins of these rivers. We have the example of the Cedro river, on the 130 km mark of the Santarém-Cuiabá¹² road, that was the biggest one in our region. In the last years, its volume of water started to decrease in number and quality, because the area where the springs of these waters comes from is situated within a large property that was used for soy cultivation. The river is completely dry; we have today 10 km of dry riverbed, and we are monitoring whatever is left of the water, but it is still a very small volume of water, without its original color, which was clear and bluish. Today the water is muddy, with the presence of a lot of fermented material in it, especially stems, leaves, wood, because the tractors cut down the ciliar forest, in most cases they throw out the forest, the wood, inside the rivers, completely covering up the area of their springs.”

Edson Azevedo, from the Instituto Manancial, Santarém, Pará

An important aspect of this situation is the type of soil in which the monoculture is being implemented. The Cerrado¹³ has suffered severe impact. To give an example, in the certified eucalyptus plantations of the company Mannesmann Florestal Ltda., called today V&M Florestal Ltda., great storage of water in soil was found along with the diminishing Cerrado vegetation, in comparison with the eucalyptus plantations. We should also consider that the new species of eucalyptus, that take less than 6 years to grow, consume even more hydro resources in the country.

“Before we had the eucalyptus in this area right there, it was good because we had water all around. Then these people came and planted the eucalyptus there. They say the eucalyptus sucks in a lot of moisture, right? All the springs are dry, see! A place right here, see, by the name of Morro Redondo, up here, the people lived on everything over there, there was water, it didn’t dry up, today there is no water. Not even the little birds are there anymore, right? So, it’s all devastated. It’s all a desert.”

Man from the Mutuca de Baixo community, Virgem da Lapa municipality, Vale do Jequitinhonha, Minas Gerais. Commentary collected by the Grupo de Estudos em Temáticas Ambientais (GESTA/UFMG)

In sugar cane cultivation, a few good practices were developed that might contribute to water reuse and prevent wastage, such as the use of *vinhaca* in the ferti-irrigation. These techniques allow the improvement of the quality of hydro resources and the diminution of chemical fertilizer consumption, avoiding this highly pollutant wastewater to be disposed with no control in water courses and soil.

Ferti-irrigation

Reutilization of the water used to wash sugar cane in closed circuits or processed in decantation lakes. Vinhaça (a fermentation residue) is pumped back to the sugar cane fields and used as fertilizer.

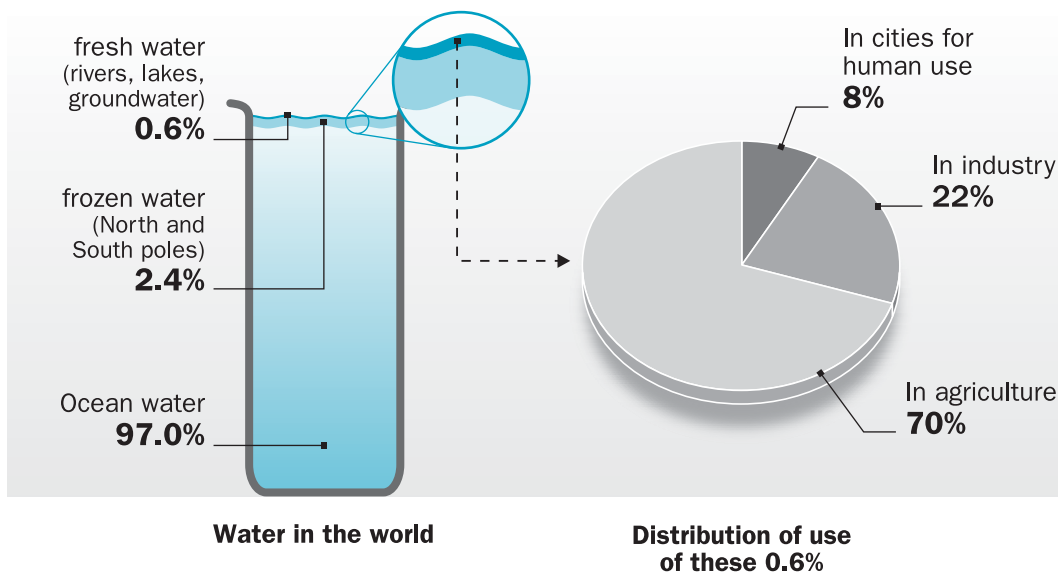
The practice of burning sugar cane before harvest, though, makes the situation worse because it leads to a higher rate of water use in the cities situated around the plantations. Data from the Department of Water and Sewer System of Ribeirão Preto, in the state of São Paulo, points to an increase of 50% in the levels of water use during the harvest season. This happens because people end up washing their backyards, driveways and clothes that hang out to dry washing many times their driveways, due to the ashes blown into the atmosphere.

