



BRAZIL OF BIOFUELS

PALMS, COTTON,
CORN AND JATROPHA

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Impacts of crops
over land, environment and society

The release of this report on palms, cotton, corn and jatropha - agricultural crops used or potentially useful to the production of biodiesel or ethanol - marks another step in the investigation work of the Biofuel Watch Center (BWC). BWC has covered 25 thousand kilometers through 11 Brazilian States to produce this document. Like in the first report, launched in April 2008, and in the next one, on sugarcane, to be released in December, the readers will encounter in these pages analysis, case studies and reports on the socio-economic, environmental, land related and labour related impacts, as well as those that weigh over indigenous and non-indigenous traditional populations, caused by the agricultural crops that might expand due to the boom of biofuels.

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Brazil of Biofuels

**Impacts of Crops over Land, Environment
and Society - Palms, cotton, corn, and jatropha**

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INTRODUCTION

Brazil witnesses distinct realities in its biodiesel industry.

On the one hand, the industry's economic situation has improved in 2008, with the increase in biodiesel prices. Last year, when several companies entered the market simultaneously, discounts in auctions were high and the price of the litre was below R\$ 1.90. Now the situation is different. In the 10th and 11th auctions conducted by the National Petroleum Agency (ANP) in past August, biodiesel were sold at R\$ 2.60 per litre.

The mandatory percentage of biodiesel added to diesel went from 2% to 3% in July this year, increasing the demand for the product. Besides, soybean oil, which is the main raw material for Brazilian biodiesel and had reached its historical record prices in March 2008, has had its prices reduced since then in more than 20% according to data from CEPEA/USP.

On the other hand, one of the basic principles of the National Programme for Production and Use of Biodiesel (PNPB) – the inclusion of family-based agriculture into the production chain – is being violated. As anticipated by Repórter Brasil's Biofuel Watch Center (CMA) in its April 2008 report, production of castor bean for biodiesel already signalled the model's problems.

The federal government bets on an enhancement of the performance of PNPB with the creation of Petrobras Biofuels, occurred in July 2008. The new state-owned company will manage biodiesel plants in Candeias (BA), Quixadá (CE) and Montes Claros (MG), as well as the Bioenergetic Complexes (CBIOS), enterprises in partnership with Brazilian producers and international conglomerates. Nevertheless, the biggest hope, according to the government, is the strengthening of family-based agriculture in the productive chain of biofuels.

The increase in the need for biodiesel in Brazil, with the mandatory 3% mixture, has supplied part of the return needs of large investors that invested in the construction of processing plants, but, with less credit available than it was necessary, family farmers were able to occupy only a small part of that market. The government's original target was to associate 200,000 families of small farmers to the National Programme for Production and Use of Biodiesel, but four years after it was launched, 36,746 have been integrated.

Furthermore, dependence on soybean strengthens the programme's market-oriented logic. Soybean is

abundantly produced in Brazil – the 2007/8 harvest will produce over 60 million tons – and guarantees that processing plants can meet their deadline. Several companies multiply their profits by working in an integrated way, funding soybean farmers, processing the grain and negotiating soybean meal, oil, and biodiesel. An estimated minimum of 80% of the 1.2 billion litres of biodiesel that shall be produced in 2008 are made from soybean.

That logic should remain with the liberalisation of the biodiesel trade market. Today, only Petrobras is authorised to buy biodiesel in ANP auctions and sell it to the country's 229 distributors. Now those distributors can also buy biodiesel directly from the processing companies, as long as it is to build stocks. From the distributors, diesel is mixed with biodiesel and taken to gas stations and then to cars and trucks all over the country.

Among that complex scenario, the present report evaluates four crops directly or indirectly linked to the generation of agroenergy in Brazil: palms (oil palm [dendê] and babassu), cotton, corn, and jatropha. For that, Repórter Brasil's Biofuel Watch Center (CMA) went to 11 Brazilian states (Mato Grosso, Santa Catarina, Rio Grande do Sul, Paraná, São Paulo, Minas Gerais, Bahia, Pará, Amazonas, Maranhão, and Tocantins), covering more than 25,000 km.

Those crops have secondary importance in Brazil's biodiesel production chain. However, since they can be used for producing fuel, there are numerous projects under way or under study that can create relevant social and environmental impact – from increasing deforestation in the Amazon, which is the case of oil palm, to degradation of Cerrado caused by cotton and corn, to exploitation of workers in areas of agricultural expansion, thus multiplying cases of slave labour.

Several companies already display technical capacity to employ one or some of those items in their productive processes (see map below). However, because of low offer or market options, they do not do it.

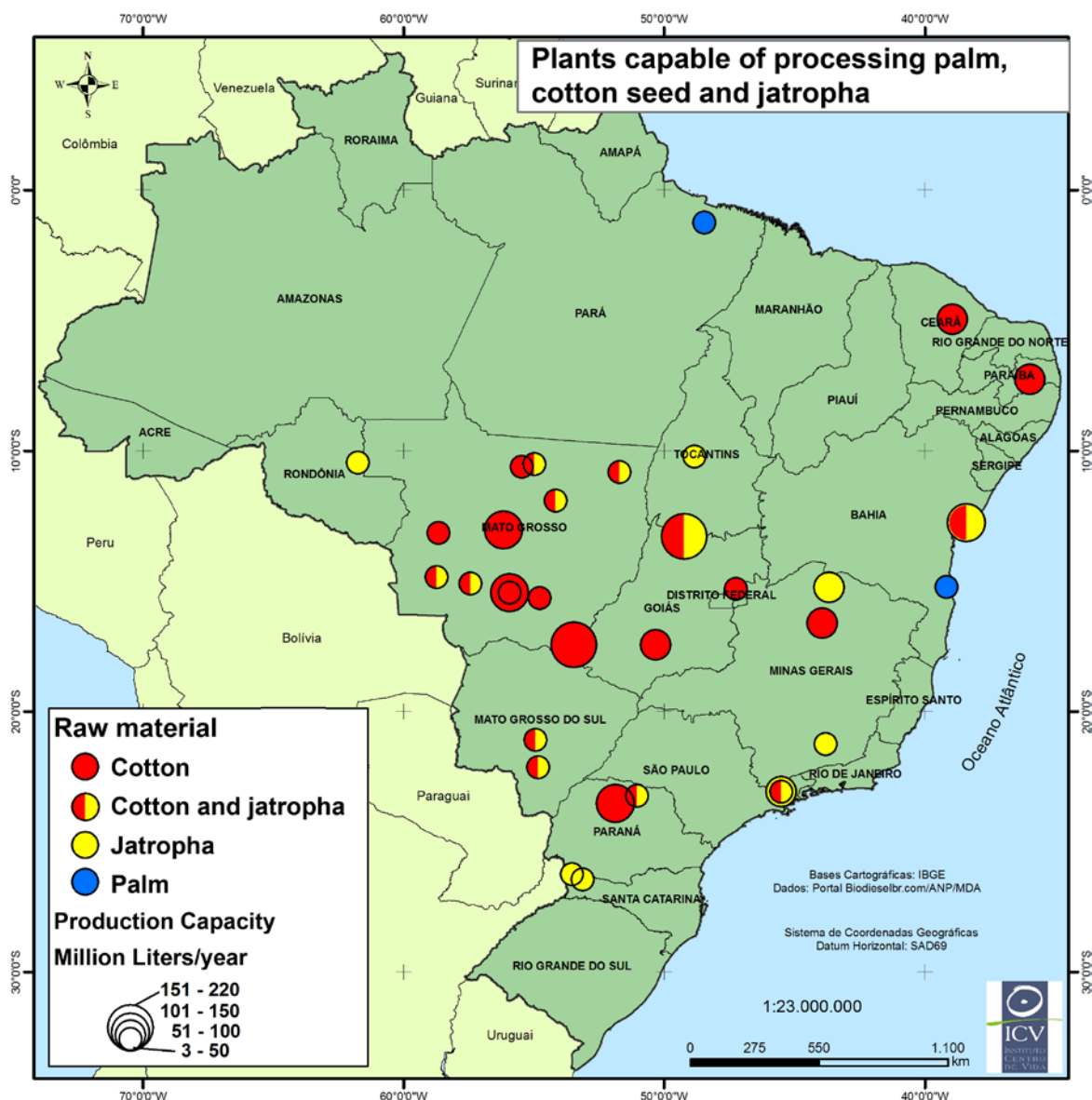
The current map of oil palm, which produces a type of oil traditionally used in the food industry, shows strong opposition between the two production models. In the Amazon, large oil palm monoculture projects have been attracting national and foreign investments already aimed at the biodiesel market. In the so-called Dendê Coast, at the deep south of the state of Bahia and the country's second-largest producer, family-based use of native palm oil explored from agroextractive systems is still prevalent.

Considered as a potential raw material for biodiesel, the babassu palm, with a strong presence in the states of Pará, Maranhão, Tocantins, and Piauí, is one of the unexplored and probably not profitable options, since it is the basis of a strong extractive activity and has never been a commercial domesticated crop before.

The installation of processing plants that are able to transform cotton oil into Biodiesel – there are at least 24 in Brazil) – drove cottonseed prices up. However, the current amount of biodiesel produced from cotton oil is very low, not only because prices of cottonseed soared, but also because the vegetal oil industry and animal feed makers compete for the seed in the market with biodiesel processing plants.

Corn, in turn, is not used for energy-generation purposes in Brazil. But it is undergoing a boom driven by deep changes in its global market, led by the US programme to produce ethanol from corn. Even so, the good moment of the market has even encouraged investment attempts by large businesses to use corn to produce biodiesel.

Last, experiments with jatropha are marked by a total lack of knowledge about its management and potential for large-scale generation of oil. Scarceness of certainty becomes profusion of doubt in the dialogue between processing plants and small producers. A channel that interests both parts, but has been marked by the low circulation of info. To sum up, it is worth noting that jatropha has achieved in 2008 its liberation as a species by the Ministry of Agriculture, Livestock and Supply (MAPA). The liberation is a partial conquest for big producers that still have to wait a few years until the first varieties of jatropha are registered in Brazil, elevating the species to the same level



as others that are utilized to the production of biofuels. In this scenery, jatropha already counts with enthusiasts in several regions of the country, which affirm the intention of increasingly invest in the crop. The success of such enterprises certainly involves understanding and overcoming the first difficulties and conflicts evidenced.

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CHAPTER 1

OIL PALM AND BABASSU

OIL PALM

1) HERO OR VILLAIN?

While in Brazil the “dendê” oil is remembered mostly as a core ingredient in Bahia’s cuisine, in the international market, palm oil – as it is better known – is the second most consumed vegetal oil, only behind soybean oil.

Produced chiefly in Malaysia and Indonesia, the product has a solid position in the supply of food and cosmetic industries in Europe, Japan, and the US, and its use to produce biodiesel, to be consumed mainly in the countries of origin, has been growing as it is used as a regulating mechanism¹ for international prices of raw oil.

The increase in the prices of palm oil in the world market since the 1990, however, ended up creating a social and environmental catastrophe in Indonesia, Malaysia, and other Asian countries, where large forest areas have been replaced by palms and thousands of small farmers have been displaced from their lands. Treated as “economy’s hero” by the market – the palm has the highest oil productivity per hectare among all commercial oleaginous crops –, it is seen by environmentalists and human rights advocates as one of the world’s biggest socio-environmental villains.

In Brazil, where, according to the Brazilian Institute of Geography and Statistics (IBGE), oil palm occupies over 96,000 hectares, its role is yet to be defined. From the biological point of view, oil palm has features that make it proper for processes of recovering degraded areas in the Amazon and, from the social point of view, the crop has shown a high potential for job generation, since its handling is totally manual. In the state of Bahia, where it covers about 45,000 hectares, it has also become an important pillar for family-based agriculture, which explores it in an extractive and small-scale fashion.

Cultivated more extensively in Pará and Southern Bahia, Brazil’s oil palm is still not included in the list of major factors for deforestation or socio-environmental conflicts. Even because, compared to soybean – with its 21 million hectares planted, it is the big villain in Cerrado areas and the so-called Legal Amazon, where 1.2 million hectares of forest had been converted into soybean plantations until 2004² - its importance is low.



That situation might change with the approval of a modification in Brazil's Forest Code, which will allow, among other things, the mandatory recovering of Amazon forest reserves – 80% of rural properties, according to today's legislation – to be made with exotic species. The measure is seen with sympathy by the federal government and strongly advocated by the so-called "ruralist" members of parliament (linked to landowners), who estimate in about 70 million hectares the degraded land in the region that can be used to plant oil palm. Environmentalists and social movements, in turn, oppose the project, which they call "Forest Zero", for its approval would effectively reduce the legal reserve and strengthen the model of predatory exploration of the biome.

Apart from technical and political stances, the following issues should be considered regarding the possibilities for the project to extend oil palm in the Amazon, at least in the short run: first, liberated to be planted with exotic species, a large part of the degraded areas will not be used for oil palm, but rather converted into reforestation projects with eucalyptus or other species to produce charcoal (for the steel industry), paper, and cellulose, meeting more immediate market demands. Second, according to industry experts, the country simply does not have enough seeds to sharply increment its oil palm culture, just as it does not have market or structures to process it. On the other hand, degraded areas are not continuous and the implementation of large-scale planting projects would necessarily lead to deforestation of the intermediate forest zones. The impacts of massive oil palm plantations within a biome as diverse as the Amazon are also not measurable, just as its effects on traditional communities and the region's family-based agriculture.

As for palm oil's participation in biodiesel

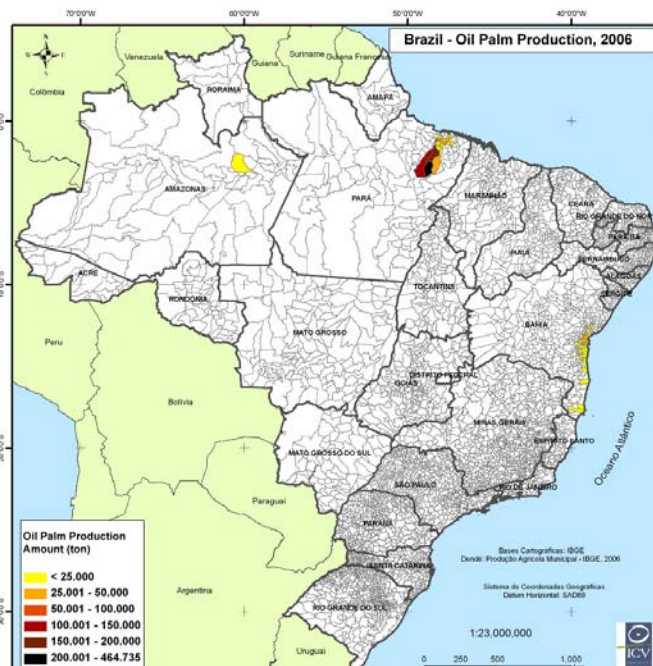
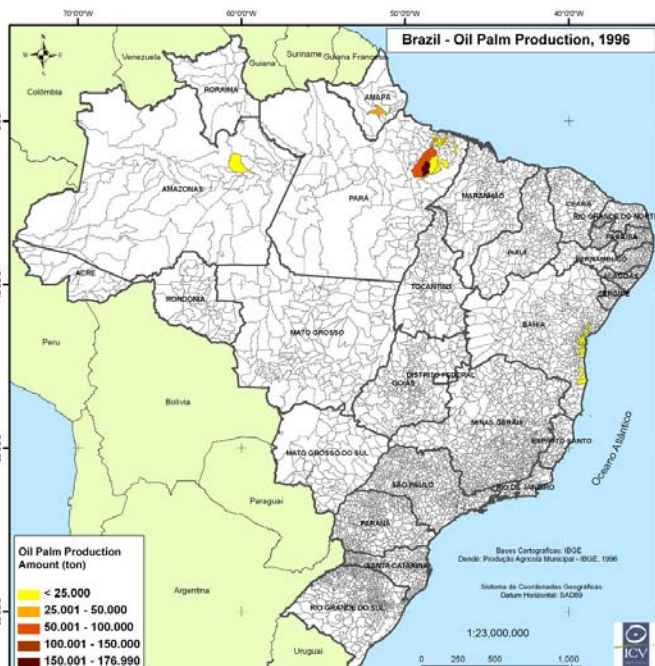
production, the percentage of oil converted into agrofuel is very small. Oil palm in the Northern region as castor bean in the country's Northeast enjoy tax incentives when they are related to the Social Fuel Seal of the National Programme for Production and Use of Biodiesel (PNPB), but the low price paid for the fuel compared to raw oil has not been cost effective.

If and when an expansion of the palm in Brazil will take place in coming years is still to be defined. Positive characteristics could make it a welcome economic alternative for family-based agriculture, if it is cultivated in agroforest systems, in small scale, and autonomously. But that does not seem to be the priority option of public policies. Notwithstanding its high profitability, large-scale plantations of oil palm have high implantation and maintenance costs – a model that tends to make it exclusive to the big agribusiness with occasional projects of integration with family agriculture. An analysis of those variables is the aim of this report, as is presented below.

2) GENERAL CHARACTERISTICS

The palm (*Elaeis guineensis*) – was brought from Africa to Brazil with the arrival of slaves. Extremely adapted to the areas of humid tropical climate, its occurrence in the country is concentrated in the states of Amazon and the lower south of Bahia, between the so-called Recôncavo Baiano and Rio de Contas, known as the Dendê Coast.

The main products extracted from it are palm oil, obtained from the mesocarp (pulp), and the palm kernel oil, taken from the almond. The former, in its pure state,



is widely used in human food – responsible for 80% of the world consumption – in making margarines, solid fats, cooking oil, mayonnaise, bread, chocolates, etc., and for industrial frying. Palm kernel oil, in turn, is highly valued in the pharmaceutical, cosmetic, and perfume industries, among others.

Correctly managed palm starts producing at the end of its third year, with a harvest of six to eight tons

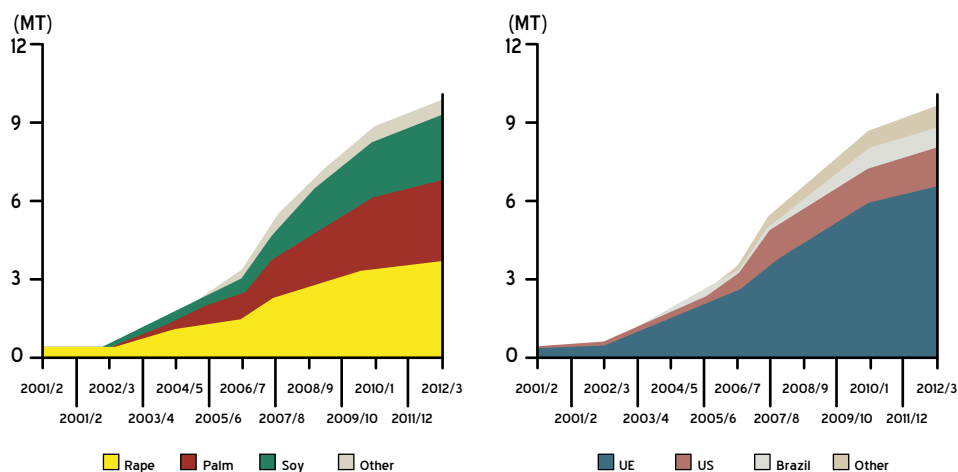
per hectare. The palm reaches its productive peak by the eighth year, when it produces 25 tons per hectare in the Amazon region, and stays at that level until the 17th year, when production starts dropping gradually. In general, the palm's viable life span is 25 years, at the end of which it is eliminated to plant new seedlings.

Oil palm is considered one of the most productive oleaginous plants among commercial crops, yielding an average 4,000 kg of oil per hectare. Worldwide, palm oil is the second most consumed oil, only behind soybean oil³. According to data from the World Bank, palm oil prices have increased exponentially between mid-2007 and mid-2008, reaching US\$ 1,206 per ton in June this year (in the same month, soybean oil cost US\$ 1,522/ton), an increase of more than 30% over October 2007.

3) BIODIESEL FROM OIL PALM

Because of the high prices of raw palm oil, the percentage of the product used to make agrofuel is still relatively small – palm oil for human consumption is much more profitable than its biodiesel. Compared to other vegetal oils, however, the importance of fuel from oil palm is out of question (worldwide, it loses only to biodiesel from rapeseed, as the chart above shows). Nowadays, Indonesia and Malaysia, responding for 85% of the world's production of palm and 87% of palm oil exports, also control the market of biodiesel made from that oleaginous crop. According to the last study by Asian-Pacific Economic Cooperation (APEC), Indonesia's biodiesel production in 2007 was 1.5 billion litres, and it should reach 5,570 billion litres in 2010. Still according to APEC, Malaysia produced 120,000 tons of biodiesel in 2006, and the government has already authorised the installation of new processing plants, which can drive production to 9.6 million tons per year.

In Latin America, Colombia leads both in planting oil palm and in producing biodiesel from it. With



Source: www.palm-oil.org

357,000 hectares cultivated in 2008, the country intends to reach 500,000 hectares planted in 2010⁴. Ecuador (with 150,000 hectares of oil palm), Honduras (50,000), Venezuela (30,000), Costa Rica (30,000), Peru (15,000), and Guatemala (15,000)⁵ are also important for the crop and are investing in biodiesel production. Brazil, in turn, which in 2006 reached 96,000 hectares planted with oil palm, according to data from IBGE, included the crop as a priority in its agroenergy public policies.

After launching the PNPB in December 2004, the Brazilian government created the Social Fuel Seal – a tool that, through tax incentives, sought to support the cultures of palm in the Amazon and castor bean in the North-eastern region of the country, aiming specially to include family-based agriculture into the productive chain.

According to Social Fuel Seal rules, registered companies enjoy the following advantages:

- ▶ distinct reduction coefficients for PIS/Pasep and Cofins⁶ tax rates. The distinct tax levels are proportional to the achievements of family-based agriculture;
- ▶ access to better financing conditions at the Brazilian Development Bank (BNDES) and its Accredited Financial Institutions, Banco da Amazônia (Basa), Banco do Nordeste (BNB), Banco do Brasil S/A or other financial institutions with special financing conditions for projects with Social Fuel Seal;
- ▶ and licensing to take part in biodiesel auctions.

In order to receive the Social Fuel Seal, the biodiesel company has to buy at least 50% of its raw materials from family-based agriculture in the Northeast and the Semi-arid. In the Southeast and in the South regions, that minimal percentage is 30% while in the North and Midwest it is 10%. It must also sign contracts

PIS/PASEP AND COFINS RATES APPLIED TO BIODIESEL (R\$/Litre of biodiesel)

	Without Social Fuel Seal	With Social Fuel Seal
North, Northeast and Semi-arid:		
Castor beans and palm	R\$ 0.15	R\$ 0
Other raw materials	R\$ 0.218	R\$ 0.07
Midwestern, Southeast and South:		
Any raw material including castor bean and palm	R\$ 0.218	R\$ 0.07

Source: Ministério do Desenvolvimento Agrário (MDA)

with family farmers (negotiation should include a union or a social representative), defining the trading conditions that guarantee income and deadlines compatible with the activity, besides guaranteeing technical assistance and training to family-based partners.

Nowadays, two companies – Agropalma and Biobrax – produce biodiesel from palm in Brazil. According to the National Agency for Petroleum, Natural Gas, and Biofuels (ANP), however, only Pará-based Agropalma took part in recent biodiesel auctions. In 2007, according to ANP data, Agropalma delivered 3,717 m3 of biodiesel. Until June 2008, that volume was 951 m3.

According to Agropalma, its production of biodiesel started in 2005. As raw material, it used about 95% of fatty acids (olein) from palm in the refining process. With its biodiesel production, Agropalma intends to replace the total amount of fossil diesel consumed by its vehicles and machines, trading only the surplus, since the price of biodiesel does not pay for more investments in the product. Nowadays, a ton of the fuel costs about R\$ 2.6 thousand, while raw oil has been sold for R\$ 3,000 in São Paulo, 12% de ICMS (state sales tax) included. The price of refined oil, also in São Paulo and with ICMS included, is R\$ 3,700⁷.

Besides the Pará-based company, which has an installed capacity of 20 tons of litres of biodiesel/year in its Belém processing plant, Bahia-based Biobrax S.A. Energias Renováveis also uses palm oil in its plant located at the town of Una. With a 50-million-litre-per-year production capacity, 80% of the raw material for the biodiesel produced by Biobrax comes from oil palm and 20% is animal fat.

4) OIL PALM IN THE AMAZON: A CONTROVERSIAL ISSUE

According to a 2006 IBGE study, the area planted with oil palm in Brazil is about 96,700 hectares, of which 53% are located in the state of Pará. The country is the world's 15th largest producer of palm oil, but according to US-based Woods Hole Research Center, which specialises in environmental research, Brazil could become one of the largest palm producers since the Amazon would have 2.2 million square kilometres proper for planting the crop – obviously not taking into account that most of that area is covered with forest, since deforestation in the Amazon is 700,000 sq kilometres⁸.

PALM OIL PRODUCTION (2008)

1	Indonesia	19.700.000
2	Malasia	17.400.000
3	Thailand	1.400.000
4	Colombia	830.000
5	Nigeria	820.000
6	Papua New Guinea	425.000
7	Equador	340.000
8	Cote d'Ivoire	320.000
9	Costa Rica	285.000
10	Congo, Democratic Republic	175.000
11	Cameroon	165.000
12	Honduras	165.000
13	Guatemala	155.000
14	Ghana	120.000
15	Brazil	110.000
16	Phillipines	70.000
17	Angola	58.000
18	Venezuela	54.000
19	Guinea	50.000
20	India	50.000

In metric tons

Source: USDA Foreign Agricultural Service

SUITABLE FOREST AREA FOR OIL PALM (2008)

1	Brasil	2.283.000
2	Congo, Democratic Republic	778.000
3	Indonesia	617.000
4	Peru	458.000
5	Colombia	417.000
6	Venezuela	150.000
7	Malasia	146.000
8	Papua New Guinea	144.000
9	Suriname	101.000
10	Bolívia	90.000
11	Cameroon	83.000
12	Gabon	81.000
13	Guyana	81.000
14	French Guiana	70.000
15	Congo, Republic of	66.000
16	Equador	55.000
17	Phillipines	31.000
18	Myanmar	25.000
19	Thailand	24.000
20	Laos	13.000

In sq km

Source: Woods Hole Research Center

In recent years, oil palm's economic potential and its adaptability to the Amazon climate has encouraged a heated congressional debate about the possibility to allow 30% of forest recovering in legal reserves illegally deforested in the Amazon to be made with exotic species, especially palm.

WHAT LEGAL RESERVES ARE

Brazil's current Forest Code establishes the need for each rural property to have a minimum forest area and other preserved natural ecosystems. That minimum area is the sum of Special Protected Areas (such as mountain tops, river banks, lakes, and other water bodies) and the so-called Legal Reserve. The function of the Legal Reserve is to keep a minimum percentage of native vegetation in each property, with an important ecological function as the habitat for biodiversity and providing several environmental services, such as the stock of forest products, control of pests and fires, improving water production, protection of soil and water bodies, thus avoiding erosion and sedimentation and silting up, and carbon uptake from the atmosphere, among others. Brazilian law establishes that the area of the legal reserve should be 80% in the Legal Amazon, 35% in the Cerrado within the Legal Amazon, and 20% in the other regions of the country. Owners of areas deforested over what is defined by law should replant the reserves to regularise the property's productive activities.

Source: Greenpeace

The proposal is part of Bill 6424/2005 presented by Senator Flexa Ribeiro (PSDB-Pará), which suggests a series of changes in the Brazilian Forest Code. Among others, the Bill – which is under debate in the House of Representatives' Environmental Committee, provides for the change in Article 19 of Law 4771 from September 15, 1965, defining that “in the case of forest recovery, priority should be given to projects that include the use of native species or other species, or planting palms whether native or exotic, aimed at economic exploitation, as long as it follows the state's economic and ecological zoning and the criteria set by the competent environmental agency”. It also says that landowners should “recover the legal reserves of their properties by planting, every 3 (three) years, at least 20% (twenty percent) of the total area needed for its complementation, with the use of native species or other species, or planting palms aimed at economic exploitation, whether native or exotic, according to criteria set by the competent environmental agency”.

The change in the Brazilian Forest Code is one of the main demands of the so-called “ruralist” Parliament members, who point out economic damages from the impossibility to legally increase the productive area in the Amazon. According to the bill's advocators, a large part of the over 70 million hectares degraded in the biome could be used to plant oil palm.

It is also argued that in any case public authorities have been unable to enforce the law regarding deforestation and forest recovery. The thesis was avocated by Senator Flexa Ribeiro in a public hearing promoted by the House's Environmental Committee in May 2008. “With the current Forest Code, we will not meet environmental targets – that has been proved – and we will not make reforestation either, because it has no economic use. Investment is too high. Unless (...) the government invests billions and billions to make reforestation by itself”, he sustained. In the same vein, federal deputy Nilson Pinto (PSDB-PA) says he sees the legal Amazon as the “dumbest zoning” he knows – “lazy people's zoning”. “How can we force someone to recover his property with no gain, with no economic benefit? Recomposing only because of one's love for nature, spending money from one's own pocket is impossible!”

Both the willingness to deliberately ignore current legislation and the arguments used to justify its change are under strong criticism by environmental organisations. According to Sergio Leitão, Greenpeace's public policy director of (which gave Bill 6424/2005 the nickname of “Forest Zero”), it would not be necessary to change the law to plant exotic palms, since it already allows their use for reforesting in areas deforested until 1996. According to the organisation, there is a deadline set for that and it should follow norms established by environmental agencies. But, in any case, the way it is written, argues Greenpeace, the Forest Code allows the sustained management of forest resources (wood, essences, nuts, etc.) of reserves, which increase the value of the forest standing, from the economic, environmental, and social viewpoints.

For researcher and professor Flavio Gandara, a member of Luiz de Queiroz Agriculture School's (ESALQ) Department of Biological Sciences, at São Paulo University, if exotic species are allowed in recomposing forest reserves in the form of monoculture, as can be understood from the text of Bill 6424/2005, they will not play the ecosystem roles expected from a legal reserve in terms of conservation and rehabilitation of ecological processes. In practice, Gandara explains, the changes proposed to the Forest Code would reduce the legal reserve area in the Amazon from today's 80% to 50%.

4.1) IMPACTS

► The environment

From the biological viewpoint, oil palm has been considered a crop with low impact on forest areas. According to the National Institute for Amazon Research (INPA), the oil palm most often planted in the Amazon region – the Tenera variety, a hybrid produced from crossbreeding African varieties Dura and Pisifera – is able to maintain biogeochemical cycles similar to those of the forest, minimising erosion, water runoff, and carbon dioxide release responsible for the greenhouse effect, besides its potential for rehabilitating modified/degraded areas through its root system⁹.

In spite of being an exotic species, the risk of oil palm to become an invader and take over forest areas is minimal, according to Amazonas State University professor and former EMBRAPA director for Genetic Resources Afonso Valois. According to Valois, since it is a heliophyte plant (demanding high incidence of sunlight), oil palm can hardly survive in shadowed forest environments. Besides, the difficulty for the seeds to germinate in natural environments makes the plant reasonably safe in the Amazon biome. According to a CNPq¹⁰ study, that characteristic is associated to the existence of inhibiting factors that promote dormancy of seeds, hence the need to have them under ideal temperature, moisture and oxygenation conditions to induce germination.



Palm oil plantations protect degraded soil

The forms of managing and planting oil palm, in turn, have caused distinct impacts on the environment. Worldwide, deforestation to plant oil palm in Indonesia and Malaysia, for instance, has drawn international attention of several environmental organisations and the UN itself. According to a 2007 report by the UN Environmental Programme, since 1990, 28 million hectares of forest have been cut in Indonesia to convert land into plantations, and other 300,000 hectares come down every year to plant oil palm. In Malaysia, according to a study by the NGO Friends of the Earth International, 86% of all deforestation between 1995 and 2000 are imputed to the expansion of that crop.

In the Brazilian Amazon, deforestation is not yet a relevant element in oil palm's total environmental impacts. The biggest problem, according to Flávio Gandara, a researcher and professor at Department of Biological Sciences of ESALQ/USP, is its cultivation as a monoculture. Monoculture of one species within environments with high biodiversity such as the Amazon forest, even if it is installed in degraded areas, has high impact specially on the fauna, since animals that do not feed in that crop tend to disappear from the area, explains the researcher. The management of cutting and replanting oil palm in the same areas after 25 years – the palm's viable life span – worsens that impact as well as soil exhaustion and other possible interferences on the native flora.

Another threat to the environment is the use of chemical fertilisation in oil palm plantations. Highly demanding for phosphorus and potassium, according to Embrapa Amazônia Oriental, each palm demands on average six kilograms of fertiliser a year to keep a profitable productivity level – applications increase as the palm grows older and the soil is exhausted. According to Gandara, in the rainy Amazon climate, fertilisers are easily washed into water bodies and might change the chemistry of rivers, causing uncontrolled proliferation of algae and resulting in ecological imbalance, with direct impacts on the ichthyofauna (such as fish mortality because of overconsumption of oxygen by algae).

► Job and income generation

In theory, oil palm cultivated in agroforest systems could be a good alternative for isolated communities and family-based farmers in the Amazon, assuming that there is market guarantee or mechanisms to extract oil for home use in engines in general, says Flavio Gandara.

In practice, however, what prevails in the region is large companies' megaprojects to plant it that, on behalf of social integration and specially because partnerships with family farmers are mandatory to obtain

tax incentives from Social Fuel Seal, sign agreements of integration with settlers, offering them technical support and contracts to buy their production.

According to Gandara, even though they represent a guarantee of income, those contracts make farmers seriously dependent on companies, which impose their technology packages and other production rules on their partners, leading farmers to lose their autonomy to choose forms of management or trading that would fit each reality. The cost of implanting commercial oil palm culture also contributes to that situation. In Pará, according to EMBRAPA, values per hectare are about R\$ 6,400 – or US\$ 3,700 – for the agronomic project, and R\$ 11,900 – or US\$ 7,000 – for the agroindustrial project.

On the other hand, there is no doubt that the oil palm culture has a high potential for job generation, since it is manually managed, demands lots of labour and its perennial character guarantees certain stability in contracting workers. Besides labour used in processing plants and other related functions, the general estimation is that the industry employs one worker for every ten hectares in planted areas, where those workers are in charge both of handling the plant and harvesting – maturation of bunches takes place over the whole year, demanding constant harvests in short intervals.

► The land issue

In Asia, and especially in Indonesia and Malaysia, the expansion of large oil palm companies over land and territories of small farmers and traditional populations has created an increasing number of conflicts, drawing attention and generating protests from peasant and international human rights organisations.

According to peasant movement Via Campesina, in 2006 about 350 land conflicts took place in Indonesia, involving large oil palm companies. In 2007, the organisation Serikat Petani Indonesia pointed out the expropriation of about 196,000 hectares of land from nearly 25,000 small farmer families. According to the organisations, 166 peasant leaders were criminalised or arrested, eight farmers were murdered and 12 were shot, counting only the cases denounced or that came to light.

In Brazil, there are no records of conflicts involving the oil palm culture, but the progressive occupation of large areas in the Amazon might create land concentration problems. In Pará – Brazil's main palm producing state – more representative projects for the crop occupy or intend to occupy large areas,

as in the case of Agropalma, with 105,000 hectares in north-eastern Pará – of which 34,000 are used to plant oil palms – and Biopalma, which is under implantation in the same region and intends to plant 40,000 hectares (according to information from Banco da Amazônia) in the over 70,000 already bought).

It is hard to obtain a precise measure of the land occupation process in Pará, firstly because of precarious land regularisation, but also because the most recent consolidated statistics from IBGE's Agricultural Census are from 1996. Some indications of the advancement of land occupation and workforce, however, are presented in the summary of preliminary results of the 2006 Census. According to IBGE, within ten years the number of plantations counted in the state was up from 174,700 in 1996 to 183,700 in 2006, and the occupied area went from 808,300 hectares to 3.2 million hectares in the same period. The number of people working in agriculture, in turn, decreased. In the case of workers who were relatives of the farmer (family based-agriculture), the number decreased to 761,200 in 1996 to 692,600 in 2006; and employees hired without being relatives went from 122,6 thousand to 105,09 thousand during the same period.

Reports from farmers and social movements in north-eastern Pará point to progressive sale of land by small farmers to midsize and large enterprises, whether it is because it is not viable to develop family-based agriculture that meets settlers' minimal needs or for pressure by the companies. In the first case, producer Massao Osaki from Tailândia, who owns 250 hectares in the town (100 hectares are planted with oil palm that is sold to Agropalma), for instance, sustains that he is systematically buying parcels from small producers who are quitting agriculture. In Concórdia do Pará, in turn, the town's black movement accuses Biopalma of forcing the sale of parcels even in areas that are under the process of being recognised as slave-descendant land (see case study). In the Amazon, another state considered very proper for the development of oil palm culture, the state government is conducting a process to grant 20,000 hectares to Felda, Malaysia's Federal Land Development Authority, represented in Brazil by Braspalma Agroindustrial. The area, located in Tefé, in the centre of the state, is now occupied by about 200 families of small farmers, whose destination is still uncertain (see case study).

4.2) CASE | Agropalma, PA - Agreements put pressure on food security

Agropalma started its agroindustrial activities in the town of Tailândia, Northeastern Pará, in 1982, with the aim of developing a project to plant and extract palm and kernel oil over a 105-thousand-hectare area (that area includes now the oil palm plantations, the legal reserve, and other activities). Nowadays, integrating the Companhia Refinadora da Amazônia and the Unidade de Acondicionamento de Gorduras, the company is Brazil's largest agroindustrial complex for planting and processing palm oil.

In 2008, Agropalma ended up gaining unexpected importance because of an action by the Federal Government that exposed the legal chaos of Tailândia's economy.

Officially created by the state highway PA-150, which connects Belém to southern Pará, the town's productive activity is predominantly based on the exploration of timber, processed at over 50 sawmills or transformed into charcoal by hundreds of small charcoal kilns located by the road and in rural areas. In spite of its importance, Tailândia's "vocation" for timber has placed it at the top of the list for environmental crimes by the Brazilian Institute for Environment and Renewable Natural Resources (IBAMA), since most enterprises are illegal.

In early 2008, that situation made Tailândia the first target of Operation Arco do Fogo – a joint action by the Federal Police and IBAMA to fight deforestation, focused on the 36 towns that are deforestation champions in the Amazon in the 2007/08 period. The operation resulted in about 50 interdictions and 1,326 kilns destroyed, besides fines that amounted to R\$ 31.8 million, according to IBAMA. With the closure of virtually all sawmills and the destruction of most charcoal kilns, after operation Arco do Fogo the town entered a sharp unemployment crisis, which, according to its population, reached 5,000 to 8,000 people.

The weakness of Tailândia's economy exposed by operation Arco do Fogo has its roots beyond the timber industry. According to the state, the town experiences total land irregularity and the absence of data about the types of land property, their location and legal situation. So much so that, for Tailândia to start receiving resources from programme Pará Rural, which will apply US\$ 100 million in sustainable development projects in five towns of Pará, the state will have to regularise land first, explains the programme's local coordinator Ivandra Kerber. According to her, both INCRA settlers and small farmers have been abandoned

by public authorities, greatly reducing productive alternatives.

In that context, Agropalma stood out as the region's largest "legal" employer, hiring about 4,000 workers and, in the period that followed the Arco do Fogo crisis, several temporary workers as a way to minimise the impacts of unemployment in Tailândia. According to the Rural Workers' Union in the town, the average salary in management and harvesting of oil palm is R\$ 600 a month, contingent on a minimal production of a 1,000 kilograms during harvest and 600 in the inter-harvest period (applying the rule of one worker for each ten hectares).

Another type of productive alternative has been implanted by the company with the region's settlers. The first experience was created in the community of Arauaí, in the town of Moju, with 150 settler families. Divided into three blocks of families, the project planned to plant 10 hectares per family in a contract that included loans, technical assistance and guaranteed production purchase for 25 years.