¹² The proximity of BR-163 is of extreme importance to facilitate the transport of production. Infra-structure projects such as this constitute another factor of stimulus to the deforestation that leads to monocultures.

¹³ Of the 204 million original hectares of Brazilian Cerrado, 57% have already been completely destroyed and half of the areas that are still left is very affected. Nonetheless, the Ministry of Agriculture affirms that there are still 70 million hectares available for cultivation in this biome. (http://www.agricultura.gov.br/portal/page?_pageid=33,982677&_dad=portal&_schema=PORTAL).

Another serious problem is the quantity of chemical products thrown into the soil and rivers. Brazil is amongst the biggest agrochemical consumers in the world, using calcium carbonate, magnesium, NPK, special composts with iron, manganese, boron and pesticides for combating insects and weeds. Of the 150 thousand tons of pesticides consumed every year in Brazil, 33% are herbicides. The cultivation of sugar cane is responsible for the use of 20 thousand tons, that is, 13% of total herbicide consumption (Cerdeira, *et al* 1998).

In order to have an idea of the problem's dimension, Embrapa verified, in 2002, the contamination levels of agrotoxics in the Aquifer Guarani¹⁴, that supplies water to hundreds of cities in the central region of the country, 60% of the municipalities from the state of São Paulo alone, among which Ribeirão Preto, the world's greatest center of sugar cane production. ●



Waste: use in plantations per hectare/year

Northeast of Brazil	18 thousand m ³
Israel	600 m ³

Source: www.springway.com.br/agua_mundo.htm

¹⁴ A natural reservoir of underground water that takes up 1.2 million km² in the states of Goiás, Mato Grosso, Mato Grosso do Sul, São Paulo, Paraná and certain areas in Uruguay, Paraguay and Argentina.

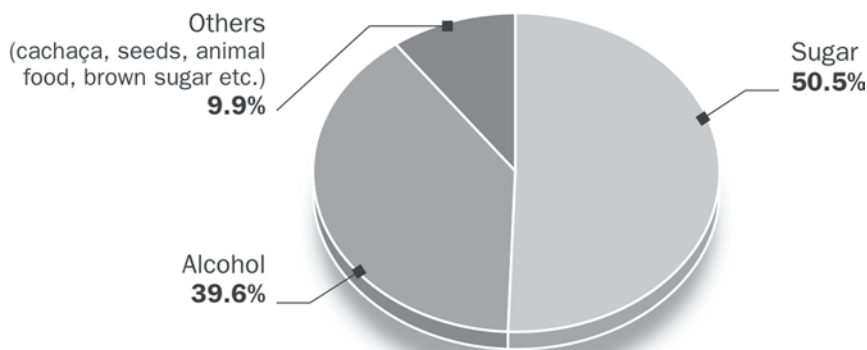
Sugar cane

A history of destruction that began in 1550

The implementation of sugar cane monocultures in Brazil is much older than the soy plantation, brought to the country only in the last century. Sugar cane cultivation started in 1550, being accountable for the most expressive wave of deforestation that occurred in the Brazilian Northeast region. In the Southeast¹⁵ and South, expansion started in the beginning of the '70s, stimulated especially by the petroleum crisis. The most affected biome was the Atlantic Forest¹⁶, one of the ecosystems that is most endangered and that has the greatest biodiversity in the world.

Currently, the planted area is expanding throughout the states of the Midwest¹⁷, in the Cerrado biome. Studies undertaken by the NGO Conservation International Brasil (CI-Brasil) indicate that the Cerrado vegetation will probably disappear before 2030. Its rich fauna and flora diversity has been increasingly destroyed to give place to cattle grazing land and plantations in monoculture regimes: first, soy, and, more recently, sugar cane.

Sugar cane derivates



Source: Conab (year: 2006).

In 2005, half of the harvest was destined for the production of sugar and around 40% went to the alcohol mills. These percentages might invert, however, in the next years. The greatest demand for ethanol occurs in the internal market, due to the increase in vehicles adapted for biofuels (flex), and in the external market as well, because of the rise in the prices of petroleum. The expansion of the sector has surpassed the expectation of the sugar cane industry that, in 2000, imagined it would produce 5 billion liters of alcohol in 2005. Instead, 16.5 billion liters were produced, among which more than 2 billion were exported.