Given the lack of perspectives, the facilities offered by the company, and palm profitability, the project seemed extremely attractive at first, says farmer Florivaldo Mendonça, who has been in the partnership for seven years. According to him, the company helped to clean the area ("cutting down woods that belonged to the government") and to establish the crop, and now it provides the fertilisers and the poison to fight weeds when it is necessary. In the first three years, when there was no production yet – and therefore no income – farmers received R\$ 360 every two months from Banco da Amazônia (BASA) as a loan to fund the activities. After harvests began, however, the debts started to be charged.

According to Florivaldo Mendonça, Agropalma pays R\$ 212 per ton of oil palm bunch, which it collects at farmers' properties. The money is deposited at BASA, which makes payments to partners, already discounting monthly instalments for their debts. Adding the discounts of the loan and the company – the cost of installing one hectare of oil palm in the region is about R\$ 6.400, which is a high debt – of fertiliser, poison, and the collection in the parcel, according to the farmer, almost half their payment is retained. Depending the stage of the harvest, farmers get about R\$ 2,000 at the peak and R\$ 500 at the low period.

That payment, despite being above the average income for family-based agriculture in the area, might not be enough to keep a family in cases like that of 16-year-old Denílson Santos Gomes, which shares work and payment

for the production with another farmer. “The owner of the land could not do the whole work, so he called my father to share it. We also divide the payment, which, in the low harvest, gets a little tight”, explains Gomes, who works about 9 hours a day on oil palm.

Time spent in handling the crop and harvesting has been considered a problem by settlers. All of them said that the family stopped planting foods like rice, corn, manioc, and banana for lack of time, and now they are



Hard work leaves no time for food crops

completely dependent on shopping at the market.

Sixty-six-year-old João Assunção, who has just joined a new partnership project, has no production yet but spends a lot of time in cleaning his parcel, since palm is extremely sensitive and might lose its productivity if care is not taken during its “childhood”. “I cannot handle the palm plantation and the other crops; I had to abandon the others”, says the farmer who now lives out of a small retirement and the loan from Banco da Amazônia. “To eat, I crash in the house of one of my sons, who already has his own production”.

According to the INCRA office in Pará, Agropalma does not allow intercropping food crops with oil palm, which puts an extra pressure on the settlers’ food security. In 2006, the agency mediated an agreement between the company and 35 farmers from the Calmaria II settlement in Moju, similar to that of the settlers from Arauaí, but in 6-hectare areas – in spite of opposition by the company, which considers projects under 10 hectares not feasible – in order to avoid damage to food crops. Nowadays, 13% of the settlement is occupied by oil palm, 7% is used for food crops, and the rest is the legal reserve.

According to INCRA, since oil palm in the settlement has not started to produce yet, it is difficult to speak of results. In case of failure, however, farmers will

be bound to the agreement at least until they pay off their debts.

Such binding through debt, as well as the dependence on the company’s technological and economic package and the prices it sets, are factors that place farmers under vulnerability and submission, despite profitability promised by the crop. According to INCRA, at the Calmaria II settlement there was an attempt to set a shorter timeframe for the agreement (10 years instead of 25). In that period, farmers would be able to build a mini-processing plant for oil that would add value to their production. The proposition was not accepted by Agropalma¹¹.

Other aspect that weakens the company’s partnership project is the environmental issue. In Arauaí, settlers’ continuous oil palm areas have already formed a 150-hectare monoculture. According to workers, there was deforestation (funded, they say, by Agropalma), and no parcel has a legal reserve. In all cases, the experience is far from the ideal of agroforest management that could bring communities to autonomous development that is socially, economically, and environmentally sustainable, says ESALQ/USP researcher Flavio Gandara.



Trees cut down to plant oil palm in Arauaí, Pará

4.3) CASE | Biopalma, PA - pressure on slave-descendant communities

In early 2008, a document sent to senador José Nery (PSOL-PA) by the Collective of Black Persons of Concórdia do Pará e and the Quilombola Association of Nova Esperança de Concórdia (AQUINAC) denounced the situation of tension and possible conflict between quilombola (slave descendant) communities in the town and Biopalma – the Canadian company that is establishing itself in North-eastern Pará to develop a 40,000-hectare project to plant oil palm.

According to the chief aid to the president of the Pará Land Institute (ITERPA), Jerônimo Treccani, Biopalma went to the agency in 2007 to negotiate the purchase of land, but the issue got stuck, both because the volume demanded was too large and because negotiation on public areas stopped as a result of a bill under debate in Congress, which should regulate the issue in the future.

AQUINAC president Antonina Borges says that in early 2008 “several intermediaries started showing up in town to buy land for the company. The price offered for the parcels was around R\$ 30,000 and their discourse was that those who did not have their ownership titles would be evacuated by justice. Many were afraid and sold it. Another mechanism used by those buyers has been asking people to sign a document issued by INCRA as a license to sell, whether or not the deal was closed. We fear that this could be used to impose a compulsory sale”, says Borges.

According to her, the movement of land purchases started to put pressure on several other areas considered quilombola territory. The Concórdia do Pará area concentrates a large number of those communities – 18 in all, according to a survey by anthropologists from the Pará Federal University’s Centre for High Studies on the Amazon –, of which only four have been recognised by the Federal Government. The black and quilombola movements demanded the recognition of at least nine areas, and they fear that any intervention by INCRA and private companies in the area in order to give individual titles or to buy land might threaten that strategy.

Byany Sanches, a member of the National Leadership of Círculo Palmarino in Pará, explains that Biopalma argued that it was informed that the areas it is trying to purchase were quilombola when it arrived at the quilombos of Cravo, Colatina, Sto. Antônio and Km 40 (areas close to the PA-140 highway). In February 2008, the company and the quilombola movement met

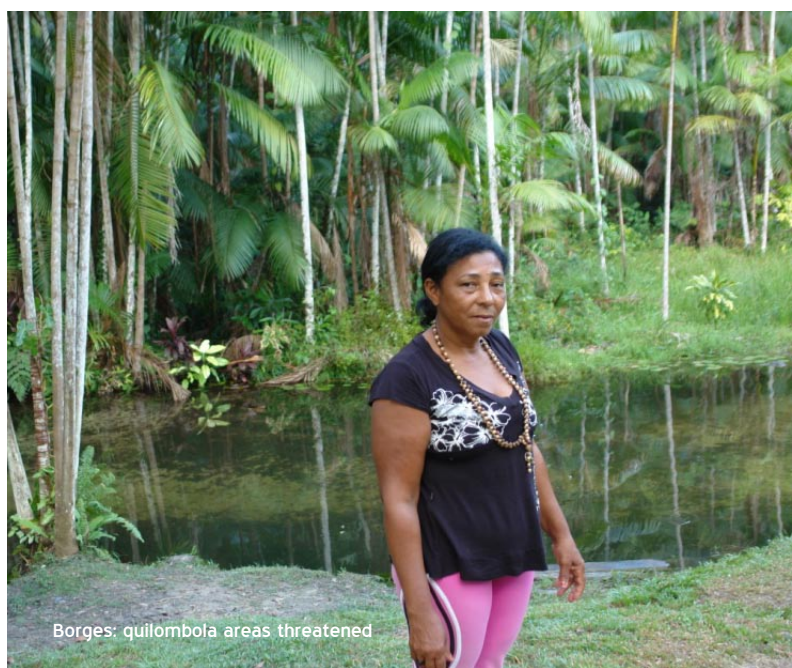


Parcel bought by Biopalma

for the first time to discuss the impasse, and agreed to establish a regional limit for land purchase, which excluded most of quilombola communities, and discuss what to do with areas already bought.

The conundrum, explains Antonina Borges, is that there is pressure by INCRA for black communities to accept individual land titles, which would give them the benefits of public policies for family-based agriculture or agrarian reform (funding and structure). In this case, the demands that the areas be recognised as quilombola territory – which would allow their expansion later, among other advantages – would be made impossible. Ultimately, INCRA’s titles would also not prevent those lands from being sold, what could not be done in quilombola territory, sustains AQUINAC’S president.

Regarding the palm culture, quilombola movements sustain that they cannot take a stance, since there is no information about its impacts – whether positive or negative. “We do not oppose it a priori, but we want Biopalma to present us the project so we can take a stance”, says Borges.



Borges: quilombola areas threatened

QUILOMBOS E QUILOMBOLAS

Quilombos are social groups descending from African slaves brought to Brazil during colonial times, who resisted or rebelled against the colonial system and their condition of captives, forming independent territories.

Decree 4887, of November 20, 2003, in its Article 2, considers as communities remaining from quilombos the ethnic-racial groups, according to self-distribution criteria, with their own historical trajectory, specific territorial relations, presumption of black ancestry, related to resistance to historical oppression they suffer.

Nowadays, the government is examining processes of land regularisation for communities remaining from quilombos - an initiative that will benefit 500 communities in 300 territories. The federal government intends, until 2008, to benefit 22,650 families from 969 quilombola communities all over the national territory.

Source: The Palmares Foundation

4.4) CASE | Braspalma, AM – Small farmers might lose their plantations

The first experience with large-scale palm culture in the state of Amazonas emerged and vanished in the town of Tefé, in the centre of the state, in the 1980s, with the Amazonas Dendê Company (EMADE). Funded by the World Bank, the project initially included planting 2,000 hectares of oil palm (over an area of about 80,000 hectares provided by the government) and recruitment of rural workers to take care of the parcels.

After the project failed for lack of investments and political interest, and the area was abandoned by public authorities. With time, several families that used to work with EMADE as well as other squatters settled in the area formed small villages and developed intense family-based agriculture, diversified into parcels varying from 5 to 15 hectares, based on crops as manioc, corn,

black beans, native fruits, pineapple, passion-fruit, and banana, among others.

In early 2007, the state government promoted a series of studies to assess the possibility of resuming a project to plant oil palms in Tefé and in 2008 it started to negotiate the provision of 20,000 hectares from the former EMADE project to FELDA – Malaysia's agency for land development, represented in Brazil by Braspalma. The project is still in its early stages, but the perspectives for its development are many, depending on the point of view of the many actors involved (such as the State Department of Rural production, the Land Institute, and Braspalma itself).

According to Amazonas' secretary for Rural Production Eron Bezerra, the state government intends to sign an agreement of intention with FELDA/Braspalma still in 2008, setting up details of the commitments assumed by the parts. When the process starts to be implanted, 10,000 hectares will be initially offered to test the feasibility of the initiative and only after an evaluation of results will government provide the other 10,000 hectares, said the secretary. According to him, the expectation is that FELDA/Braspalma will immediately build a crushing unit in Tefé and a refiner in Manaus, whose demand will be met by imports while the Tefé area is still not productive.

Braspalma, in turn, says it wants to start planting on only 3,000 hectares of its own land, with the possibility of giving incentives to small farmers to plant 1,000 more hectares in a partnership or integration system. The company also explains that the state will provide only part of the land from its projects, since it intends to buy other areas in Tefé on its own. Regarding processing structures, the coconut crusher and an oil refiner are still under study, but they will certainly not be installed before seven or eight years.

The future of small farmers that now occupy land where Braspalma will be planting palm, in turn, divides opinions within the government itself. According to Eron Bezerra, there will be no dislodgement in the former EMADE area, and no farmer will be displaced. All of them would receive ownership titles for their parcels and could choose whether or not they are willing to establish partnerships with Braspalma. The idea, he says, is that at least 1,000 families plant about four hectares of oil palm for the company.



Diversified family-based agriculture might lose its strength with oil palm



Flour house in a community within EMADE land

On the other hand, technical director of Amazonas Land Institute (ITEAM) Miguel Abi-Abibi sustains that first of all the agency will have to study the land situation in that town in order to detect the number of families that are on the EMADE area and in others, off the perimeter, which would have been occupied illegally. With those data, it will be possible to develop a project to relocate the squatters, a large part of whom will be moved.

The alternative for those families, sustains the ITEAM director, would be the creation of settlements, probably near lake Caiambé, with parcels of about 15 hectares, supported by INCRA (since the state has no funds to structure such a large-scale project with housing, roads, energy, etc.). But, initially, Abi-Abibi believes that there is not enough area to settle the some 3,000 families that should be removed from EMADE and other private areas.

In Tefé, the perspective of the arrival of FELDA/Braspalma encouraged farmers with its promises of job and income generation. With an economy based on Brazil nut extraction, oil palm would be a welcome alternative in the town, but the lack of information about the squatters' future is raising concerns. A first public hearing where Braspalma explained the project to the population took place in July 2008, but the scarce information about land issues led farmers to demand another special meeting on the subject.

According to Raimundo Neves, president of the community association of Mapi, which includes 138 families who live in the EMADE area, the government promises that each family would get a 5-hectare parcel

from which 4 hectares would be for oil palm and one for food crops. Banco da Amazônia would finance the implantation of the crop (which has an average cost of R\$ 7,000 in the area, according to Embrapa), and the company would provide technical assistance. Where and how – and even if – such promise would come true is still a big question mark, says the farmer.

Another issue that is not clear to farmers is what type of option families will have in the process of regularising land: Will they be obliged to plant oil palm to receive the ownership title or a parcel in a settlement or those who are not willing will not have to join the project? “If we want to give up, will we have to leave this area?”, questions Jessé Glanio, president of the association of the EMADE community.

The projects' environmental aspect can also become a complicating factor. According to Amazonas State University professor Afonso Valois, oil palm will really be an impulse to the town's economy, but there is not enough deforested land in the area to establish Braspalma. “There will certainly be deforestation, but we have to work with oil palm positive aspects regarding the environmental issue, as its capacity for carbon sequestration”, sustains Valois, for whom the issue will have to be evaluated on a pros-and-cons basis.

On the other hand, in order for Braspalma to plant 20,000 hectares of palm, another 80,000 would have to be available for the project's legal reserve. Speculation about “donation” of a forest area of that size to the Malaysians are considered strange in Tefé, but, according to secretary Bezerra, the idea is that the state government “blocks” forests in that volume to establish

a special protected area (SPA), whose commercial exploration would not be granted to the company.

The legal reserves that would have to be associated to settlements or other settler lands, in turn, are yet another issue to be discussed, according to ITEAM director Miguel Abi-Abibi, since the problem will one again be availability of land. He says that the situation will only be solved with the approval of Bill 6424/2005, converting oil palm in a species that can be used to recover legal reserves. "Without that, there will not be enough degraded areas to implant the project and solve remaining land and social problems", says the ITEAM director.

Finally, despite Tefé's excellent soil and climate conditions, there are doubts about the economic feasibility of palm projects because of the town's location and the difficulty and the cost of transporting the production. That factor led Agropalma, which has studied the region for over ten years, to rule out investments in Tefé. According to the company, transporting fruit or oil from Tefé to Belém – or even to Manaus – is very expensive and it is strange that FELDA chooses to pay such a price, which would be close to take the product from Malaysia to Europe. That obstacle could hamper the project's future success, according to Agropalma.

Braspalma is also cautious about the economic aspect. Firstly it wants consultants hired to assess the potential of the project to present data on feasibility, which will also take into account the environmental impact studies and the possibility of raising funds. According to the company, the perspective is that 50% of investments be the company's own capital and 50% be raised with financial institutions such as Banco da Amazônia (BASA), Banco Nacional de Desenvolvimento Econômico e Social (BNDES), Inter-American Development Bank (IDB), the World Bank (BIRD), and private investors. Not while all aspects are not clear, the company says that it will hardly be able to say anything more concrete about the project.

5) OIL PALM IN BAHIA

In the state of Bahia – the second largest producer in Brazil, after Pará, the characteristics of the crop are very different from those found in the Amazon. Plantations cover about 45,000 hectares over a region called the Dendê Coast, between Camamu and Valença. Differently from what happens in northern Brazil, Bahia's palm, brought and introduced into the environment by slaves, eventually became an almost "native" species in the Atlantic Forest zones in the south of the state.

Bahia's Oil palm, whose core dissemination agents are vultures (they eat the coconut and defecate seeds all over the region), occurs naturally in remote areas until 20 km from the coast. It has been explored since long ago by small farmers in an extractive system, and its oil, produced manually for home consumption and sale in local markets, has become one of the major symbols of Bahia's culture and cuisine.

A crucial difference between oil palm culture in



Oil palm plantation in Bahia

the Amazon and in Bahia, however, is that in the latter case, it is a strong pillar for family-based agriculture, which occupies areas that vary from 5 to 50 hectares. In the town of Taperoá, the Dendê Coast's largest producer of oil palm, for instance, a large part of the over 600 producers that work with the crop are families, and even companies considered large scale, such as Óleos de Palma S/A Agro-industrial (Opalma), have relatively small areas – in Taperoá, Opalma has 1,500 hectares of oil palm and 200 hectares more in Nilo Peçanha. But out of the 10,500 tons processed annually by the company, it produces only 4,500 tons. The remaining 6,000 tons are bought from local midsize and small farmers.

Manually produced palm oil is made by removing

later cooking the pulp, which contains most of the oil. That removal is often manual, with pestles, but several farmers already have the so-called *rodão*, or big wheel, an animal-driven instrument that consists of a stone or cement wheel that surrounds a circle dug on the ground, which crushes oil palm fruits. The use of the residues of that process as fuel for cooking ovens has also reduced the environmental impact of cutting firewood¹².

Similar to the flour houses – rudimentary facilities for community production of manioc flour found all over Brazil – the palm oil wheels are mostly private but end up serving also other families from the community for small fees. According to a 2006 study by the Bahia's Regional Office of the Ministry of Agriculture¹³, grinding wheels account for most of the palm oil processing units, generating about 3,000 direct jobs and a sizable part of the region's income.

While an important part of production by wheels is sold directly to the consumer, the largest market is concentrated in four midsize and large companies – Opalma in Taperoá, Oldesa in Nazaré,



Crushing wheel

Jaguaripe in Muniz Ferreira, and Mutupiranga in Nilo Peçanha. Together, they process most of the raw material produced in the state and usually control prices paid to farmers.

► Bottlenecks

In spite of oil palm's economic and social importance at the Dendê Coast, the precariousness of the culture and its low productivity are still a problem to the region. Bahia's spontaneous oil palm areas include the Dura and Pisifera varieties, but only the former is used to extract oil. It yields between one and three tons per hectare – a lot lower than the tenera cultivated variety, which can produce as much as 25

tons per hectare and in Bahia, from six to 20 tons.

The Executive Commission for the Planning of Cocoa Plantation (CEPLAC) – the main agency for research and support to the crop in the region, which supports 1,500 farmers among the 3,000 ones that are active – has developed projects with small farmers in order to introduce a more commercial culture, such as replacing native species with improved varieties like Tenera. But they admit that the lack of seeds is a bottleneck in their work.

In order to leverage the activity, oil palm culture has been included in the Executive Plan to Accelerate the Development and Diversification of Agribusiness in Bahia's Cocoa Region (known as the cocoa-oriented version of the federal government's Growth Acceleration Plan, or PAC). As part of the project, in December 2007, Petrobras signed contracts to buy castor bean and sunflower seeds and palm oil with seven family farmer co-operatives, in order to commercially produce biodiesel at the Candeias processing plant. According to CEPLAC, the contracts, valid for one year, include buying about 1,000 tons of palm oil in 2008.

6) A ROUNDTABLE ON SUSTAINABLE PALM OIL

With the increase of palm oil in the international market of vegetal oils, social and environmental problems related to its worldwide production – massive deforestation, clearance by burning, displacement of small farmers, and land conflicts, among others – started to draw attention and criticism from environmental organisations. Large companies that produce and consume the oil became the target of questioning and pressure by public opinion and, in 2001, the environmental NGO Worldwide Fund for Nature (WWF) started contacts to organise the several segments involved in the productive chain and the palm oil market, resulting in 2005 in the creation of an international forum to discuss sustainability criteria for the industry – the so-called Round Table for Sustainable Palm Oil (RSPO).

Among the targets to be met by its members, RSPO proposes studying and setting definitions and criteria for sustainable production and use of palm oil as well as the development of methodology for the adoption and verification of best practices for plantation establishment and management, procurement, trade, and logistics, among others. Based on those principles, it intends to monitor the industry and certify companies with better performance, which can be one additional important element in the dispute for the international market.

In spite of good principles, however, the ability to verify the adoption of criteria by the companies is minimal, says environmental NGO Greenpeace. According to a report on impacts of palm in Asia – called “How the palm oil is cooking the climate” and published in early 2008 –, “the organisation’s [RSPO] impacts on restraining business expansion over tropical forests have been insignificant. Nowadays, the organisation does not forbid oil producers to get involved in forest conversion, and neither does it stipulate fines or limits for greenhouse effect gas production from the activity. Besides, it has no mechanism to segregate the oil produced under the criteria and that based on deforestation”. Among the companies associated to RSPO, such as Johnson & Johnson, Unilever, Nestlé, Bayer, Cargill, Bunge, ADM, Kellogg, L’Oreal, Procter & Gamble, Kraft, Greenpeace’s report points out that especially Unilever – the largest buyer and trader of oil in Malaysia and Indonesia –, Cargill and ADM as deficient in their systems to track sustainability criteria.

On the other hand, joining the RSPO can be a major commercial advantage for the oil producer that sticks to the organisation’s rules. That was one of the reasons that led Brazilian company Agropalma to join the Roundtable. According to the company’s commercial director Marcello Brito, since the 1990s the investment in social environmental and quality standards has been incorporated into Agropalma’s management, which has the certifications ISO 9001, ISO 14001, and OHSAS 18001 (product quality, environmental protection, and employees’ safety and health). Having planted “lots of palms on forest areas in the 1980s, says Brito, today the company has benefited from the adoption of social-environmental standards because of buyers’ demands. “We are palm oil suppliers of Nestlé, Kraft, Pepsico. It is a mistake to think that only the international market has its demands; their branches in Brazil also have theirs. Therefore, RSPO will provide us the bases for a process of permanent improvement”, he explains.

According to Brito, the company intends to obtain the Roundtable’s certification still this year, through a process conducted by the Biodynamic Institute (IBD) – the only Brazilian institution accredited by RSPO. The costs of management and documentation mechanisms for the company’s socio-environmental practices are high, but they are seen as an investment rather than an expense, since the future should pay off.

On the need to apply RSPO criteria in Brazil – formulated basically as a response to deforestation problems in Asian countries –, Brito says that the agrofuel fever in the country can really cause future problems, specially by attracting foreign investors. According to the Agropalma director, the fact is that there is a large

volume of degraded areas in the Amazon, but, since they are not continuous land, large oil palm projects will eventually lead to cutting intermediate forest areas.

BABASSU PALM

1) PRICE INCREASES CAN BRING POVERTY

After the PNPB was launched in 2004, research institutes and agroenergy enterprisers raised their expectations about and investments in the potential of several oleaginous plants for producing biodiesel, especially those that could represent more appropriate alternatives to regional geo-climate specificities. In the wake of economic results from the oil palm agribusiness in the Amazon, several palms and other native species from the biome, such as babassu, copaíba, andiroba, macaúba, açai, cupuaçu, bacuri, tucumã, uricuri, and murumuru, among others, were considered as possible raw materials for agrofuels. However, only the studies on the use of babassu concretely received significant investments.

A native palm from the south of the Amazon basin, where the tropical forest becomes cerrado, babassu is one of the core income sources for over 400,000 families in the Brazilian states of Pará, Maranhão, Tocantins, and Piauí. They collect coconut and extract the almonds to make oil manually, comprising the “category” of the babassu coconut quebradeiras, or “women breakers” – officially recognised by the government as a traditional population.

The first project to use babassu to produce biodiesel was created in 2004 by the government of Maranhão. The state has about 80% of babassu plantations in the legal Amazon. Initially, the government established a working group in order to study the technical, economic, social and environmental feasibility and competitiveness of agrofuel from babassu, and it planned a biodiesel pilot plant with support from the Ministry of Science and Technology’s Energy Sector Fund. However, problems internal to the government ended up stopping the works, which advanced little in terms of conclusive results.

While the production of biodiesel from babassu is still at the project level, communities that have been living out of the income from manual coconut collection and processing fear losing babassu areas with the increase in the product’s prices. The problem is already occurring since steel factories from the Carajás industrial cluster in Pará have “discovered” the high caloric value of the babassu charcoal and started to lease palm areas or to buy the whole coconut for their charcoal kilns.

BABASSU COCONUT BREAKERS

They are extractive populations living mainly out of babassu collection and its use, especially in the midnorth, in the cerrado, and the forest, including Maranhão, Piauí, and parts of neighbouring states. In February 2007, a decree was signed establishing the National Policy for Sustainable Development of Traditional Peoples and Communities. The decree defines actions in the areas of education, land regularisation, citizenship recognition, protection of traditional territories, construction of infrastructure, attention to health, institutional strengthening, sustainable production, safety and social inclusion for traditional communities such as babassu coconut breakers, quilombolas, rubber tappers, Amazon agroextractive people, Indians, Pantanal people, small scale fishermen, gypsies, "faxinairos", "sertanejos", "pomeranos", "caçaras", and "geraizeiros", among others.

2) GENERAL ASPECTS

A native plant from Southern Pará, Western Maranhão, Northern Tocantins, and Western Piauí, babassu is one of the most important products in Brazil's extractive activity. Of easy and fast proliferation, the babassu palm takes about 12 years to start producing – in a highly symbolic image, its reproductive cycle is compared by coconut breakers to that of women, who become apt for reproduction at the age of 12 and have a 9-month gestation, the same time a palm's first babassu bunch takes to mature.



Babassu palm

A palm can produce up to six coconut bunches a year, which are collected to use the almonds (each coconut has up to five almonds) for extraction of oil, the mesocarp to make flour, and the exocarp (shell) to make charcoal. Its large leaves, which can measure up to

eight meters, are also largely used to cover houses and for producing handcrafted objects for sale. The babassu oil – its coconut's main commercial product – is used to make soap, glycerine, and cooking oil.

According to data from IBGE's historical series on babassu production, the volume of the product has decreased in the last 7 years. In 1990, the first year accounted for, the country produced 188.7 tons of almonds – a performance that gradually decreased until in 2006 – the last year accounted for – when it reached 117,100 tons.

Such decrease in production is related to reduction in the babassu palm areas. According to the publication *Guerra Ecológica nos Babassuais*¹⁴, coordinated by anthropologist and Amazonas Federal University professor Alfredo Wagner de Almeida, the expansion of cattle raising, soybean, and the cutting of second-class timber were responsible, specially in the last 20 years, by the fast cutting of babassu areas in the legal Amazon. Only in the state of Maranhão, 40% of original areas were extinct until 2004 (about 4 million hectares).

3) BIODIESEL ON PAPER

In 2004, the Maranhão state government started to formulate a project to produce biodiesel from babassu, in order to take advantage of the potential of the state, which has about 80% of the babassu areas in the Legal Amazon. Within Programme Biodiesel of Maranhão, a working group was created in order to study the technical, economic, social, and environmental feasibility and competitiveness of the "babassu agribusiness", besides a project to establish a pilot plant that received R\$ 700,000 from the Ministry of Science and Technology's Energy Sector Fund.

According to Adailton Maciel, a researcher with the Biodiesel Centre of the Federal University of Maranhão (UFMA), the project ended up stuck for technical problems, but it is already known that there are major difficulties to create a large-scale programme for biodiesel de babassu. He says it is not possible to sustain a biodiesel industry only through extractive activities. On the other hand, the social issue regarding coconut breakers is highly complex. "Today we have no way to make biodiesel from babassu, and I don't even know if we will", says the researcher.

In Tocantins, in turn, Ceará-based companies Tecbio (agrofuel industry) and Tecnoforma (engineering) intend to start a project to organise the production in the Bico do Papagaio region, at the state's far north, aiming at the future installation of a pilot processing

plant to produce agrofuels such as biodiesel, biokerosene for aircrafts (made from the coconut mesocarp). The company claims to have the technology, but it will not risk to say deadlines to start activities.

4) ENVIRONMENTAL, SOCIAL, AND LABOUR-RELATED IMPACTS

Collection and extraction of babassu coconut almonds – which account for the family income of over 400,000 women in the states of Pará, Maranhão, Tocantins, and Piauí – has suffered a significant setback since the caloric potential of vegetal charcoal from whole coconut or its shell was “discovered” by pig iron factories supplied by ore from Carajás.

In spite of fast deforestation in the last 20 years, babassu still covers about 18 million hectares in four Brazilian states. The breakers, by and large “landless” women, collect the coconuts traditionally from palms located all over the region, regardless of who their owners are. The babassu almond is used to make cooking oil, milk, or soap. The mesocarp is the raw material for flour and the charcoal made with the shell is used for the families’ own consumption (as firewood for cooking) or to be sold the local market.

From 2001 on, however, the fast expansion of agriculture and cattle raising and the resulting massive cutting of babassu palms, as well as “closing” of babassu areas, (restricted access to private properties by landowners and gunmen) have triggered the struggle for the Law of Free Babassu. Under debate in Congress, that law should guarantee breakers’ unrestricted access to babassu palms (regardless of their location in public or private areas) and forbid cutting the palms. But it was when coconut prices soared because of demand for raw material to make vegetal charcoal, more sharply since 2005, that an impact started not only on income, but on the whole culture of breakers.

According to the Inter-State Babassu Breakers Movement (MIQCB), active in the four states, babassu coconut, which until recently had no commercial value for landowners, has become a market product. While price increase might stop the cutting of palms, it has also restricted even more the access of breakers to the product and started to change the whole extractive activity of the communities (see case).

On the other hand, the weakening of breakers’ communities and their traditional production chain (collecting the coconut, extracting almonds, making the oil, and commercialising the product in the local market) allowed the exploitation of workers by companies like Tobasa – Bioindustrial de Babassu S.A, located in the town of Tocantinópolis, Tocantins.

In December 2004, Tobasa, which produces babassu oil, coconut soap, alcohol, protein by-products, ecologic charcoal, and activated charcoal, was caught in the act by the federal government’s mobile inspection group with 174 workers in conditions similar to slavery at the collection of babassu coconut. The action eventually included the company in the “dirty list” of slave labour, where the Ministry of Labour and Employment lists employers that have used that kind of labour, in August 2006. In July 2008, Tobasa was excluded from the list after regularising its situation and undergoing the two-year waiting period.

Companies in the “dirty list” lose access to federal credit and are avoided by clients that have signed the National Pact for the Eradication of Slave Labour. Tobasa used to sell its production to large companies such as the Bertin Group and Química Amparo. When both companies learned that Tobasa was included in the “dirty list”, they sent a letter to the National Pact for the Eradication of Slave Labour informing that they were cutting it from their list of suppliers until it settled its issues with the Ministry of Labour and Employment.

According to the Labour Department of Justice, workers freed at Tobasa used to live in urban areas and were taken to the region of collection in irregular or unsafe transportation means, or they were lodged in straw shacks by the company. Most workers had no contract, and they were paid according to their production – R\$ 15 per day of work or R\$ 0.40 per cubic meter of babassu coconut collected, and the company did not provide “decent working conditions, such as drinking water and personal protection equipments”. Workers included 12 children and adolescents under 18, the youngest being 12 years old.



Babassu area in Maranhão

In an interview to Brazilian newspaper *Folha de S. Paulo*, the company sustained that “employer-employee relations were against the essence of the extractive process” and that it was impossible to impose “hierarchy, economic dependence, or habitualness to babassu collectors, and those are three pillars of the labour tie¹⁵.”

4.1) CASE | Babassu price increase threatens the income of coconut breakers

Active in the midnorth areas of the states of Pará, Maranhão, Tocantins, and Piauí for over a century, babassu coconut breakers, recognised as and included by the federal government into the concept of Traditional Population in early 2007, developed one of the most important extractive activities in the Amazon region. The increase in babassu prices, however, is changing the coconut collection activity and the manual production of babassu oil as well as weakening the activity’s economy.

According to Ana Carolina Mendes, technical coordinator of the Inter-State Babassu Breakers Movement (MIQCB), in São Luís, Maranhão, many breakers have been turned into mere “catchers”, collecting the whole coconut for landowners, pig iron companies, or charcoal companies, with extremely low payment that, besides not providing the necessary income to maintain their families, also deprives women of the babassu by-products. “Now they pay us R\$ 1.00 for each coconut bag. From that, breakers could take 12 kg de almonds (enough to produce 1.5 litre of cooking oil, sold by R\$ 6.00 on average), 1 kg of mesocarp, sold by R\$ 6.00, and four cans of shell charcoal, sold R\$ 2.50 each can”, sustains Maria Querubina da Silva, MIQCB coordinator in Imperatriz. Maranhão.

In the small village of Água Viva, 50 km from Imperatriz, Maranhão, some 15 families who live only out of babassu started to be threatened by local landowners since 2005. “They are five large landowners who live in the area already destined to the creation of Mata Grande Extractive Reserve (RESEX). Nowadays, babassu areas are leased to steel factories from Açailândia, Maranhão. Anyone who enters the areas is shot. We advise no one to try”, says Ribamar da Silva, president of the Mata Grande Resex Association, who has already received death threats. “When I learned about the leasing, I couldn’t sleep at night. I have no income, the only income is coconut from babassu palms”, adds coconut breaker Antônia Lima.

In the community of Mundo Novo, in Amarante, Maranhão, about 150 km from Imperatriz, virtually

all babassu areas were leased by a charcoal company belonging to a supplier of the steel factory Ferro Gusa Carajás (FGC), which belongs to Vale do Rio Doce and Terra Norte Metais, in Marabá, Pará. According to the president of the local association of breakers, Ivaneide de Andrade, the breakers even negotiated the license for coconut collection in the areas leased, transferring all the shells and part of the almonds extracted to the company. In 2008, however, the share of the almonds that stayed with them dropped from 70% to 50%, after the leaser started selling babassu oil to a company. The same leaser also pays, according to Andrade, R\$ 0.90 for each 60-litre sack of coconut to collectors. “Since the leasing started, life has become much harder. Lots of people have no work between December and April, between harvests”, she explains.

In the community of Grotão, also in Amarante, Maranhão, the situation has deteriorated a lot in recent years. Many breakers have been forced to buy coconut to keep their small clientele of cooking oil and charcoal, and one load of a ox-drawn cart is sold by R\$ 35.00 to R\$ 50.00, which leaves very little profit to breakers. “Besides, the buyers of oil and charcoal are those fixing the prices they want in our products. Here we sell the litre of oil for R\$ 4.00 and the bag of charcoal for R\$ 6.00. That’s too much humiliation”, lets out breaker Raimunda de Andrade.

The project for production of biodiesel from babassu, announced by the Maranhão state government, concerns the MIQCB. According to the movement’s technical assistant in Imperatriz, Maria José Viana, adding commercial value to the coconut might worsen the problems already felt with the increase in the prices of the product by the charcoal and steel industries, which could create a real social crisis.



Babassu breakers in the Grotão community in Maranhão

1) THE NEW MAP OF COTTON

The map of cotton culture has been redrawn several times along the country's history, and the last harvests strengthen the idea that a new draft is about to be finished.

Having been the country's largest cotton producers, the states of Paraná and São Paulo now witness the decay of their plantations, replaced year after year by soybean and sugarcane. In the meanwhile, cotton speeds up its march over Cerrado areas, not only in areas already consolidated in Mato Grosso, Goiás, and Western Bahia, but also in positions in Southern Maranhão¹⁶ and Piauí that until recently were wild land.

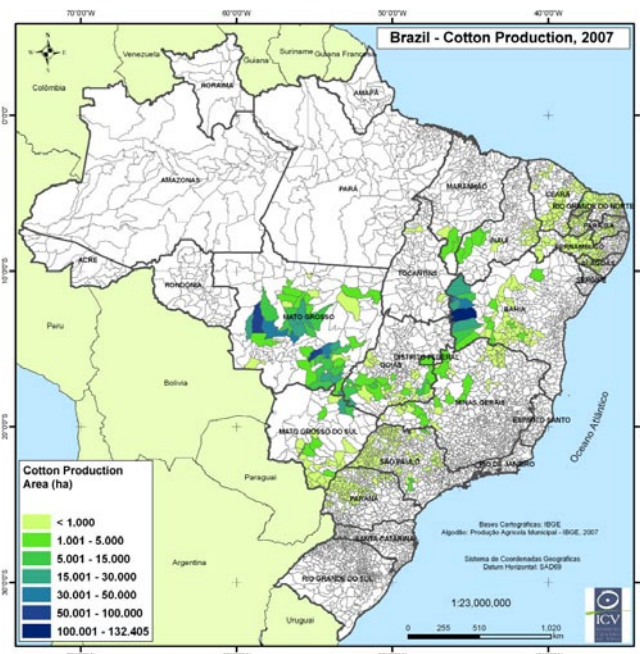
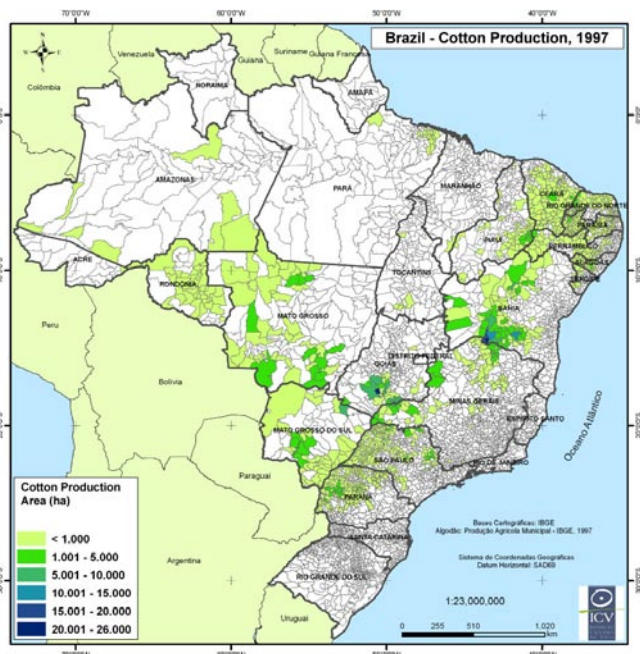
In the last harvest, production dwindled definitely in Paraná and São Paulo. Those states, which reached 52%¹⁷ of the area planted with cotton in Brazil in 1990, sowed only 2% of the country's total, estimated in 1.08 million hectares¹⁸ in 2007. In the same period, Mato Grosso remained as the largest producer of cotton lint, reaching 542,000 hectares, virtually half the national area.

That migratory tendency towards the Cerrado was strengthened almost two decades ago. Between 1990 and 2007, the area sowed in São Paulo decreased from 300,800 hectares to 36,000, and from 490,000 to 12,200 in Paraná. On the contrary, Mato Grosso¹⁹ saw its cotton plantations increase from 43,400 hectares to 560,800 in the same period. In the Cerrado areas of Goiás and Bahia, growth has also been expressive. In the former case, the planted area jumped from 188,000 to 301,900 and in the latter, from 35,500 to 82,800²⁰.

A new element confirmed by recent harvests is the expansion of cotton culture in Cerrado areas in southern Maranhão and Piauí. It comes at no surprise that, between the 2006/07 and 2007/08, harvests, the area planted with cotton in Piauí went from 13,200 thousand hectares to 17,100 (a 29.7% increase) and in Maranhão, from 7,300 to 12,300 (68.5%), while the total area in Brazil remained stable.

In all those cases, migration of cotton culture to the Cerrado areas has a similar explanation: producers seeking cheaper land, with flat topography, regular rainfall, and intense light. The production model employed, based on the business culture, with intense use of technology, large-scale production, and integration of production and cottonseed extraction, aims at adding value to the agricultural product and competing in foreign markets.





That model is distinct from the one that used to be seen in cotton plantations in Paraná and São Paulo. Although the process of technifying the crop has been assimilated by producers in those states, more expensive land and predominant small and midsize properties have hampered competition with the lint produced in large scale in Cerrado areas.

Farmers from Pará and São Paulo started to plant sugarcane and soybean, whose demand has increased with the construction of new sugar and ethanol processing plants and with the sharp increase in purchases from China, respectively. Even though some sectors are considering projects to resume cotton production in Paraná and São Paulo, that is not likely in the short run.

2) EXPANSION IN THE HORIZON

For the years to come, existing forecasts point to growing cotton production in Brazil. The country's Ministry of Agriculture estimates that the average growth per year between the 2007/08 and 2017/18 harvests will reach 4.41%. In that period, the production of cotton lint is estimated to go from 2.27 million tons to 3.51 million (+54%), domestic consumption will jump from 940,000 tons to 1.09 million (+15%), and exports will grow from 470,000 tons to 910,000 tons (+93%)²¹.