In order to deal with the estimated demand, Brazil will need to produce, in seven years, around double the quantity of ethanol and 44% more sugar, whose sales to other countries

¹⁵ The Southeast region is responsible for a constant increase in the production and currently produces 88% of all sugar cane, 89% of all alcohol and 90% of all the sugar in Brazil (IEL, 2006).

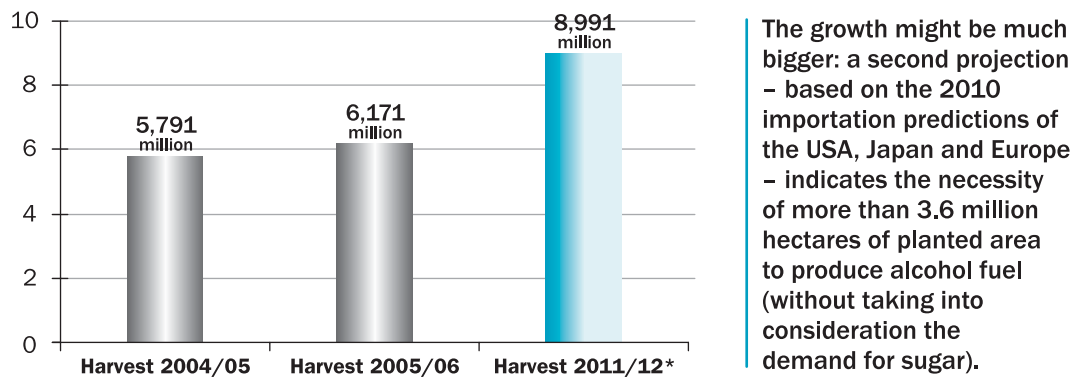
¹⁶ Originally occupied 15% of the Brazilian territory, from Rio Grande do Norte in the Northeast, to Santa Catarina, in the South region. Today only 7% of its original area exists.

¹⁷ Especially in Goiás, where the cultivated area increased in 81% between 1999 and 2003; it represents 6.6% of the sugar cane production in the country.

have also increased. In fact, Brazil has the lowest sugar production cost¹⁸ in the world, but in order to accomplish such task, the sector exploits labor and has no commitment to environmentally sustainable practices.

Most part of the cultivation takes place on properties that belong to the 340 sugar mills and alcohol distilleries that control this market; but 27% of the production comes from the 60 thousand suppliers that plant in areas that are smaller than 150 hectares, according to the Ministry of Agriculture, Cattle Raising and Supply. However, the so called “suppliers” are often people who live in urban areas and rent their land for sugar cane production, not necessarily working as family farmers.

Cultivated area expansion (in ha)



Source: IBGE (* Klemens Laschefski and Wendell Ficher Teixeira Assis, based on CGEE, 2005).

Degrading work conditions

The sector hires approximately a million people, of which 511 thousand work for agriculture, most of them cutting sugar cane: around 80% of Brazilian sugar cane production is manual. It is one of the most degrading types of work in the country. Sugar cane cutters are paid for their daily work only if they meet a pre-established production quota. In the region of Ribeirão Preto, interior of São Paulo, the average quota per worker is 12 tons per day – double of what it was in 1980.

According to the Pastoral do Migrante, 14 people died cutting sugar cane during the harvests of 2004/05 and 2005/06, due to the excess work load. They were workers aged between 24 and 50 years, from Minas Gerais, Bahia, Piauí and Maranhão states.

On the positive side, there was a decrease in child labor¹⁹ in the last decade, that, however, can be explained partly by the increasing unemployment of adults in the rural sector due to the intensive mechanization process of large-scale plantations.

Even in the rich region of Ribeirão Preto, the farmers contract supervisors that, in turn, hire and control the workers. Many are hired in other regions of the country and come to work deluded. They only discover the true work and living conditions upon arrival. They live on the farms, in cabins with no mattresses, water or stove, cook in cans over small campfires and buy their food in the farm paying sums that are well-over market prices. In Ribeirão Preto, the sugar cane cutters pay R\$ 1.50 for a kilogram of sugar.

¹⁸ In the state of São Paulo, the cost is US\$ 165 per ton; in the European Union, that produces sugar from beets, the cost reaches US\$ 700 per ton.

¹⁹ In 1993, one out of four sugar cane cutters in the state of Pernambuco was aged between 7 and 17 years, almost half of them received no salaries. Parents often take their children along to help meet the production quota.