Those estimates, however, are conservative if compared to those made by the United States Department of Agriculture (USDA)²². According to the agency, Brazil will be the country to increase the most its exports between the 2007/08 and 2017/18 harvests. Shipping will go from the estimated 600 tons of lint in the

current harvest to 1.47 million within ten years, consolidating the country's position as one of the world's major suppliers, together with the US, Australia, the countries of former Soviet Union, and Sub-Saharan Africa.

According to the USDA, the increase in world consumption of cotton lint within the next 10 years will be sustained by China's textile industry. World imports are estimated to rise 40% in the period, while Chinese imports will grow 91%, to 5.95 million tons in the 2017/18 harvest. Other Asian nations, such as Pakistan, Thailand, and Indonesia, will also import more in coming years.

That scenario benefits Brazilian exporters, because Asian markets are preferred by the country's cotton producers. In 2007, the five largest buyers of Brazilian cotton lint were Indonesia, Pakistan, South Korea, Japan, and China. Between January and June 2008, the leadership is with South Korea, Indonesia, Switzerland, Pakistan, and Argentina²³.

The evolution of Brazilian lint exports will depend on several market factors, including how much the world economy slows down and the rise in the value of Brazilian currency. In the former case, economic problems faced by the US, Europe, and Japan reduce the worldwide demand for textiles; in the latter, a cheaper dollar reduces competitiveness of Brazil's lint exports and favours its imports²⁴. It will also be crucial, according to market analysts, that the country recovers the Chinese market, which has reduced its purchases from Brazilian cotton producers.

3) COTTON AND BIODIESEL

The installation of a biodiesel production park in Brazil has created a new market for producers of oleaginous plants, including cottonseed. That product has been historically targeted by the vegetal oil industry and by cattle raisers, who used the processed product as animal feed. Now, biodiesel factories also want it. Today there are at least 24 processing plants ready or under construction²⁵, which are able to transform cotton oil into biodiesel.

The new demand has already driven up the prices of cottonseed in recent years. In Primavera do Leste, Mato Grosso, the ton of the product during periods of more commercialisation, between August and September, used to be traded, on average²⁶, for R\$ 170 in 2004. It went to R\$ 155 in 2005, R\$ 150 in 2006, R\$ 200 in 2007, and finally R\$ 500 in July 2008. In the week of August 18-22, prices returned to slightly lower levels of R\$ 400 per ton. But they still reached R\$ 500 in Goiás and the so-called Triângulo Mineiro, R\$ 400 in Rondonópolis, and R\$ 340 in Bahia.

According to economist Lucilio Alves, a researcher with the Centre for Advanced Studies in Applied Economics at São Paulo University (CEPEA/USP), the increase in cottonseed prices is explained by speculation, since, in practice, only a tiny amount of the product has been directed to biodiesel. And there are several explanations for that situation.

The first one is that the biodiesel industry focuses on soybean as its raw material. That occurs because it is more available in the market than cottonseed, and so it guarantees raw material all year round for the industry to fulfil its trade contracts. In the 2007/08 harvest, Brazil will produce 60 million tons of soy and “only” 2.4 million tons of cottonseed.

The second explanation is the dispute for cotton cottonseed between different segments: cattle raisers, the vegetal oil industry, and biodiesel processing plants – the last two segments often act in an integrated way. With so much demand, prices rise and reduce access to the product. Djalma Fernandes de Aquino, an expert from the Fibre Management of National Supply Company (CONAB), estimates that at least half of Brazil’s cotton production is destined to animal feed, especially in the Northeast region. The tradition of using the material and the existence of an old and consolidated market for small businesses contribute to that. The rest of the cottonseed is absorbed by the vegetal oil industry, including some of the large crushers present in the country, whose end product is highly valued in the market. According to Aquino, the price of

cotton oil usually stays 10% above that of soybean oil.

The third reason for the still low use for cottonseed as a raw material for biodiesel is the small presence of oil in it. It is not feasible to produce cotton specifically to make biodiesel, and the crop’s main purpose is still to obtain lint. According to the Cotton Unit of Brazilian Agricultural Research Corporation (EMBRAPA), species varieties planted in Brazil have on average 14%-16% of oil in their mass. Therefore, soybean, with 18% of oil, palm almond, with 26%, and castor bean, with up to 45%²⁷ are more attractive.

Still according to Embrapa, there are cotton varieties with up to 32% of oil in their seed, but they would have to be further developed in order to be used in large scale. While that does not happen, the Brazilian biodiesel industry keeps living on soybean. An estimated 80%-90% of the almost 1.2 billion litres²⁸ of biodiesel that will be produced in 2008 shall come from that grain.

4) SOCIO-ENVIRONMENTAL IMPACTS

The scenario of low use of cottonseed by the biodiesel industry is not unchangeable. Political decisions can be made any time regarding the increase of the biodiesel mixture to diesel, which would change the calculations about which is the best raw material to process. After the increase from 2% to 3% of the mandatory mixture in July this year, the biodiesel lobby is working to reach the 5% target as soon as possible.

Therefore, farmers, including cotton producers, will be increasingly able to look more and more at the biodiesel industry as one of the aims of their production. The recent increase in cottonseed prices in the Brazilian market, even though it has a peripheral impact on the gains of cotton producers, strengthens the segment and becomes yet another impulse for the decision to plant.

Such reasoning justifies that organized civil society pays more attention to the expansion of cotton plantations, especially in Cerrado areas. As the second largest biome in Brazil, with 23% of the country’s territory, Cerrado is the preferred area for expansion not only of that crop, but also of agribusiness in general, and the neglect with which public actors and private companies treat it is scary.

In spite the rich biodiversity and the importance for climate regulation and the preservation of water resources²⁹, concerns about the preservation of the biome are far from those regarding the Amazon and the Atlantic Forest. Cerrado has no satellite monitoring systems like those existing for the Amazon forest and, instead of envi-

ronmental policies, there is a wealth of policies encouraging the expansion of agriculture and cattle on it.

The lack of consolidated data about its degradation comes at no surprise. The most recent map of Cerrado devastation was published by the NGO Conservation International³⁰ in 2004, based on the analysis of satellite data collected in 2002. At the time, only 34% of the biome remained preserved. Since then, the area planted with agriculture in Brazil has increased strongly. Between 2002 and 2007, it went from 16.3 million hectares to 20.6 million and the cotton area, from 763,900 hectares to 1.1 million³¹. Most of that growth has been absorbed by Cerrado areas.

A sign of such impact was the alert launched by the Map of Priority Areas for Biodiversity, made by the Ministry of the Environment. Its last update in March 2007 found that six areas of high biodiversity in the Cerrado were threatened by the expansion of cotton plantations. The same study also found that sort of problems in an area of another Brazilian biome, Caatinga, located in the Northeast region and covering 10% of the country.

In the case of Cerrado, three problem areas are located in Mato Grosso: “Sapezal/Campos de Júlio”, “Nascentes do Juruena”, and “Terra do Papagaio”. All of them are located in areas where cotton culture is increasing, especially in the town of Sapezal, which, with 61,900 hectares of cotton planted in the 2007/08 harvest, has the third largest cotton area in the country and the second largest in the state. According to the Ministry of the Environment, those areas are threatened by irregular deforestation, uncontrolled expansion of agribusiness related to soybean, corn, and cotton, predatory hunting, infrastructure construction works, such as roads and hydroelectric plants, and contamination by agrochemicals. The presence of Indian groups such as the Parecis, makes the agricultural expansion even more conflictive.

The Map of Priority Areas also highlights the cotton threat in two Cerrado areas and one Caatinga area in Bahia. It should be pointed out that the state has some of the largest cotton-producing towns in Brazil, including São Desidério, with the country’s largest cotton area (132.4 thousand hectares), and Barreiras, the fourth largest producer, with 48,900 hectares. The major concerns of environmental authorities in Bahia’s Cerrado are the basins of the rivers “Corrente” and “Grande”, with the irregular use of water resources, contamination from agrochemicals, land grabbing by large owners and land concentration. There are concerns about the degradation of the São Francisco river, since both the Corrente and the Grande are its tributaries, as well as the aquifer Uruçuia, which runs over 76,000 square kilometres between southern Piauí and North-western Minas Gerais, with its largest part within Bahia.

In the case of Bahia’s Caatinga, the warning involves the region around the town of Guanambi, in the southwest of the state. According to assessment by the Ministry of the Environment, the re-emergence of cotton after its decay in the 1990s will place the remaining areas of Caatinga, buriti palms, and Cerrado at risk. The Ministry itself admits, however, that more studies are needed to define the real danger faced by the region.

The last case of threat to biodiversity described in the Map of Priority Areas is related to the Grande Sertão Veredas-Refúgio corridor, in Northern Minas Gerais. That Cerrado area is being recovered since the enlargement of the Grande Sertão Veredas National Park in 2004. Even so, authorities consider that agricultural expansion might damage the region’s traditional populations, such as “geralists” and cowboys, Indians, as well as the local flora and fauna. In order to solve the problem, environmental authorities and NGOs advocated that landowners create private reserves around the park, which would help to reduce the pressure from the agribusiness.

4.1) CASE | Cotton re-emerges in Southern Bahia



Processed cotton bales from family-based agriculture in Guanambi, Bahia

About 470 km separate two opposed worlds in Brazil’s cotton plantations. Both are in located Bahia, the country’s second largest producer, losing only to the state of Mato Grosso.

On one side there is Western Bahia, including cotton-champion São Desidério, but also other important towns for that crop, such as Luis Eduardo Magalhães, Formosa do Rio Preto, and Barreiras; at the other side, Guanambi, hub of the region known as the Iuiú valley, in South-western Bahia. With results still modest in absolute terms, the area experiences a true cotton resurrection. As a traditional cotton region in the country, the valley saw the decay of plantations driven by the combination of pests and the competition with cotton from other parts of the world, after the fall in import taxes in the 1990s.

But a large part of that reality will be lost if the difference between those two hubs is measured only in tons produced. After all, absolute results of production based on huge land properties, strong mechanisation, and high consumption of inputs – the case in the west – cannot be compared with that based on small properties and driven only by the power of family-based agriculture, as is the case in Iuiú.

Another factor has contributed for South-western Bahia's cotton to regain the status it already had in Brazil. For five harvests the region has taken part in the programme of revitalisation of cotton plantations conducted by the Bahia Agricultural Development Corporation (EBDA). Furthermore, in the production period of 2007/2008, it could count on the pioneering work of that company also in the stages of processing and trading the production.

In this first experiment, 296 farmers from seven towns in the region joined the programme. The partnership between EBDA and small farmers guaranteed success of processing plants and the sale of all the cotton they had planted. Processing was paid by 70% of the cottonseed, while the remaining 30% – the seed is often used as animal feed – and all the fibre was available for rural workers. “With that programme, farmers leaped three steps in the cotton production chain”, sustains Ernesto Marcos Lacerda, director of the Caetitê regional branch of EBDA.

As for processing, direct contracts were signed between the processing company, which used to be idle, and producers. After processing, also through the intermediation of EBDA, all the product was sold to the textile industry. According to Lacerda, over R\$ 800,000 were generated by that trade and the whole amount went to the workers.

Therefore, the company's expectation is that, in the next harvest, the number of towns and producers involved increases.

As for the quality of the cotton produced by family-based agriculture in South-western Bahia, rater Heral-

do Carvalho confirms that it leaves nothing to be desired in comparison to the Western one: “The cotton produced in the Southwest this year was well received by the industry, which is very demanding”. He says that the difference is that the western product already has its reputation in the market, while that from the surroundings of the Iuiú valley was marked negatively by the decay of the last decade. “It is a question of time until the cotton from here [Southwest] regain its name in the national market”, he closes.

In a sense, the quality of the product from the Southwest is even higher than that of the Barreiras region. Since the cotton in the valley is collected manually, based on the family system, fewer residues are left in comparison with the West's mechanic harvest.

According to Lacerda's view, that competition between production hubs is healthy and it helps to build a good image for Bahia's cotton in the Brazilian market as well as the world over.

The cotton culture in South-western Bahia is still starting to resume, but EBDA's example shows that with more assistance to producers, obstacles will gradually fall. One of the strongest obstacles is the belief that cotton is a difficult crop that demands high investment. And that has already been countered by the partnership between EBDA and producers. “In the west, productivity is very high, but so are costs. With family-based agriculture, production is much lower but costs are infinitely lower”, explains Lacerda. That is why a small producer can have more profits per hectare than a large one.

“For small farmers, planting cotton alone, depending on credit, is still not feasible”, says Valcirez Rodrigues, a member of the Union of Rural Workers of Guanambi. “But with that opportunity of a partnership with EBDA, it is possible to produce”. He says that the fact that the company distributes seeds and pesticides, provides technical assistance, and lends tractors to prepare the soil is what makes the difference for producers to have joined the programme. “That ways it is viable”, he says.

The challenge, as the Ministry of the Environment warns in its Map of Priority Areas for Biodiversity, is to assure that the re-emergence of cotton in the Guanambi area is compatible with environmental preservation and that it does not threaten remaining areas of Caatinga, buriti palm, and Cerrado.

► Contamination by pesticides

One of the major problems brought by cotton plantations is contamination by pesticides, both environmental and human. That happens because cotton is one of the crops that receive the highest amount of chemicals in the world. One of the reasons for that is that the plant draws lots of insects, attracted by its juicy and sugar-rich flower buds. From the 1980s on, for instance, the expansion of the praga do bicudo, as the insect *Anthonomus grandis* became known, contributed highly to the decay of cotton for several years. Embrapa Algodão estimates that 25% of all insecticide produced in the world go to cotton plantations. And Brazil is not different: the production model employed in Cerrado areas, based on large land extensions and high technology, further encourages the use of those products.

While record productivity levels are obtained³² in the production of lint, contamination risks increase for workers and the environment. A study by IBGE for the 1998 and 1999 harvests in the state of Paraná³³ found that cotton plantations received more pesticides from the “highly toxic” group than soybean, corn, and manioc.

Information publicised by health authorities in Brazil does not allow knowing how many workers are contaminated by pesticides used in cotton. But the latest data available at the National System of Toxic-Pharmacological Information (Sinitox), publicised in July, show that the number of workers contaminated by agricultural products reached 5,873 in Brazil in 2006, a 5.3% increase over the previous year. The number of deaths has also increased, from 159 to 178. In the Midwest, Brazil’s largest cotton-producer, 492 cases of contamination were recorded, while in the Northeast, the second largest producer, 1,116 people were contaminated.

In spite of being high, those figures are not a precise reflection of reality, since many cases are not informed. According to Mato Grosso Federal University professor Wanderlei Pignati, who has been coordinating studies about pesticide contamination, international estimates point that, on average, only one out of 50 cases is informed. Therefore, nearly 300,000 people could have had some kind of pesticide contamination in Brazil in 2006.

One of the major environmental impacts caused by cotton plantations is water contamination. In the Midwest, where 60% of Brazil them are located, Pantanal is one of the better documented cases of environmental contamination. Studies from Embrapa Pantanal³⁴ and the Mato Grosso Federal University reveal

that the planet’s largest humid area, with 140,000 sq km in Brazilian territory, is under threat by chemicals used by agriculture that is kilometres away from there.

Researchers collected, in 2001, 2002, and 2004, samples from 16 water courses that form the Paraguay River – the spinal cord of the biome’s diversity. They analysed 32 active principles, with 9 herbicides and 23 insecticides used in cotton, soybean, corn, and rice plantations. In the 46 samples collected between 2001 and 2002, 83% were contaminated by at least one of the active principles. One of the most impressive findings was the detection of pyrethroids, used in crops like cotton. Its traces in soil disappear within one to six weeks, but they are highly toxic for fish, water invertebrates, and water herbivorous insects.

Scientists warn that long-term contamination in the Pantanal might reduce the biological potential of animal and vegetal species. Without a change in agricultural practices, like using of direct planting and a decrease in pesticides applied, as well as the preservation of water springs and gallery vegetation, one of Brazil’s most valuable natural assets will remain under threat. More recent data about contamination of rivers in the state of Mato Grosso might be known after 2009, when a study made through an agreement between the Mato Grosso Federal University and Fiocruz for the analysis of waters will publicise results.

In spite of problems already detected, some argue that the situation is improving. According to information from the Programme of Incentive to the Cotton Culture³⁵ (PROALMAT), administrated by the Mato Grosso state government and organisations of farmers and workers, the politics of giving cotton farmers tax exemptions – 75% of ICMS – when they follow some rules for environmental preservation and guarantee of fibre quality has brought several benefits. Among them, improvement and spreading of planting techniques, which guaranteed, for instance, the reduction of the application of pesticides in 10 to 12 times, before 1998, to 4 to 5 in recent years. If that trend continues, it is argued that the degree of contamination caused by cotton plantations could be lower in the future.

► Land concentration

One of the most visible results of the expansion of the current model for cotton lint production in Brazil is the concentration of land ownership. In order to guarantee high profitability and to compete in foreign markets, cotton farmers invest in large areas with a few workers and high level of mechanisation. Since data from the 2007 IBGE Census have not been completely publicised, it is not possible to know the current degree of land concentration in agricultural properties with cotton plantations. But information from the last available Census, that of 1996, showed that the model of lint production implanted in the Cerrado and which has become hegemonic in the country is highly concentrating.

According to those data, Brazil had 619,600 hectares planted with cotton in 1996, most of which – 17% – were collected from properties between 20 and 50 hectares and only 6% in areas between 5,000 and 100,000 hectares. In the case of Mato Grosso, which then had only 5% of the Brazil's cotton-planted area and has now become the largest national producer, properties between 20 and 50 hectares had “only” 11 % of the state's lint area. Most of them – 36% – were concentrated in farms with 5,000 and 100,000 hectares. In the following years, that model based on large properties expanded all over the country's Cerrado areas, including Southern Maranhão and Piauí.

The risk of land concentration was one of the arguments raised by civil society organisations from Maranhão to criticise the US\$ 40-million loan granted in March 2008 by the International Finance Corporation (IFC)³⁶ to SLC Agrícola, one of Brazil's largest producers of soybean and cotton. The Fórum Carajás, for instance, criticised the lack of dialogue with civil society during the negotiation of the loan, which would result in a wave of land purchases in Maranhão. In spite of the omnipresence of the large property model, the traditional culture of lint through small areas still exists and also has its advantages. An interesting case can be seen in South-western Bahia, which attempts to overcome the decay of the crop after the 1980s in order to resume production.

► Labour conditions

Labour issues existing in cotton properties have always had a repercussion in the media, especially for the contradiction between intense modernisation of plantations and precarious labour relations, including, in extreme cases, the use of slave workers. Producers' associations usually argue that those cases are concentrated in a few farms, but the potential for contamination of the industry's image has become a reason for concern.

Since the “dirty list” of slave labour was created in 2003, nearly 400 farms passed through it – some of which were cotton farms. Nowadays, at least five³⁷ are still on the list – two from Mato Grosso (Brasília farm, in Alto Graças, and Maringá farm, in Novo São Joaquim), two in Bahia (Guará do Meio, in Correntina, and Correntina, in Jaborandi), and one in Piauí (Perímetro Irrigado da Gurguéia, in Alvorada do Gurguéia). According to a study by Repórter Brasil, 4.7% of farms present in the “dirty list” in January 2007 had cotton plantations. For comparison: cattle raising leads with 62% of cases, followed by vegetal charcoal production with 12% and soy with 5.2%.

A total of 431 workers were freed from the condition of slavery in the cotton areas listed above. The stories of those workers – by and large used to draw roots and weed from the soil that will be planted – impressed by the inhuman conditions they were subjected to.

One of the most recent cases of slavery caught in the act in cotton areas took place in March this year at the Guarani farm in São Desidério, Bahia. Twenty-seven workers that did the cleaning of the soil in the plantation were found in degrading work conditions³⁸. They used to drink water kept in empty pesticide containers and sleep in a shack used to storage the cotton. Some had no mattress and had to rest on plastic bags. According to do Ministry of Labour and Employment inspectors, the group was paid according to production and many had debts in the local illegal commerce kept by the so-called “gato” (or cat – a middleman between the employee and the workers) were cigarettes, cookies, and several personal hygiene articles were sold. All purchases were written down on a notebook – which was apprehended by the inspectors – to be later discounted from salaries³⁹.