Many agree with these conditions because they lack options. Even in São Paulo, seven out of ten sugar cane cutters did not finish basic grade school. Most of them have difficulties in finding work because they lack of qualification. The commentaries²⁰ of sugar cane cutters, collected in farms in Ribeirão Preto, show what life is like in this market:

“(The supervisor) comes lying to us, saying that we will earn almost 180 per month, even 350. (...) Then, when we get here, we thought it was something else: ‘you can buy a television, you can buy a sound system, you can buy this and that. You can get everything there’. Then, we think it is true, we come here deluded and go back regretful.”

Sugar cane cutter

“A ton of sugar cane is 100 bundles, but on his scale (the supervisor’s) there can’t be 100. We have to put in 110, because 10 is for them.”

Sugar cane cutter

“The coupon? We work and he hands out a piece of paper, he scribbles on the paper and gives it to the person to use at the supermarket. We never see any money, we only see the bill, the total sum that we earn, he puts on a little piece of paper and we buy stuff worth the amount that he wrote on the paper.”

Sugar cane cutter

“My money here with sugar cane sometimes I earn some; sometimes I don’t. Sometimes I earn 20 bucks, 25, 18 (per day). Now, there are days that I don’t earn anything. I just go home.”

Sugar cane cutter

“There’s no water. We bathe in that little river that you see there. We can even contract a disease.”

Sugar cane cutter

“Once, when the airplane went by showering poison, my father, he was drenched (...), he became really ill with the poison that they use. So, that poison is really ruining a lot of young people. The old people say that when you get old you die, but that is not it, disease is coming from the sugar cane.”

Ex-sugar cane cutter

In some farms, manual harvest of sugar cane, done after burning, is now substituted by machines that can do the work of at least 100 people (Ustulin *et al.*, 2001). Mechanization depends on the topography because harvest machines can only be used in areas with a slope of up to 12%. In the mountain areas of Pernambuco, for example, almost all of the cutting is done manually, while the level of mechanization in the state of São Paulo is already at 30%, with a tendency to grow (Teixeira, 2002). According to the estimates, the use of machines should reduce by more than half the number of jobs generated by the cutting of sugar cane.

The harvest machines have not reduced the burnings²¹, since the productivity of the machines in the cutting of burned sugar cane is superior (up to 30%) to dry sugar cane. Given this, burning practices go on in most of the cultivated areas (80%), resulting in great environmental damage and provoking respiratory problems among the local population and those who live in neighboring municipalities as well. In Piracicaba, interior of São Paulo, for example, the number of hospitalizations of children and adolescents with respiratory problems increases by 21% in the periods of sugar cane burning in the region (Arbex, 2004). ●

²⁰ Extracted from the documentary “Bagaço”, produced by the Comissão Pastoral da Terra (CPT) and by the Rede Social de Justiça e Direitos Humanos, in 2006.

²¹ A state law in São Paulo expects the gradual reduction of burned areas until this practice is extinguished in 2021, in the mechanized areas, and in 2031, in the non-mechanized areas.

Soy

The overgrown bean

The cultivation of soy in Brazil and in the world increased incredibly from the 1990s on, stimulated by the increase in the consumption of soy meal by confined animals, above all chickens and pigs. This was the reason that gave a thrust to soy cultivation and made Brazil the second biggest world producer and exporter²² of the product, only falling behind the United States.

The process of grain crushing transforms around 80% of the soy's volume into meal and the rest into raw oil. The oil in average represents between 18% and 20% of the grain's weight²³. In the last years, many uses have been created for this raw oil. Besides the traditional refined soy oil used by most of the Brazilian population to cook, soy generates hydrogenated fat, margarine, soy lecithin paints, cosmetics, pharmaceutical and medicinal products, among others. Biodiesel production is its most recent commercial use; the current interest in soy meal might change when this oil-giving plant enters the biodiesel market: raw soy oil, currently a byproduct, will be worth more, being even more valuable than soy meal.

Soy world production (millions of tons)

Country	2005	Part. %	1995	Part. %
United States	85.0	39.5	59.2	46.7
Brazil	51.1	23.7	25.7	20.2
Argentina	39.0	18.1	12.1	9.5
China	17.4	8.1	13.5	10.6
Others	22.8	10.6	16.5	13.0
Total	215.3	100.0	127.0	100.0

Source: USDA.

We can foresee some of the problems resulting from soy biodiesel:

- Increase in the price of refined soy oil, an important item in the daily diet of the Brazilian (in 2006 alcohol fuel increased in value, precisely because of the expressive growth in exportations. If exportation proves a better deal, the producer will prefer to sell in the external market, leading to lack of supply in the internal market. Less offer of the product will increase its prices. The same might happen in the future with soy).
- Greater control of agricultural product prices and of fuels by transnational companies, because of the products' connection with petroleum, similar to what happened with alcohol fuel:

²² One out of three kilograms of soy that is commercialized in the international market is Brazilian. National production has gone up four times, going from 12.1 million tons in 1976/1977 to more than 50 million tons from the 2004/2005 harvest, according to the Companhia Nacional de Abastecimento (Conab).

²³ In the case of castor bean, 48% of its weight is transformed into oil.

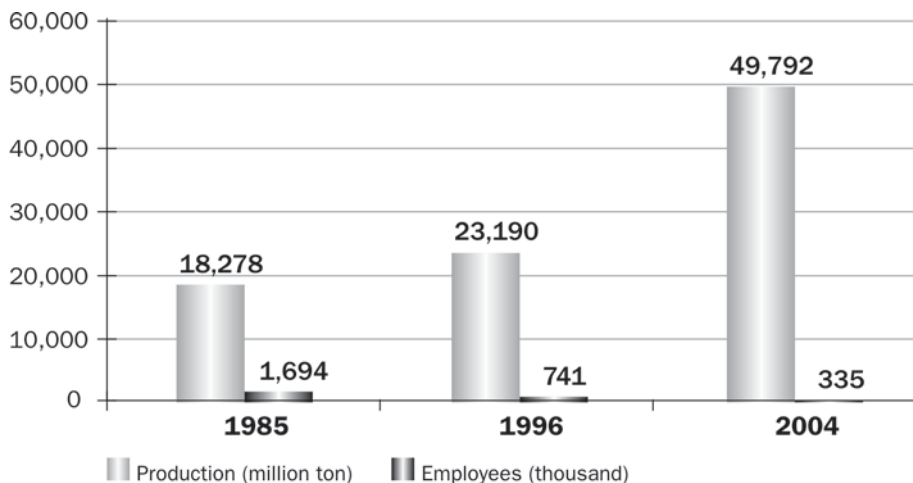
“The circle closes in when we see almost the whole production of soy in the hands of foreign corporations²⁴. There is superproduction of soy oil in Brazil because soy’s main product is precisely meal for animal feeding, almost totally exported to Europe and the United States. The oil is a byproduct that is currently abundant in refineries. The remedy to do away with this surplus²⁵ is to demand that Petrobras mix it as biodiesel with common diesel, guaranteeing that our enormous energetic potential remain in the hands of imperialist countries.”

Artur Augusto Alves, from Soyminas Biodiesel, interviewed by José Ricardo Prieto (“A experiência da produção em massa de biodiesel”, in www.anovademocracia.com.br)

Dangers of a new cycle of expansion

The concern is that the incentive to biofuel production might stimulate the expansion of soy cultivation under the same conditions verified in the last years, that is, based on the expulsion of small farmers, rural workers and indigenous people, violation of human and work rights; environmental destruction; concentration of land and income.

Brazil – Production and number of jobs in soy agriculture



Source: “O grão que cresceu demais”, by Sergio Schlesinger, based on FIBGE data (1985) and Gelder *et al* (2005).

The areas of cultivation expansion are concentrated in the Amazon and in the Cerrado, two of the biomes most abundant in biodiversity in the planet. Their forests, waters, animals, traditional peoples and cultures are being affected by soy, the same way they were when cattle arrived in the region.

Nonetheless, according to the president of the Associação Brasileira da Indústria de Óleos Vegetais (Abiove), Carlo Lovatelli, soy will be the “queen” of biodiesel. In order for this to happen, he sees the necessity of increasing by 5 million hectares²⁶ the area of soy cultivation.

Biomes

Name given to each community from nature that is composed by specific fauna and flora, generally with a predominant species of vegetation. Brazil has six biomes: Amazonia, Cerrado, Caatinga, Atlantic Forest, Pantanal and Pampa.

²⁴ The sector is controlled by North-American companies ADM, Bunge and Cargill and by the French company Coinbra, of the Louis Dreyfus group. All four negotiated around 60% of Brazilian soy grain, oil and meal exports in 2005 and crushed 60% of the grains destined for the internal market.

²⁵ The surplus capacity is 10 million tons of raw soy oil per year, according to the president of the biodiesel commission of the Associação Brasileira das Indústrias de Óleos Vegetais (Abiove), Juan Diego Ferrés.

²⁶ This increase is equal to the area that is today occupied by sugar cane plantations in Brazil. Soy already takes up 22 million hectares, equivalent to five times and a half the size of Holland.