In an extensive research about the production chain based on slave labour, in 2004, commissioned by the Special Secretariat for Human Rights of Brazil's Presidency, Repórter Brasil and the International Labour Organisation (ILO) mapped the commercial relations of 100 farms included in the dirty list. The result was a network of 200 Brazilian and foreign companies that used to buy raw material from rural properties using slave labour. Well-known textile cotton companies and trading companies were caught in the act, such as Coteminas, Vicunha, Karsten, and Unitika do Brasil.

After finishing the study, in a process coordinated by the Ethos Institute – Business and Social Responsibility, the most relevant and representative organisation of that kind in Brazil, and ILO, the Brazilian and foreign companies in that list were invited to create me-

chanisms that interdicted suppliers that used that form of exploitation. In 2005, the discussions gave rise to the National Pact for the Eradication of Slave Labour, the only such agreement in the world. The initiative already includes 160 companies and trade associations, whose revenues are over 20% of Brazil's NGP.

From the companies mentioned above, Coteminas and Vicunha have signed the Pact and committed themselves to work for the eradication of that form of exploitation from the production chains. Coteminas – one of Brazil's largest cotton buyers and processors – says that it terminated businesses with farms that used slave labour and established tools to identify the origin of the lint it buys. The company played a decisive role in the signature of the Pact by the Brazilian Textile and Apparel Industry Association (ABIT).

The pressure by civil society organisations and companies was crucial for the Mato-Grosso Association of Cotton Producers (AMPA) to lead, also in 2005, the foundation of the Social Cotton Institute (IAS), aimed at raising awareness among cotton producers about the labour legislation and certify the production. It was feared that lint purchasers, in Brazil and abroad, would create barriers due to problems in the origin of the product. A further step in the IAS was taken two years later, in 2007, by launching a seal that would bear witness to the "responsible production" of a given producer.

In order to receive the "Seal of Social Conformity", producers have to meet 95 requirements that prove their adherence to the legislation. Those demands were defined by the institute itself and include safety at work, good lodging conditions, formal contracts, union organisation freedom. Inspections are made by mobile teams from IAS, which have travelled the state to orient producers on how to adjust to labour norms. The institute received support from the Brazilian Association for Technical Norms (ABNT), which made rules based on the Brazilian Constitution, the Consolidation of Labour Laws (CLT), the Penal Code, and on Regulatory Norm (NR) 31.

The monitoring work made by the IAS itself has shown that there are still many farms with problems. In the current harvest, 27 of the 217 properties evaluated did not receive the seal and will have to follow several recommendations to qualify for the certification in the next year. In the last harvest the number of farms barred was higher: 37 of the 234 that were monitored. IAS does not publicise which farms were barred or the problems found in each of them.

That lack of transparency did not go unnoticed by some critics⁴⁰. They say that the fact that the certifi-

cation is an initiative of producers, who control the rules, would damage the seal's credibility. Other similar initiatives in the country, such as the Citizen Charcoal Institute, which gathers the pig iron production chain in the Carajás Industrial Cluster, chose to give their data full publicity. Besides, the certification market sees as outdated a process that only takes into account production units rather than the production chain as a whole.

An embarrassing moment for IAS took place in January this year, when 41 workers of the Vale do Rio Verde farm in Tapurah, Mato Grosso, were found in degrading working conditions. The property was leased to the Bom Futuro Group, whose director-president is Eraí Maggi, a cousin of Mato Grosso governor Blairo Maggi, one of Brazil's largest producers of soybean, cotton, and corn. The Bom Futuro Group is a member of IAS and José Maria Bortoli, Bom Futuro's representative in the negotiations regarding the case of the Vale do Rio Verde farm, is one of the institute's founders and was a member of its first board of directors, from 2005 to 2007.

According to reports by inspectors, the 41 people rescued were catching weed from cotton plantations and, with no Individual Protection Equipment (IPE), would receive pesticide "rains" from airplanes. While inspectors were in the property, a person who had been in contact with the chemicals fell ill and was taken to the hospital. IAS investigated the case, but did not cancel the certification of the lint produced at the farm, which had already been exported.

According to Félix Balaniuc, executive-director of the Social Cotton Institute, producers of the Vale do Rio Verde farm met the Conduct Adjustment Commitment signed with Justice and returned to legal normality. He says that the case was solved and did no harm to image, since several farms keep having their certification requests denied. Besides, Balaniuc thinks that the IAS democratised farmers' access to the certification, since many of them would have no financial means to pay for the more common options in the market, such as ISO4001 and SA8000.

In the coming harvests, cotton producers from Bahia, Goiás, and Mato Grosso do Sul will also be able to be certified by the organisation. The initiative came from the Brazilian Association of Cotton Producers (ABRAPA). First, the IAS will assess the labour relations situation in those states and then issue recommendations for regularisation. The seals are to be issued within an estimated two-year period. Another project that started to be discussed is to consider environmental issues in the list of demands for certified farms. But

that debate is just starting.

Even though there are several certifications in the cotton market, including the IAS seal, the negotiations in the cotton trade market in which one of the parts makes some environmental or social demand are a minority, according to trading operators in the industry. "The industry often does not even analyse the quality of the lint", adds Lucilio Alves, from the São Paulo University's Centre for Advanced Studies in Applied Economics (CEPEA). In practice, certifications emerge more as a competitive distinctive factor with no binding character. But demands are increasing, especially from European importers.

According to ABIT director-superintendent Fernando Pimentel, the textile industry works with the concept of socially and environmentally clean production and it knows that it is a "competitiveness vector" for Brazilian products. But, at the same time, he believes that "the IAS was ahead". Félix Balaniuc, from Instituto Algodão Social, agrees with Pimentel when he says that certification is not usually demanded today, but he sustains that it will soon become so. "We are looking ahead", says the IAS executive-director.

For Lucilio Alves, from CEPEA/USP, Brazil's scenario for the textile market, under pressure from increasing imports, makes it hard for Brazilian companies to place a lot of demands when they buy lint. "The cotton buyer only wants to know the price", he explains. Between 1996 and July 2008, Brazil's cotton thread imports increased 1,403 times. Between January and July 2007, cotton and synthetic thread imports amounted to 92,000 tons. In the same period of 2008, it has already reached 120,000 tons.

In such a complicated scenario, companies' own initiatives to improve social and environmental conditions in the textile chain should remain as the exception. ABIT announced that it is working on the strategic programme for the textile and apparel industry, of which sustainability will be one of the pillars, but it should only be launched in 2009. From abroad, trading operators say that buyers should not be expected to place socio-environmental demands in the short run, since the importers from the Asian market, who have concentrated the purchases of Brazilian lint in recent years, remain behind European ones in the debate about certification. That increases the responsibility of civil society organisations in their work to pressure public authorities and businesses.



CHAPTER 3 CORN

1) ETHANOL DRIVES PRICES UP IN THE US

Brazil does not produce ethanol from corn. The abundance of sugarcane as raw material makes the production of fuel from that grain not viable. Even so, the Brazilian corn market suffered the effects of the rise in US demand for it to produce ethanol, which forced several increases in its prices from 2006 to 2008.

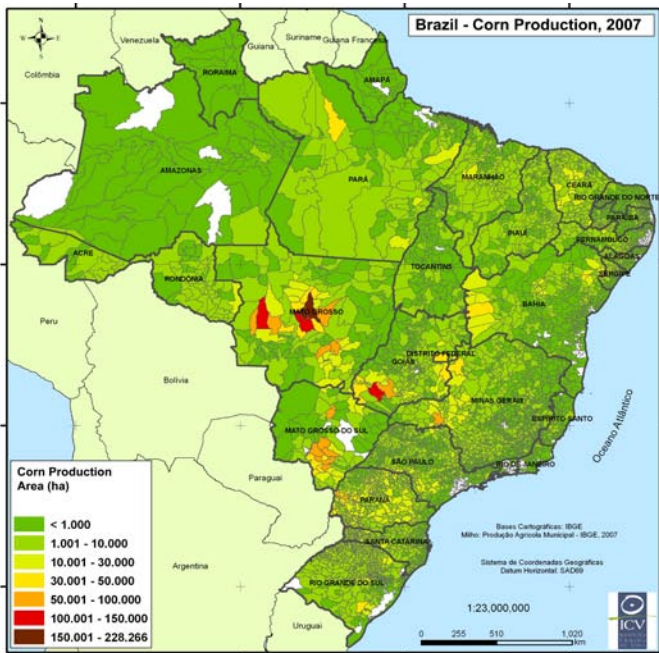
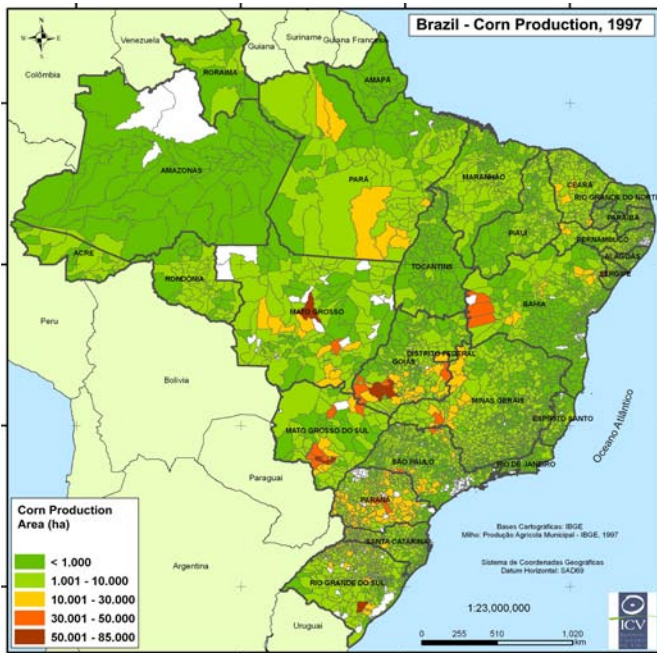
From producers' point of view, the scenario opens space for the corn rather than other crops. But the high production costs restrict that possibility only to farmers with more capital.

On the other hand, for those who depend on corn to feed their cattle and do not have their own plantations, the situation is worse. That forced the intervention of state agents such as the National Supply Company (CONAB), in regulating stocks and distributing grains to markets with lower access. That scenario had a direct impact on the segment of fowl and swine, driving prices up.

Because of that, Brazilian corn is one of the best examples of the reconfiguration of the field that the advent of agroenergy has been causing all over the world. In a situation where global offer and demand have more impact than countries' domestic market features, recent increases in the prices of corn have turned Brazil from a secondary role to a protagonist within world production.

Among other secondary factors, the main reason for such change in profile was precisely the intensification of the use of corn as raw material for ethanol in the US. The Bush government's statement that it would invest in the search for energy alternatives to petroleum while it called the nation to reduce in 20% its gasoline consumption within ten years was crowned in March by the of the Biomass Multi-year Programme Plan⁴¹. Even though it sustained that its aim is to seek a varied offer of renewable energy sources, with emphasis in the future potential of cellulosic ethanol, the document points at corn as the only viable raw material for large-scale fuel production.

In spite of a series of factors favourable to the increase in international sales of Brazilian corn, the major element responsible for the impulse that the crop received in the country is US ethanol from corn.



The core aims of the programme, which had a controversial reception all over the world, are: to reach a competitive price for ethanol cellulosic by 2012; by 2015, to guarantee that three billion gallons of the fuel used for transportation in the US are agrofuels; by 2022, that share should increase to 16 billion gallons; and finally, by 2030, to replace of gasoline in the US.

Even though the US is the world's largest producers of corn – with over 312 million tons in 2007/2008 – the additional domestic demand created by ethanol from corn has already unbalanced the foreign offer of the product⁴².

As a result of that new allocation of US corn, between 2007 – when production was record, reaching over 330 million tons – and 2008, corn exports fell almost 11 million tons, from 61.59 million to 50.80 million.

Therefore, in spite of not being used as raw material for agrofuels, Brazilian corn underwent a boom, driven by strong increases in prices, especially in late 2007 and notably because of the increase in exports in recent harvests.

Because it is present in virtually all of Brazil's territory and is a staple food item, basic in subsistence plantations and in the composition of animal feed, it is hard to evaluate corn's direct impact created in plantations by those increases. Until 2007, despite price increases, corn still occupied the same areas, with a slight variation. Since 1990, the land extension occupied by the crop varies between 12 and 14 million hectares. The record occurred in 1994, when that number reached 14,522,806 hectares. And in 2007, the figure was 14,064,271⁴³. That is, until 2007 the perspective of better payment was not able to encourage producers to increase their corn areas.

The same dynamics is seen in the amount of corn produced for the same period, from 1990 to 2007. From 1990 to 1992, production goes from 21,347,774 tons to over 30 million. From then on, it oscillates between that and 41 million. Only in 2003 it records another considerable leap, reaching 48,327,323 tons. And in 2007 it crosses the 50-million-ton barrier with 51,846,196⁴⁴. Again, by 2007, best prices had not had any clear effect to increase production.

According to CONAB⁴⁵, the more significant increments took place in second-harvest corn, which increased by 9.8% in terms of planted area – against 1.6% of first-harvest corn.

However, the record results of the recently-closed harvest have ratified once and for all the status of Brazilian corn. The 2007/2008 agricultural year consolidated in Brazil the real effects of corn price increases all over the world. According to CONAB projections, the total production – including first and second harvests – will reach the record value of 58.5 million tons⁴⁶. The figure is sustained by increases of 9.5% in first-harvest corn and 24.5% in second-harvest. In regional terms, the North-eastern region stood out with a production increment of 44.7% in the total production over the previous harvest.

1.1) CASE | Bertin's project aimed at producing biodiesel

The more dynamic corn market encouraged an attempt to use the grain as an agroenergy source. The experiment was proposed by the Bertin Group, one of the leaders in the meat industry, but which, since August 2007, has been producing biodiesel from bovine tallow in a factory in Lins, 450 km from São Paulo.

Differently from what happens in the US, where ethanol is produced from corn, Bertin's project aimed at producing biodiesel.

According to the company, the idea was to mobilise family farmers in 14 towns, including settlers from the Landless Rural Workers Movement (MST), who would provide corn and sunflower for energy generation and/or other uses, such as food production. For that, Bertin was willing to guarantee purchase and obtain support from the organisations that represented the farmers.

If implemented, the project would involve over 1,500 families from the state of São Paulo in the National Programme for Biodiesel Production and Use (PNPB), according to Bertin.

The company also contacted workers to negotiate the provision of other products, such as jatropa, but the proposal was received with scepticism and was not accepted.

The company requested inclusion into the programme Social Fuel Seal, but the Ministry of Agrarian Development, in charge of the seal, denied the request. The Ministry ruled out completely the concession of seal to projects involving corn, for its extremely low oil percentage. "It's impossible to accept that. With 5% of oil, the grain cannot even be considered an oleaginous plant", says Arnaldo de Campos, head of PNPB at the Ministry.

Therefore, the veto to the Bertin project was purely technical and did not involve issues of food sovereignty whatsoever. The PNPB head agreed that the partnership would be a great opportunity for family farmers. But the agency's decision was based only on the impossibility to consider corn as an oleaginous plant.

After the Ministry's denial to grant the seal to Bertin, the project was aborted.

2) FOREIGN AND FUTURE MARKETS

While only the current harvest shows a definite change in the domestic scenario of corn, other indicators have been revealing for some time now deeper impacts of price increases on the grain. Future markets and commercial balances of corn all over the world are the best examples of that.

Therefore, this analysis is more based on the macroeconomic scenario and on corn perspectives than on investigation of social or land impacts caused by the increasing dynamics of that market.

A study focused on impacts could only be conducted after a reasonable time that allowed seeing whether corn is sustained as an option able to compete with soybean, for instance, in intent to plant, in the long term, and in the consequences of that competition.

In the meanwhile, the trends towards increase in exports and the increment in volume and value in negotiations of future contracts and corn options have already shown to be persistent. According to the agribusiness balance of July 2008 of BM&F/Bovespa, the volume of future and option contracts – in number of contracts – for the corn market increased by 457.1% over July 2007. In financial terms, such increment represents an 848.1% increase also regarding the same period in 2007. From January to July this year, the accumulated variation in number of future and option contracts is 209.2% over the same period of 2007 and 244.7% over the same period of 2006⁴⁷.

Those results follow international trends led by the Chicago Board Of Trade (CBOT), which has also seen successive increases. In June, the contracts for the corn market to be liquidated in 2009 reached a historical record and were negotiated at US\$ 7.20 per bushel⁴⁸.

In the domestic market, that trend is also confirmed. The 60-kg sack of corn, which was traded at about R\$ 13 in March 2006, reached R\$ 34.62 in December 2007. In August, that sack was worth a little over R\$ 24.

According to the Centre de Advanced Studies in Applied Economics (CEPEA/ESALQ), for the second quarter of 2008, corn prices are sustained on three factors: low world stocks of the product, drop in the US production, and constant demand. Add to that the input of investments in commodities driven by the weak performance of financial assets⁴⁹.

Another important reason for the increase in the activity of the corn market is the change in China's profile. Previously an important exporter, the country has gradually reduced its share and a projection by the US Department of Agriculture (USDA) indicates that in the next harvest China shall export only 500,000 tons, over 15.2 million in 2002/2003⁵⁰. The justification for such a sharp drop is in the Chinese economic development, followed by a strong increase in the demand for proteins. That increases the consumption of corn for animal feed, thus reducing stocks available to export.

According to USDA estimates, Brazil will replace China on the top of the corn export market, together with United States and Argentina. However, Bra-

WORLD CORN PRODUCTION, CONSUMPTION AND STOCKS						
	2004/05	2005/06	2006/07	2007/08	JUL 2008/09	AGO 2008/09
Production						
Argentina	20.5	15.8	22.5	21	23.5	22
Brazil	35	41.7	51	57.5	57	57
China, People's Republic of	130.29	139.365	151.6	151.83	153	153
EU-27	66.471	60.668	53.829	47.324	57.462	58.585
United States	299.914	282.311	267.598	332.092	297.575	312.126
World Total	715.77	698.507	712.233	789.15	775.29	789.584
Total Consumption						
Argentina	5.2	6.2	6.7	6.5	6.9	6.7
Brazil	38.5	39.5	41	42.5	45	45
China, People's Republic of	131	137	145	149	157	157
EU-27	63.2	61.5	62.3	61.5	62	61
United States	224.648	232.063	230.769	264.044	266.586	272.936
World Total	688.945	705.939	728.375	775.174	794.614	799.664
Ending Stocks						
Brazil	4.192	3.015	3.579	10.329	9.829	13.829
China, People's Republic of	36.555	35.255	36.602	38.882	34.632	34.482
EU-27	8.108	9.461	7.382	5.706	8.818	6.291
United States	53.697	49.968	33.114	40.021	21.147	28.79
World Total	132.054	124.622	108.48	122.456	105.314	112.376

Source: International Agriculture Service/USDA

zil has a positive distinctive point in its possibility to expand the area planted with corn while the others are already saturated.

That discourse, however, is identical to that conveyed by soy producers when they boast the potential for expansion of their plantations. But, since land available to first-harvest corn and soybean is often the same, in that search for expansion of both crops, one might depend on restrictions to the other.

Therefore, a major ally of Brazil in that race is the demand by European Union after two weak harvests of wheat and grains in Europe.

All those factors have been driving Brazil's good performance in corn exports. According to CONAB's harvest study, the projection for corn exports in the 2007/2008 harvest is above 11.5 million tons. In the previous harvest, the figure had reached 10,933,500 tons, above the almost 7 million tons of the 2005/2006 harvest, and consolidating corn's position as 17th most important item within Brazilian exports in 2007. And the trend is that such mark be sustained, since production is already by far above domestic consumption.

2.1) CASE | Small family farmers fight to keep corn's native species alive

According to the Brazilian Agricultural Research Corporation (EMBRAPA), 302 corn cultivars will be available in the market for the 2008/2009 harvest, including varieties and hybrids. The latter will include the first transgenic seeds authorised for commercial use in Brazil – the 13th country in the world to approve genetically modified corn.

In the meanwhile, in Brazil's largest corn producer, the state of Paraná, small family farmers fight a real battle to keep corn's native species alive. The advantage of those seeds is their natural origin, which does not involve genetic modifications. Besides, they bring with them centuries-old agricultural traditions that are often pillars of traditional cultures all over the country.