Bad examples

The expansion of soy in the Midwest and North strongly affected the life quality of the rural population, according to field research promoted by FASE throughout 2006. When closely analyzed, the reality of the interior of the country presents itself very differently from the image of development and progress that the government and agribusiness businessmen attempt to transmit to the rest of the nation. The farmers explain what happens:

“They say Campos Lindos is full of riches, but how is that possible? Where does the soy richness go to? It doesn’t stay here. If it does, it is in somebody’s pocket. The future looks very grim for us.”

Adão Macaxeira, squatter peasant on the Sussuarana farm, in Campos Lindos, municipality that produces most soy in the state of Tocantins

“Because they say that, the big ones come and bring progress to the region. I’m against that, it depends on what progress you are talking about, because if coming to the region, to the municipality, means doing everything like they do, extracting everything from the soil, pulling the trees out, and leaving agrochemicals, and a desert... Because their families don’t come around here, they stay in São Paulo, they stay in Cuiabá and here they only deal with the workers. Harm is left to us, they throw poison and that’s it. The animals that were in the forest, the fish that were in the river, the trees that were standing, holding in the river. Because the climate here, 20 years ago, it rained everyday and today you see, it’s waning, the way the deforestation is taking over the rain is waning, a lot.”

Antonio Silvino, peasant settled on Liberdade, Canabrava do Norte municipality, Baixo Araguaia region, Mato Grosso

“If I plant passion fruit, orange, tangerine and they plant next to me and behind my land, they start spraying poison on their rice and soy and harm me. I tell them the poison they use decreases the fruit production. One of them said to me: ‘if he doesn’t want to sell, I can buy from 13 and then use poison so he won’t harvest anything and will sell the land to me’, he said it right here, just like we are seating here.”

Farmer from Santarém, Pará, that preferred not to identify himself

“There are communities where this is the biggest problem, because you sell and the others sell and some of the farmers are pressured, until the moment comes when they are forced to sell. In a way, it’s a pretty calm expulsion. Because you are used to family agriculture and you grow chickens, pigs, lambs and plants. Where there is soy, the level of poison is very high. For example, in the (Tracuá, in Belterra) community he grew pigs but now they are gone. He grew chickens, they are gone, he planned on growing bees, but gave up. Why? Twenty meters on the other side was a huge soy plantation. His chickens would eat all of the little animals that came here with a symptom of poisoning, the pigs would eat them, and they started dying out. He was forced to sell his land and sold it cheap and now he is in another place, because he could not hold out. The bees that he was going to grow would go to the soy flowers and get poisoned. The children that would go to school, at the moment when they sprayed the poison, couldn’t stand the contamination”.

Venilson José Ferreira da Silva, president of the Centro de Estudos e Formação de Trabalhadores Rurais do Baixo Amazonas (CEFTBAM), from the Santarém region, Pará ●

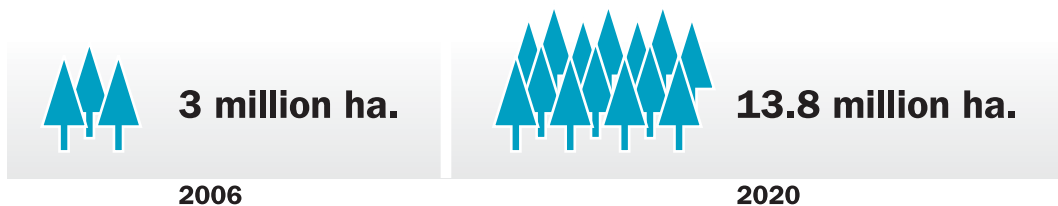
Eucalyptus and pinus

Unwanted “Forests”