In the town of Bituruna, the trench is built in the Rondon III settlement. There, in the parcel of settler Anísio Francisco da Rosa, five families take part in a long process to arrive at a native seed. Eleven types of seeds have been planted, mixing traditional and hybrid ones. In all, it took ten years to find the best variety, called "precoce-amarelo": five years to get the definitive seed and five more to guarantee its isolation against any contamination. "If there is contamination, ten years' work are at stake", says Fábio Lima Santos, a member of the Landless Rural Workers' Movement (MST).

In a 0.6-hectare area, 15 kg of seed are planted, which means 25,000 plants and 30,000 corn ears. That can produce up to 3 tons of corn. A small part of them is

sent to the Londrina State University and the organisation Assistance and Services to Alternative Agriculture Projects (ASPTA), for distribution and construction of a seed bank. Another part is sold in fairs and destined to new plantations. And 2 to 2,5 tons are milled to be used as animal feed.

Planting process is totally poison- and chemical fertiliser-free: it uses only sheep manure and cow urine, besides limestone. Producing their own seed and using alternative planting techniques, producers save considerably. And they save even more for not having to buy seeds. "God willing I won't have to buy seeds!", says da Rosa.

Several organisations instruct producers not to plant transgenics. For da Rosa, if were not for this work, other farmers could use modified seeds.

ASPTA is a pioneer in rescuing seeds. Working in the whole country, it started its action in 1993 in the towns of Irati, Bituruna, and Rebouças. The work is based on the five core verbs for traditional seeds: rescue, evaluate, multiply, preserve, and exchange. With the organisation's assistance, producers conduct experiences with seeds and gradually define the best ones.

Regional or town fairs are organised with native varieties produced. In 2004 there were 102 types only of corn. In the last year, there were 138.

The advantages of that type of seed are several: they guarantee autonomy for producers, they can be replanted and they maintain stable productivity. Besides, they protect farmers from price control exerted by seed companies.

In spite of all that work, ASPTA fears that what has been happening with soybean might also happen with corn. "It's very hard to find pure conventional soybean", says André Emílio Jantara, the organisation's technical assistant. Now, with the licensing of three types of transgenic seeds – from transnational companies Syngenta, Bayer, and Monsanto – corn is under the same risks. "The National Biosafety Technical Commission (CTNBio) asks companies to instruct a 100-m distance. That won't work, there should be at least 500 m of separation to avoid risk [of contamination]. And it's still dangerous", he adds. "Have you ever considered losing, in a few years, that centuries-old wealth of over 140 corn varieties because of transgenics"?

Companies like Sadia and Perdigão pay about 5% more for conventional soybean. With corn there will be something like that. If there is contamination, producers lose. And if there is contamination, producers

will have to pay the royalties, even if they did not use transgenics. The 2008/2009 harvest should bring more concern to farmers and advocators of native seeds. In this two-year period, over 14 events are scheduled related to the licensing of transgenics.

Paraná's State Department of Agriculture and Supply warns against the threats brought by those organisms. According to the agency's technicians, the major concern is with pesticides residues present in the seeds themselves. Soybean shipments inspected show glyphosphate percentages above the legal limits. They also challenge the discourse that GMOs reduce the use of pesticides, sustaining that in the case of soybean the opposite happens, and the same will happen with corn.

Initiatives for preservation of native seeds are also a priority for Indian peoples. In the Paraná coast, 13 Guarani M'bya families are receiving advice from the Paraná Centre for Agroecology Reference in order to keep that tradition alive. According to the organisation, that is a way to guarantee food sovereignty of those populations, who are then free from commercial seed suppliers. Before the start of the partnership, those families had only three native species. Nowadays they are more than ten, including cowpea, sweet potato, and corn.

In fact, the knowledge that white peoples, descending from European immigrants have of the management of traditional seeds started by living side by side with the Guarani and Kaingang peoples. That subject was brought up by the demonstration known as "Romaria da Terra" in Paraná in 2004.

Such interchange remains until today in the surroundings of Chapecó, Santa Catarina. There, local producers have been planting corn received from the Guarani from Paraguay, the so-called "tchipa corn" or "avati moroti corn", instead of laboratory seeds sold by large companies.



CHAPTER 4 JATROPHA

1) JATROPHA IN A WAITING PERIOD

In recent years, the culture of jatropha has caused strong debate and disagreements in Brazil, between private enterprises and the Ministry of Agriculture, Livestock and Supply. While large-scale producers were excited to know in other countries the perspectives for that plant in terms of agrofuels, jatropha (*Jatropha curcas*) was not even registered as a species at the proper agencies in Brazil – which prevented, for instance, the sales of seedlings and seeds.

After strong pressure on the federal government and the creation of the Brazilian Association of Jatropha Producers (ABPPM) in January 2008, the Ministry granted the species registration, which precedes the registration of the plant's respective varieties – its cultivars. Having registered the species is seen as a major victory of the ABPPM, but the organisation also sees it as a provisional license. Among other restrictions, by not having cultivar registration the crop has limited access to public credit and its production does not have the insurance granted to cultures already registered.

In that scenario, producers invest in and experiment with seeds and agricultural techniques on their own choice and risk. Public agencies, in turn, are working expeditiously to get to know and understand jatropha in order to reduce risks to private enterprises and allow the species registration to be granted soon. According to Embrapa Agroenergy – the agrofuel arm of EMBRAPA, the Brazilian Agricultural Research Corporation – differentiating and registering a cultivar takes about seven years. With demand posed by the current scenario, research conducted by other institutions, and activities developed by private enterprises, the agency estimates that the process might be concluded within three years. ABPPM considers that the country might be losing the lead in the industry. According to EMBRAPA, its role is to assure producers' and consumers' safety.

While agrofuels in Brazil are in a wait-and-see stage, jatropha attracts an increasing number of people interested and investors. Large transnational groups have sought to enter the species' production chain, extending their participation to projects in several regions of the country. That is the case of British company D1-BP Fuel Crops Limited, in the state of São

Paulo, Switzerland's Global Agricultural Resources – GAR, in the so-called Triângulo Mineiro area, and Spanish CIE Automotiva, in Nova Mutum, Mato Grosso, and Janaúba, Minas Gerais, among others.

In Janaúba, northern Minas Gerais, CIE joined NNE Minas Agro Florestal and formed Biojan to conduct a large project to study and improve jatropha, mainly in the genetic field. Simultaneously to the advancement of research, Biojan profits from the sale of seeds and seedlings, which makes the group – and above all researcher Nagashi Tominaga – a national reference. Like them, other producers have started major enterprises in the field of seeds and seedlings of that species.

Among over 150 agrofuel processing plants existing in Brazil that are listed by the website BiodieselBR, about 29 (operational, under construction, or planned) consider the possibility of using jatropha as their raw material. Twenty of those are already operational or under construction and were consulted by the Biofuel Watch Center as to whether they already use that crop. Out of the nine processing plants that answered the inquiry, seven do not use jatropha as a raw material to produce biodiesel yet. However, besides the two processing plants that do use it, all of them said they plan to use it or even that they intend to start its use in the coming years. A large part is already negotiating supply and partnerships with family farmers and other groups of producers.

JATROPHA	
World overview	
<p><i>Jatropha</i> (<i>Jatropha curcas</i>) is one of the world's stars among potential raw materials for agrofuels. Because of its features (see, below), its enthusiasts, events, and marketing are all over. However, some experts suggest caution and more research before large enterprises and strong beliefs. Tests and investments are under way in several countries, especially in Asia, Africa, and the Americas. India and China are evaluating projects that might involve over ten million hectares.</p>	
General characteristics	
<p>It reaches four to five meters of height. It is a rustic and resistant bush, developing independently from major use of fertilisers and pesticides. It adjusts to several combinations of soil and climate, and those above 20°C are the most appropriate. Areas with 300- 1.500 mm of rainfall per year offer conditions for growth and fruit production, especially after 600 mm. It does not tolerate floods and it is susceptible to frosts.</p>	
Jatropha's productivity	
<p>It is a perennial plant whose economic lifespan lasts 35 to 40 years, and it is harvested after the 3rd year. Its productivity is highly variable in terms of tons of seeds per hectare/year, and its oil concentration is 30%-40%. With optimal irrigation and fertiliser combination, it can reach 12.5 tons/hectare/year. In poorer soils with no inputs and correct techniques, it can lead to major failures. Its meal is a good fertiliser. Seeds are the basis for soap, candles, and medical purposes. The fruit is not eatable and is relatively toxic. The plant is used for hedgerows.</p>	
Source: BiodieselBR magazine, year 1, no. 5 (June/July 2008) and other specialised publications	

Finally, it should be said that small farmers are crucial for the companies' projects, especially to obtain the so-called Social Fuel Seal. Family-based agriculture, in turn, sees jatropha as an interesting alternative for job and income generation. Careful actions will be needed for the expectations of creating possibilities for poorer areas do not end up as an economic fiasco, overexploitation of labour or replacement and shortage of food crops. Therefore, information and respect between the parts will play a central role.

Tabela 2

POTENTIAL USE OF JATROPHA IN BRAZIL'S PROCESSING PLANTS (In millions of litres per year)				
Plant	City / Town	Capacity*	Raw materials	Origin of nut
AmazonBio	Ji-Paraná (RO)	13,5	Bovine tallow	Does not use it (considers using after 2011)
AustenBio	Londrina (PR)	Under construction	Recovered oils and fats	Does not use it (sees plant's offer as low)
Bioauto	Nova Mutum (MT)	30	Jatropha	Own production and family-based agriculture
Biotins	Paraíso do Tocantins (TO)	8	Bovine tallow and soybean	Does not use it (needs to install specific crusher)
Bioverde	Taubaté (SP)	85	Soybean	Does not use it (considers possibility)
Comanche	Simões Filho (BA)	100	Recovered oils and fats, animal tallow, soybean, sunflower, cotton, and castor bean, among others	Does not use it (is now studying the crop)
Cooperfeliz	Feliz Natal (MT)	3	Cotton (60%), jatropha (20%), soybean (10%) and others (10%)	Family-based agriculture (20%) and large producers (80%)
Fertibom	Catanduva (SP)	42	Soybean and bovine tallow, among others	Does not use it (it has a partnership with family farmers to purchase it)
Tecnodiesel	Sidrolândia (MS)	6	Cotton, soybean, and sunflower	Does not use it (should use 10% after 2009)

Source: website BiodieselBR and companies

Among companies able to use jatropha as raw material, whether they are operational or under construction, according to the website BiodieselBR, Araguassu, Barralcol, Beira Rio Biodiesel, Biocar Biodiesel, Biofronteira, Bionasa, Biopetro, Daffer Biodiesel, and Fusermann did not answer the questions sent by e-mail. The research staff were not able to contact Bioere.

1.1) CASO | Low productivity undermines expectations in the state of Tocantins

In Caseara (Western Tocantins), bad economic results and debts concern family farmers who entered the program to plant jatropha with the Tocantins Biodiesel Company (Biotins Energia).

The company's first processing plant, located in the town of Paraíso, can reach 8 million litres per year, but it initially operates with a single unit with capacity for about 2.5 million litres/year. Besides the Paraíso plant, Biotins plans to build two others – in Araguaína and Alvorada.

According to William Assunção, the company's head of agricultural advancement, at the Paraíso plant biodiesel production has been made from bovine tallow and soybean oil – the crusher for jatropha has not been installed and the crop is not at its productive peak. A large part of the nut that will supply the company is planted at the Bacaba farm, in Caseara, which assigned 2,000 hectares for the crop.

Besides, Biotins invests in partnership with small-scale farmers, especially agrarian reform settlers. Until July 2008, the company had closed deals with farmers from seven INCRA settlements in Caseara, Araguacema, Marianópolis, Divinópolis, Pium, and Paraíso, in Western Tocantins.

Besides the search for raw material, the partnership with small farmers aimed clearly at allowing the access to the large amounts of tax incentives embedded in the Social Fuel Seal offered by the Ministry of Agrarian Development (MDA).

Difficulties



With an initial ten-year contract, Biotins' partnership with local farmers started in 2006. At the time, it funded some settlers, helping to establish the crop in 1-3-hectare parcels. However, most partners took ten-year loans from Banco da Amazônia (BASA). The company expected an average production of 800 kg per hectare in the first year, 1,800 kg/hectare/year in the second year, 3,000 kg/hectare/year in the third year and, from the fourth year on, 4 to 5 tons/hectare/year.

The price defined by the company was R\$ 300 per ton. But in the second year, the absolute majority of farmers had not reached the expected productivity. Few reached a peak 700 kg/hectare/year and bad results are already making partners consider terminating the activity.

Lack of technical guidance and information – both available about the plant and conveyed to farmers – improper crop management in some cases, adaptability of jatropha to local conditions, especially climate and soil, and the necessary time for the plant to reach its production peak are among the main elements that explain the initial bad results. Besides Biotins, partner farmers also face the initial risks – and damages – resulting from the pioneering local initiative to plant jatropha in the country.

In the Califórnia settlement in Caseara, farmer Amujaci Martins da Costa, owner of a small parcel where she plants rice, corn, manioc, pineapple, banana, and sugarcane, besides fowl, swine, and honey, planted 1.5 hectare of jatropha. The 2008 harvest produced meagre 75 kg, for which she did not even want to be paid.

She sees the multiplication of an insect similar to a chinch bug in her parcel, after the jatropha trees were planted, as a threat to biodiversity and the agro-ecological practices she carries out – as well as to her honeybees and her honey production. With a 3,000-real debt, Costa wants results. "I'll wait another year to see what happens. If production does not improve, I'll take it all off and plant manioc".

Francisco Alvarista da Silva, from the Caiapó settlement, also in Caseara, received R\$ 66.00 for the 190 kg of jatropha he produced – in 3.5 hectares. "According to what the company said, we would make a lot of money from the crop, and we trusted them". According to Silva, that ended up stealing time and labour from food production. He said he tried to renegotiate the values paid by Biotins, with no results. Owning R\$ 6,000 to the bank, Silva says that in the settlements "fear of debt is strong".

2) WITH CAUTION AND LITTLE FUNDING, SMALL FARMERS EXPERIMENT WITH JATROPHA

Seen as a plant of imminent success in Brazil, especially for the inclusion of small farmers, in mid-2008 jatropha had a shy presence among family farmers in several regions of the country. From Rio Grande do Sul to Vale do Ribeira (São Paulo) and Northern Minas Gerais, to Pará, the crop can really create income, jobs – and fuel – in that segment, but farmers have chosen cautious. The logic has been to test the crop in small areas within their parcels while they wait for more solid information about it. That information is actually scarce in the relationship between producers and companies that proposed partnership to them.

In July 2008, 30 producers were planting jatropha to sell to Fertibom in Miracatu, in the Ribeira Valley. The project, encouraged by the municipal agriculture agency, is aimed at selling jatropha seeds – rather than raw oil – to Fertibom, to be used in 2009 in the company's processing plant in Catanduva, also in the state of São Paulo.

Albertino Marino da Silva, a farmer from the Faú neighbourhood, used a small portion of his property – about half hectare – to plant 500 jatropha trees. The plant was brought to Silva's area in late 2007, and, according to the producer, it initially adjusted well to the region. Describing the development of the crop in his area, he expresses the large information gap between him and those who proposed him the partnership. "It was nice before, now all the leaves have fallen, I'm a bit discouraged", he says, not sure to believe that the fall might be related merely to winter.

On the other extreme, Heitor Mariano Gobbi Barbosa, from Fertibom, explains that the Catanduva processing plant can produce 42 million litres of biodiesel a year. According to Barbosa, it is a "multi-oil factory", able to process any animal fat or vegetal oil".

Nowadays, the main raw materials used at the plant are soy and bovine tallow. However, Fertibom has deals to plant and buy jatropha "under way with several small farmers from São Paulo" and Barbosa says that "expectation is that, with the success of the partnerships, the number increases fast".

Barbosa explains that the biodiesel produced in Catanduva is now sold in auctions promoted by Brazil's National Agency of Petroleum, Natural Gas and Biofuels (ANP). And he says that, after partnerships are strengthened, a local unit to extract oil in the area can be considered.

The information gap seen in Miracatu, far from being an exception, is the main subject in most conversations of small farmers about jatropha.

Esmael Telles, a farmer and president of the Association for the Integration of Urban and Rural Workers (ASSITEC), in Pitanga, Paraná, says that the organisation has a project involving agroecology and building a micro-processing plant to produce vegetal oil and fuel. The unit should be finished by October.

The project has one-year initial support by Petrobras, and now involves 80 families – the idea is to involve 150 families. According to Telles, farmers even considered using jatropha to produce oil at their processing plant, "but more experiments are needed." He adds that frosts are common in the area and there is still "scarce research" about the crop.

Producers' initial experiments were made with sunflower, peanut, radish, sesame seed, and birdsfoot trefoil. "The idea is that each family starts by planting only one hectare, and then we expect to get to something between 2,000 and 3,000 kg of seed per hectare", he estimates.

The proposal is that the enterprise is used to process the products of each farmer rather than trading them. Besides creating income, the project should meet each producer's own consumption and finally provide good seeds.

Projects such as ASSITEC's represent a new hope for several communities. In Pará, small farmers joined the Jatropha Forest Consortium in the area of Novo Repartimento (near the town of Tucuruí), to conduct management of jatropha together while reforesting the area with native species. Besides, farmers will plant, associated with jatropha, crops like corn, black beans, and rice. Over two thousand families have signed up and 1,400 have already planted jatropha. First results are expected for late 2008. Farmers, however, have not yet defined whether they will sell the jatropha to partners to produce biodiesel or build a processing plant through co-operatives.

In Guarapuava, Paraná, settlement Paiol de Telha has 64 families – 32 of settlers and 32 of slave descendents (so-called quilombolas). Most families produce for their own consumption, as is the case of Ana Maria Santos da Cruz's family, who plants mainly corn and black beans in her parcel, besides some cattle and a community vegetable garden. According to Cruz, a member of the National Coordination to Articulate Rural Black Quilombola Communities (CONAQ) in Paraná, the quilombola community Paiol de Telha is now

struggling to have their right to their original territory in the region recognised. Difficulties are many and there are few alternatives. When she reads the reports by other movements that start trying to plant jatropha, she underscores that for her community it would be very interesting to watch a presentation about the subject.

In the area of Palmeira das Missões, Rio Grande Do Sul, the Movement of Small Farmers (MPA) has invested in efforts related to the production of fuel as a pathway to farmers' food and economic sovereignty. MPA leader Romário Rossetto explains that companies like Bunge, Sadia, Nestlé, Perdigão, Aurora, and Souza Cruz have a very strong presence in the area and land concentration is high. "They determine agriculture, what farmers will plant".

One of the solutions to face such reality, according to him, is diversifying production so that farmers do not have to change "what they plant in their whole parcel because of prices, depending on the market".

Gélio Suptiz, from Cerro Grande, Rio Grande do Sul, is pointed by Rossetto as an illustration of that. In a 12.5-hectare plot, he plants corn, black beans, soybean, and sugarcane, he has a vegetable garden, an orchard, some cattle, swine, and fowl, and he even plants tobacco and eucalyptus... as well as 300 jatropha trees.

Part of the jatropha did not survive the mid-year frosts, understandably feared by people at ASSITEC. The plants that stood the cold, however, have good perspectives. "I planted those jatropha seedlings at the end of the year. And they are that tall already! Here I used manure, and look how tall it is!", says Suptiz, impressed.

For Rossetto, the jatropha meal might be yet another option to fertilise the plant, avoiding chemical – and expensive – fertilisers sold by companies. The MPA leader believes that the same can be made with tung, which he sees as even more adapted to the area and with higher concentration of oil in its seed. Both are planted in the vivarium in Palmeira das Missões, where the MPA intends to conduct seed differentiation and selection. "Besides the vivarium, we have a solar dryer for seeds, made with gravel and plastic, with an engine and drying capacity of 500 sacks [60 kg] a day", he says.

Although Suptiz had less information about jatropha than about the other activities in his area – for instance, he did not know what the fruit looked like or how much the tree would grow – the trust and com-

mitment between him and Rossetto are evident. Just as their excitement about the new perspective.

In other projects, there are distinct views about the degree to which the crop can really be established as an alternative for small farmers. In Tucuruí, Paraná, Hilário Lopes Costa, from the Catholic Church's Land Pastoral Commission (CPT), says that workers were sent by Biogur to plant jatropha. And that "CPT's response was to seek dialogue with farmers, their leaders, in order to clear doubts, to explain how the planting would take place, bring information, make calculations". According to Costa, "the conclusion was that it was not a good deal for producers".

Biogur's partner-director Mauro Martins says otherwise. He explains that nowadays about 550 farmers are registered as the company's potential partners to plant jatropha, and the target is to reach 1,400 producers within seven years. Right now, less than half of farmers are planting it to supply the Biogur processing plant – which was under construction in September and will have a capacity of about 20 million litres of biodiesel per year. The director recognises that the company expected "a faster pace" for the project, but he says that critical issues in the area, such as time for environmental licensing, slow the process down. According to Martins, farmers have "bought the idea," even because "there are no alternatives for agriculture in the region".

Marcus Fino, a researcher with the Institute of Agricultural Economics Applied to the Tropics and Subtropics at Hohenheim University, Germany, has been studying jatropha for a year as part of his study "Socioeconomic analysis of biodiesel production in the Brazilian state of Tocantins". According to him, who studied six settlements that signed deals with Biotins, the core problem faced by small farmers is the lack of technical guidance by the company.

Besides difficulties with soil management and selection, he sustains that lack of information has led to unnecessary cutting the area's native forest in Western Tocantins, at the transition zone between the Amazon and Cerrado biomes.

Fino says that "there is certainly large replacement of food crops with jatropha". The meagre initial economic results, however, have already led farmers to abandon the crop. Others will wait a little longer. And a smaller part says they are enthusiastic with the activity and willing to make longer-run investments.

2.1) CASE | In the South, agrofuels, foods, and environment are together in the same menu

In Southern Brazil, agrofuels have recently entered the menu of small farmers. While production of fuels from oleaginous crops has had a slow start among farmers, it emerges as an important chance in the projects of the Movement of Small Farmers (MPA) in the region. The movement proposes that production of agrofuels be organised together with food production and environmental concerns, as a joint response to the crises in energy, food production, and the environment, as well as an alternative for small farmers to face the agribusiness productive model.

In Paraná, the MPA acts in 22 towns. The movement's David dos Passos regional chapter, whose centre is the town of Laranjeiras do Sul, involves 8,000 families in 8 towns. Within the chapter's area, the initial focus of oil production is sunflower planted for vegetable oil, which will be produced in a mini-processing plant in Porto Barreiro, Paraná. In order to manage the processing plant and its production, they created CPC-PR, the Mixed Co-operative for Peasant Production and Trade in Paraná. According to Paraná MPA leader Valter Israel da Silva, it will take care of the products of the "Do Campesinato" (Peasant's) brand, which belongs to MPA National.

He says that the Movement has been trying to study and recover the logic of peasant production, having even launched books about it: "Small farmers were entering the logic of agribusiness".

In the area of Palmeira das Missões, Rio Grande do Sul, Romário Rossetto, a member of the MPA national leadership in the state, underscores that, although small farmers have been always diversifying what they plant, "in the 90s, many planted only under the logics of monoculture". He says that there is a process under way to reverse that trend, "adding the logic of diversification to that of food sovereignty".

Silva agrees and estimates that now "about 20% of families with whom we talk started to use the logic we advocate". Before, he says, "we used to fight for credit, but funding worked against us, since it encouraged farmers to enter the system, to use the seeds, fertilisers, everything from transnational companies". According to Silva, MPA's proposals are now more accepted by farmers than ever. "That discourse, which always sounded merely ideological, becomes clearly economic with the current crisis".

According to the leader, in the future jatropha will be included into MPA projects for the area, together with tung and other perennial oleaginous plants. "That will take place at stage 2, during the establishment of agroforests, which aim to face the environmental crisis, but including food and energy-oriented crops". Differently from other agrofuel-oriented efforts, where native forest gives way to monoculture, jatropha would be managed among trees that are originally from the area, which would favour the development of both.

In Palmeira das Missões, the movement already has a midsize vivarium for the agrofuel project, with jatropha and tung seedlings, among others – peanuts and sesame are to be used soon, as well as perhaps castor bean and soy.

According to Rossetto, from the 63 towns that make up the area where the MPA works around Palmeira das Missões, the Movement has agreements with over half the town governments. Thirty-five governments give some sort of support to the project.

"Today there are 230 families involved", he says, estimating that in 2008 farmers will use about 600 hectares for biofuels. "We intend to reach 11,000 families when the project is completed", he sustains enthusiastically. In order to reach such an ambitious target, the MPA is counting on the construction of a Petrobras agrofuel plant in the region, besides implementation of agroforests and the consolidation of the project to produce alcohol in micro-distilleries.

The production of alcohol by MPA in the area includes nine micro-distilleries spread over several towns, each one with a 500-litre-per-day production capacity. Besides alcohol, obtained from 8 tons of sugarcane, the micro-distilleries can make about 700- 800 kg of sugar from that same amount of sugarcane. And the units are also projected to produce sugar cane brandy (cachaça), fertiliser, and cattle feed.

The project also includes a processing plant in the region, in Frederico Westphalen, Rio Grande do Sul, aimed at producing final alcohol under ANP standards. The plant – the last destination of the micro-distilleries' productions, will be able to produce 5000 litres/day of alcohol and should be ready by October.



CHAPTER 5 RECOMMENDATIONS

If, as the Brazilian government says, a realistic way to improve the lives of small farmers is to include them in the agrofuel production chain, they should be provided with better conditions for that. The National Programme for Production and Use of Biodiesel (PNPB), launched in 2004, presents mixed results in that sense.

The PNPB aimed at including 200,000 families, but so far only 36,746 of them have been benefited. Besides, several projects were troubled by difficult access to technical assistance, insufficient credit to plant, and farmers' lack of autonomy to define the contracts with biodiesel companies.

With family-based agriculture under-represented, the PNPB sees the consolidation of the use of soybean as hegemonic raw material for Brazil's biodiesel rather than other crops that could mean the economic emancipation of small farmers and the struggle against the increase in monocultures. It is true that many of those small farmers take part in the programme by planting soybean, but that preference by the industry should not prevent the diversification of crops, so necessary for a sustainable agriculture in the country.

Crops such as oil palm and cotton, adopted by several small farmers, have a minority share in the national biodiesel production. And several projects proposed and under execution, such as the ones described in this report, come out of the pen of large investors, who often see small farmers as a small cog in their production chain. CMA brings a series of recommendations to be made in order to change that scenario, to include small farmers and face the impacts caused by large agroindustrial projects. The changes are restricted to those recommendations, and they should be seen as a starting point.

For that to happen, the requests of social movements have to be heard. In June 2008, the "Jornada de Lutas" of Via Campesina has included biofuels under a new perspective in their politic platform. The demands involve incentives to bioenergy projects for family-based farmers, the fomenting of the integration of energy and food production and the pursuit of energetic sovereignty. If included in the PNPB, these issues would strengthen the dialogue between the government and peasant and family agriculture representative movements.

OIL PALM AND BABASSU PALM

Extracting oil from the fruits of several palms for domestic consumption and local trade is a widespread practice among traditional communities and small farmers in Brazil's Northern and North-eastern regions, especially babassu and oil palm, respectively. They represent an important basis for local economies, therefore improving the management of the crops and oil processing should be a priority for public research agencies.

In Southern Bahia's Dendê Coast, the Executive Commission for The Cocoa Plantation Plan (CE-PLAC) has been investing in providing assistance to small farmers both in technical aspects (management of the crop, agroforest systems, improving the systems of crushing wheels for extracting oil, etc.) and in providing seeds and seedlings, even though in a deficient, since demand overcomes offer.

Family-based agriculture should be strengthened and its autonomy before large agroindustrial complexes should be guaranteed also in the Amazon. Nowadays, Embrapa Amazônia Oriental is a reference in oil palm research in that biome, and its production of technology, seeds, and seedlings should also focus on traditional communities rather than business projects. Despite the job generation capacity of large businesses, oil palm culture in family agriculture allows the adoption of planting systems (such as agroforest and intercropping with food crops) which minimise the environmental risks of deforestation and monocultures and, if efficient systems for processing and trading are developed, it can be an income source qualitatively and quantitatively superior to that of the system of business/family-based agriculture integration. Not always, therefore, to burn palm oil transformed in biofuel is a good deal for several of Brazilian communities.

Another aspect that requires more investment by public authorities – and which has not been dealt with in this report – is the development and dissemination of technologies that allow isolated communities to use oil from palm, babassu, and other oleaginous plants in the production of electricity by adapting generator engines (to accept those oils as fuels). Similar experiences have already been developed in communities in the states of Rondônia, by the Rondônia Federal University (UNIR), and Pará, by the Federal Government's National Institute of Technology (INT). They strengthen the concept of energy sovereignty for a population that is still left out of public policies.

Regarding specifically the security of communities that depend on babassu collection, Congress must urgently pass the so-called Law of Free Babassu, which guarantees breakers free access to babassu areas and forbids cutting the palms. The Law, already in force in some towns in Maranhão, was passed by Tocantins State Parliament in August 2, 2008.

Finally, it is essential that current rules are maintained in the Forest Code regarding legal reserves in the Amazon. Changes towards reducing forest areas or allowing to plant exotic species to recover them will not only weaken irreversibly their strategic function for maintenance and preservation of biodiversity and water resources within legal reserves, but also encourage deforestation in areas close to those degraded.

COTTON

Cotton is now a crop related to agricultural business and large landowners that expand their production to Cerrado areas. However, small producers still exist and they could be included in the biodiesel chain. Projects implanted in Bahia, for instance, help to foster that sort of production, but technical assistance and enough credit are essential for that.

From the social point of view, it is crucial to intensify labour inspection operations in areas of cotton expansion, where workers – usually in situation of vulnerability – are used for land cleaning and preparation. Slave labour cases in those areas have encouraged a series of efforts within the industry, in an attempt to seek production and certification standards, but in order for those measures to succeed, textiles industries, trading companies, retail businesses, and consumers must be more concerned about the origin of the products.

From the environmental perspective, it is necessary to increase control of pesticide use in order to reduce levels of human and environmental contamination, as well as create mechanisms for remote sensing in Cerrado areas, where cotton plantations are expanding to and which remain more ignored than other biomes such as the Amazon and the Atlantic Forest.

CORN

Even though the country produces neither ethanol nor biodiesel from corn, Brazil's corn market suffered the effects of the increase in US demand for it to produce ethanol. Brazilian corn plantations expe-

rienced a boom driven by strong price increases that resulted in a production 13.7% higher in the current harvest.

Given the importance of that crop for small farmers and Brazilian's regular eating habits, efforts should be made to preserve native seeds in order to maintain traditional agricultural practices, whether by family-based farmers or by Indian and non-Indian traditional populations. The use of corn as raw material for ethanol and/or biodiesel should be restrained on behalf of food sovereignty.

It is also vital that the principle of precaution regarding the liberation of genetically modified varieties, which have been being approved in The National Biosafety Technical Commission (CTNBio) without the necessary impact and contamination of non-genetically modified varieties' studies, according to several members of the collegiate, is respected (what also applies to cotton).

JATROPHA

Although it is still in a waiting stage within Brazil's agrofuels scenario, jatropha has attracted increasing interest and investments. Large transnational groups have sought to enter the species production chain, extending their participation to projects in several regions of the country. Nowadays, however, the crop undergoes certification of cultivars and lacks conclusive agronomical studies and even accumulated experience about its development.

Therefore, it is important that pressures by the productive sector do not lead public institutions to be careless in identifying and registering varieties and the resulting strengthening of the crop in the Brazil. The process under way should be based on the interests and security both of large producers and the rest of society.

Small producers should start using small parts of their land for the first experiments with jatropha and prevent the crop from risking their food safety and sovereignty. Small farmers should be integrated into the processing plants' projects of in a way that creates balanced benefits for all parts involved. Better results by one of the parts will be mutually better for the other.

- 1 When palm oil prices fall in foreign markets, producing countries choose to reduce imports and produce more biodiesel for domestic consumption.
- 2 Data from report “*Eating the Amazon*”, Greenpeace, 2005.
- 3 Source: CRN India, analysis of the palm oil commodity, <http://www.crnindia.com/commodity/palmoil.html>
- 4 Colômbia quer usar biodiesel de palma como alternativa à coca, *Valor Econômico newspaper*, August, 5, 2008.
- 5 Source: World Rainforest Movement
- 6 Federal taxes on gross revenues.
- 7 Brasil avança no valorizado mercado de óleo de palma, *Valor Econômico newspaper*, July 23, 2008.
- 8 Source: *Amazon palm oil: Palm oil industry moves into the Amazon rainforest*
Rhett Butler, Mongabay.com, July 9, 2008 - http://news.mongabay.com/2008/0709-amazon_palm_oil.html
- 9 Miranda, Ires de Paula, “*Caracterização dos ecossistemas florestais e de áreas manejadas com cultivo do dendê*”, INPA, 1986
- 10 Green, Márcia, *Avaliação de práticas de armazenamento e germinação de sementes de dendê*, edital CNPq 032/2005 - CT-Petro, CT-Amazonia, CT-Info, CT-Aquaviario
- 11 The request to visit the office and facilities of Agropalma in Tailândia was denied as well as a request for an interview in time for the company to expose its views on the issue.
- 12 *Viabilidade do biodiesel de dendê para a agricultura familiar*. Bahia Análise & Dados, v. 16, p. 107-118, 2006.
- 13 Dendeicultura da Bahia - Superintendência Regional da Bahia e Sergipe - Ministério da Agricultura, Agosto 2006
http://www.conab.gov.br/conabweb/download/sureg/BA/dendeicultura_na_bahia.pdf
- 14 Almeida, Alfredo Wagner de, Shiraishi Neto, Joaquim, & Martins, Cynthia Carvalho, *Guerra Ecológica nos Babacuais*, São Luis, Lithograf 2005
- 15 Senador é incluído em lista suja do trabalho escravo, *Folha de S. Paulo newspaper*, August 2, 2006.
- 16 Maranhão was Brazil’s first large producer and exporter of cotton in the late 18th century. But the crop experienced decline in the 19th century due to the difficulties to make the transition from the slave to the waged system, increasing competition in the international lint market, and rising transport costs, in face of the advancement of the agricultural frontier and the resulting distance between plantations and rivers used to transport goods. Source: Barbosa, Francisco Benedito da Costa. “Relações de Produção na Agricultura: algodão no Maranhão (1760 a 1888) e café em São Paulo (1886 a 1929)”. São Paulo, Revista do Instituto de Economia Agrícola (IEA) de São Paulo, v. 52, n. 2. <ftp://ftp.sp.gov.br/ftpiea/publicacoes/asp2-2-05.pdf>
- 17 Data from IBGE – Produção Agrícola Municipal. The cotton crisis is attributed by Embrapa Algodão researcher Joffre Kouri to the productive disarticulation of the crop in Brazil, caused by the so-called praga do bicudo (*Anthonomus grandis* Boheman) and official policies that have encouraged lint importing.
- 18 Conab estimates – 11º Levantamento de Safra – August 2008.

19 Cotton expansion in Mato Grosso is also attributed to the Programme of Incentive to Cotton Culture (PROALMAT), created by State Law 6.883 of 02/06/1997 and regulated by Decree 1.589 of 18/07/1997. The program offers 75% reduction in ICMS for the product for farmers that meet certain agronomic, environmental and phyto-sanitary norms.

20 All data presented in this paragraph come from IBGE – Produção Agrícola Municipal

21 Data from “*Projeções do Agronegócio*”, by the Strategic Management Office of the Ministry of Agriculture, Livestock, and Supply. January 2008.

22 Information contained in the study “*USDA Long-term Projections*”, February 2008.

23 Study by the Ministry of Development, Industry and Foreign Trade.

24 According to the Economática consulting firm, the Real was the currency with the highest increase in the world between December 31, 2002 and July 7, 2008, compared to developed and developing countries: 124%. (http://g1.globo.com/Noticias/Economia_Negocios/0,,MUL703136-9356,00.html)

25 Study by the internet portal BiodieselBR

26 Data from Cepea/USP

27 Bilich, Feruccio; Silva, Ricardo da. “*Análise da Produção de Biodiesel utilizando multicritério*”. Presented in congress, 2006 (<http://www.biodiesel.gov.br/docs/congresso2006/agricultura/AnaliseProdu%E7%E3oL.pdf>).

28 Economist Fábio Silveira, from RC Consultores, estimates that in 2008 Brazil’s biodiesel production will be 1.13 billion liters. Lucilio Alves, a researcher with the Centre for Advanced Studies in Applied Economics at São Paulo University (CEPEA/USP) projects 1.2 billion litres.

29 “*Brazil of Biofuels: Impacts of Crops on Land, Environment and Society – Soybean and castor bean 2008*”. Biofuel Watch Center, NGO Repórter Brasil, 2008

30 “*Estimativas de perda da área do Cerrado brasileiro*”. ONG Conservação Internacional. Brasília, 2004

31 Data from IBGE

32 From 1990 to 2007, Brazil’s productivity of cotton in cottonseed went from 1,281 to 3,659 kg per hectare, according to IBGE.

33 For more detail about the IBGE study, access <http://www.ibge.gov.br/home/estatistica/economia/agropecuaria/default.shtm>

34 CALHEIROS, Débora Fernandes, OLIVEIRA, Márcia Divina, DOLORES, Eliana F. G. *Poluição por pesticidas, nutrientes e material em suspensão nos rios formadores do Pantanal Matogrossense*. Corumbá, MS: Embrapa Pantanal, 2006. 4p. ADM – Artigo de Divulgação na Mídia, n. 096. Available at: <<http://www.cpap.embrapa.br/publicacoes/online/ADM096>>

35 The criteria proposed for access to tax benefits by PROALMAT include: proving by legal documents the use of cotton seeds with quality compatible with the quantity planted and according to varieties recommended for the state of Mato Grosso. Those seeds should be produced and purchased by farmers regularly registered at the Ministry of Agriculture and Supply. The farmer will also have to prove the use of technical assistance to make actual control of pests and diseases in the cotton plantation 60 days after harvest, to have a system to dispose of pesticide containers, to adopt practices to reduce residues, to control environmental pollution and contamination, and to have no debt to Receita Federal (Brazil’s tax agency). Source: <http://www.facual.org.br/home/proalmat>

36 The IFC is the World Bank’ branch for private investments.

- 37 That figure might be higher since some notification records do not specify which crops were in the farm inspected.
- 38 Degrading work refers to conditions that violate basic human rights and the labour legislation.
- 39 More information about the inspection in the Guarani farm can be obtained with Agência Repórter Brasil, at <http://www.reporterbrasil.org.br/exibe.php?id=1270>
- 40 “*Certificado para algodão mato-grossense recebe críticas*”, article published by Agência Repórter Brasil at <http://www.reporterbrasil.com.br/exibe.php?id=1237>, with speeches by Clóvis Scherer from Dieese and Caio Magri from Ethos Institute.
- 41 Publication by the Centre for Energy Efficiency and Renewable Energy of the U.S. Department of Energy, which defines US actions in research, development and implementation of several technologies for the use of biomass until 2017. http://www1.eere.energy.gov/biomass/pdfs/biomass_program_mypp.pdf
- 42 USDA Foreign Agricultural Service . www.fas.usda.gov/.
- 43 Automatic Recovery System of Brazilian Institute of Geography and Statistics (Sidra/IBGE).
- 44 Automatic Recovery System of Brazilian Institute of Geography and Statistics (Sidra/IBGE).
- 45 Data from the 11th study on grain harvest by the National Supply Company (CONAB).
- 46 Data from the 11th study on grain harvest by the National Supply Company (CONAB).
- 47 Sector agribusiness report on volume negotiated by BM&F/Bovespa, from July 2008.
- 48 A bushel equals 27.2155 kg.
- 49 Analysis of cost and market for corn in the second quarter of 2008, by the Advanced Studies in Applied Economics (CEPEA/ESALQ). http://www.cepea.esalq.usp.br/comunicacao/Cepea%20Custos%20MILHO_2trim08.doc
- 50 USDA Foreign Agriculture Service. <http://www.fas.usda.gov/grain/circular/2008/08-08/grainfull08-08.pdf>