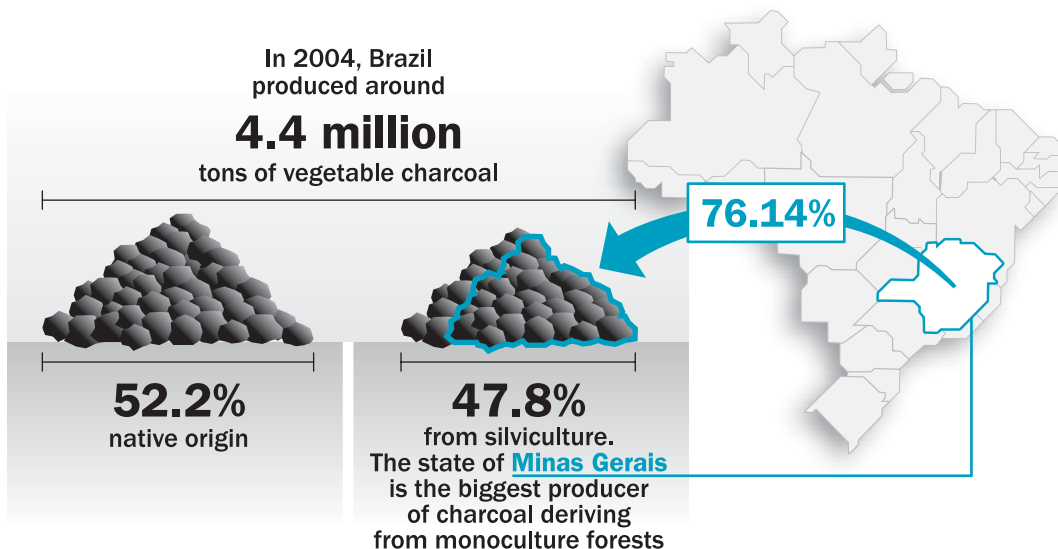
Brazil has 5.3 million hectares of forests planted with monocultures of eucalyptus and pinus, cultivated basically on order to supply the paper and cellulose industry with wood and to produce vegetable charcoal²⁷ for the iron and steel industry. Pinus is also used a lot by the wood industry, since it is a preferred species for furniture fabrication. The production of vegetable charcoal, however, depends mostly on eucalyptus. The number of this type of forest will probably grow a lot in the next years. Currently, the state of Minas Gerais²⁸ is the main producer, both in area cultivated with eucalyptus and the fabrication of vegetable charcoal. In the last years, this expansion has been promoted by the iron and steel industry.

Another serious problem is the increase, in the last years, of the use of vegetable charcoal from native forests.

Projection of area cultivated with eucalyptus



Source: MAS (2005).



Source: IBGE (2005).

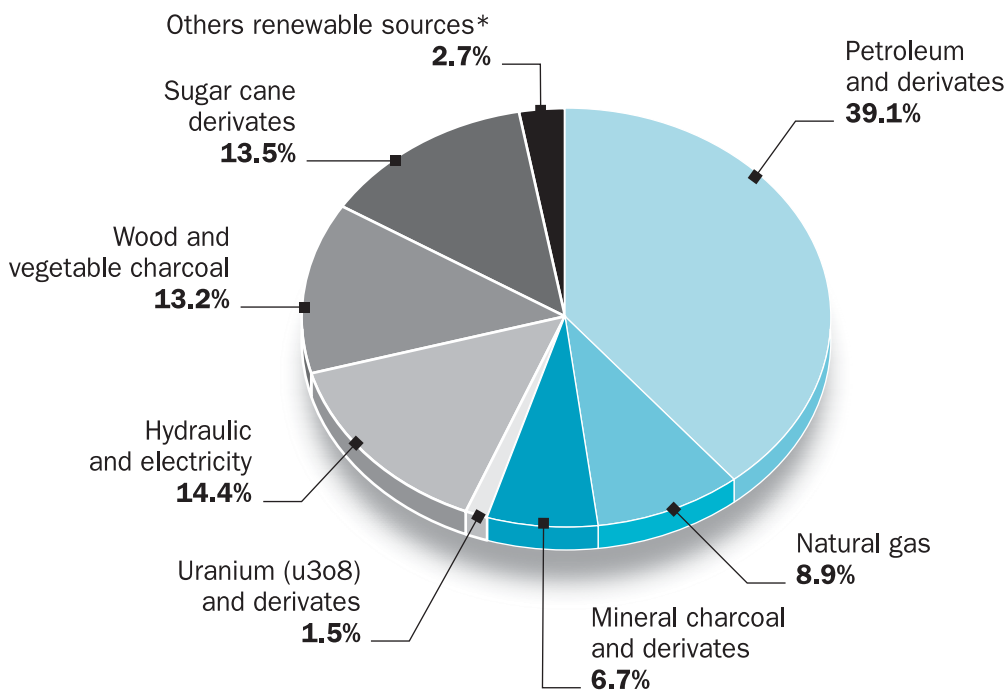
²⁷ Wood and vegetable charcoal represent 13.2% of Brazilian energetic resources. Almost half of this sum (43.7%) is consumed by the furnaces of the national iron and steel complex, according to the Ministry of Mines and Energy.

²⁸ This state has approximately 1.3 million hectares of planted forests, above all in the basins of the rivers Doce and Jequitinhonha. The 85% increase in vegetable charcoal consumption verified in Brazil between 2000 and 2004 are concentrated in Minas.

The opening of new areas of industrial cultivation, often results from the illegal cutting of diversified native trees. A recent episode involved Aracruz Celulose, that promoted the illegal deforestation of 50 hectares of Atlantic Forest in an advanced stage of regeneration, at the spring of the river Jacutinga, in Linhares, state of Espírito Santo. The deforestation, that took place on the 16th of June 2006, was not bigger because six rural workers, including a nine-month pregnant woman, stood in front of the 27 tractors and the security men that were doing the work of cutting the trees down.

This type of action also occurs in other Brazilian biomes, threatening family farmers. The isolation of rural communities within the great monoculture properties represents a serious social impact. Similar to what happens in the areas of soy and sugar cane expansion, companies in the sector pressure small farmers to sell their lands. Many resist even isolated by these monocultures, but others cannot keep up with their subsistence plantations and are forced to leave. Forestry monoculture has occupied, as well, agrarian reform areas such as indigenous lands, *quilombolas* and the surroundings of conservation units.

Brazilian energy distribution 2004



Source: National Energetic Balance 2005 (2004 data) / Ministry of Mines and Energy.

* Includes biofuels produced from residues and vegetable oils.

Good news about biofuels

Initiatives that can change Brazil

The production of biofuels from plants cultivated by family agriculture, without the use of agrottoxics and in a regime of crop rotation, has an enormous potential to improve the quality of life of its population. However, this will not happen if public policies benefit agribusiness and its businessmen. There are already many positive examples, but there is still a need to invert priorities: in the place of agribusiness, family agriculture.

The creation of biofuel cooperatives is a promising new initiative, involving small-scale farmers that plant for energetic and subsistence purposes. For example, it is possible to promote the production of hydrated alcohol in micro-distilleries that count on federal and state laws of incentive. From an integrated production and the treatment of sugar cane bagasse, it is possible to increase the productivity of milk and meat cattle.

The first biodiesel cooperative, Cooperbio, was launched in 2005 by the Movimento dos Pequenos Agricultores (MPA) and by the Movimento dos Trabalhadores Rurais Sem Terra (MST), in Palmeira das Missões, in Rio Grande do Sul, involving around 25 thousand families of 62 municipalities of the state's Northwest region.

Cooperatives such as this one give priority to the use of castor bean, jatropha, sunflower and other species produced in a diversified regime. These species also have the advantage of generating more oil – raw material for biodiesel – than soy. But even soy, sugar cane and eucalyptus could be maintained for this finality, as long as in an agrieological production regime.

Agrieological

This is different from organic agriculture because it can occur in latifundios in a monoculture regime; it is enough to intercalate vegetation and cultivation areas. Both systems do not use agrochemicals and require the preservation of natural vegetation.

Agroecology that does not use chemical products is based on the diversity of cultures in the same area. Its benefits can be seen in experiences implemented throughout Brazil, including in the semi-arid Northeast, where many families have migrated to in order to participate in this mode of production and today are experiencing an improvement of life quality.

The advantages of the use of wastes

Many residues serve as raw material for biodiesel. One of them is cattle lard, already analyzed and bought by Petrobras for biodiesel production. The killing of 23 million heads of cattle in 2005 indicates a potential for almost 350 million liters of this fuel per year. But the price and the logistic of transport to the refineries would be an obstacle according to producers. In these cases, local production and consumption initiatives would be necessary. For example, local city governments can stimulate the implementation of a mill to supply fuel to municipal automobiles.

Household used oil is another possibility that is being implemented in some Brazilian cities²⁹. The environmental aspect is an extra advantage, because, if thrown into the sewer system, kitchen oil makes the treatment of residues more expensive in up to 45%, and what goes into the rivers provokes the impermeabilization of riverbeds and adjacent lands, contributing to inundation.

When isolated, these practices do not have the capacity of meeting the demand for biofuels in the next years. And it is precisely because of this that exploring the possibilities offered by the country in this area can change the reality of millions of families of small-scale rural producers. The path of monoculture, however, produces in abundance, but at a social environmental cost that, besides not being included in the price of soy or sugar cane, can deplete the country's natural wealth and hamper its development.

“We are starting to experience a new economic cycle that will once more be based on the exploitation of natural resources. We have to understand that if we do not take this matter into our hands, we will have, in a while, when this cycle ends, a much more deteriorated country, with much more deteriorated biomes. We need to make the most of this moment to work for social inclusion and for a better environmental management of our territory.”

*Délcio Rodrigues, physicist, environmentalist and researcher,
extracted from “Agroenergia” ●*

²⁹ The projects Cata Óleo, from the Universidade de São Paulo de Ribeirão Preto, and Remov, involving tourist municipalities from the Serra Gaúcha, produce biodiesel from oils and saturated fats collected in bars and restaurants.

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