



BRAZIL OF BIOFUELS

ANIMAL FAT, PALM OIL,
COTTON, JATROPHA,
SUNFLOWER AND RAPESEED
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Impacts of Crops on Land,
Environment and Society

 **Repórter Brasil**

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This fifth report by the Biofuel Watch Centre (BWC) presents an unprecedented study on the use of animal fat to produce biodiesel, as well as special attention to two other crops that have not been deeply studied by us last year: sunflower and rapeseed. Case studies on the use of vegetal oils to generate electricity in isolated communities of the Amazon. Besides broadening the focus, the report represents the continuity of the monitoring of oleaginous plants already deeply examined in “Brazil of Biofuels - Impacts of crops on land, environment and society – Palms, Cotton, Corn and Jatropha 2008”. In order to conduct this work, we have travelled 27.9 thousand kilometres by air and land, over eight Brazilian states: Amazonas, Bahia, Mato Grosso, Pará, Rio Grande do Sul, Rondônia, São Paulo, and Tocantins. Our work can also be followed on the internet at www.biofuelbrazil.org.

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Brazil of Biofuels:

**Impacts of Crops on Land, Environment
and Society - Animal Fat, Palm Oil, Cotton, Jatropha,
Sunflower and Rapeseed - 2009**

NGO REPORTER BRASIL

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This fifth report by the Biofuel Watch Centre (BWC) presents an unprecedented study on the use of animal fat to produce biodiesel, besides dedicating special attention to two crops that have not been covered by this series of studies: sunflower and rapeseed. Also new are case studies on the use of vegetable oils to generate energy in isolated communities in the Amazon. Besides such extension of its investigation focus, the report also features analysis on the impacts of oil palm, cotton, and jatropha - crops that have already been examined in a 2008 study, but which present news that warrant their approach in the present work.

Along 2009, soybean has remained as the flagship of Brazil's biodiesel programme. Data from the National Agency for Petroleum, Natural Gas, and Biofuels (Agência Nacional do Petróleo, Gás Natural e Biocombustíveis, ANP) indicate that at least four out of five biodiesel drops produced in the country originated from soybean oil. In a lower position come products such as bovine fat and cottonseed and palm oils. Sunflower, rapeseed and jatropha, in turn, have an insignificant share in biodiesel production, but experts warn about the potential of those crops under a scenario of increasing demand. Currently, the country needs to produce 1.8 billion litres of biodiesel a year to guarantee the 4% mixture of that biofuel into regular diesel - the so-called B4. With the coming of B5 in face of the pressure of an industrial sector with installed capacity to make three times as much as it makes today, new raw materials can become viable in the biodiesel production chain.

According to the Ministry of Agrarian Development (MDA), Brazil's federal government is interested in diversifying biodiesel raw materials. That would be positive to integrate a larger number of farmers into the programme, including their families, as well as to reduce effects of the humours of the soybean international market on the cost of Brazil's biodiesel. One of the measures under study by the government is to extend tax benefits provided for in the National Programme for Production and Use of Biodiesel (Programa Nacional Produção e Uso de Biodiesel, PNPB) to processing companies that purchase raw materials from small farmers, but do not use them to make biodiesel. That happens, for instance, with Petrobras units in north-eastern Brazil. The company buys castor bean from small farmers, creating a new market niche for them, but, since it does not use that oil to make biodiesel, it does not get part of the incentives.

On the one hand, logistic technological, and agroindustrial development created around soybean, which dates back from 40 years ago, should guarantee that the crop ranks first among raw materials used to make biofuels for many years. On the other hand, government as well as businesses know that it would be interesting to seek viable alternatives. That is the case of meat companies that are already using bovine fat to produce biodiesel. That can potentially bring problems from the cattle production chain - from deforesting to slave labour - into Brazil's biodiesel chain. In this report, we reveal situations where that "contamination" is already taking place. In the case of cotton, its development mainly through large properties and with intense use of pesticides raises doubts about its sustainability, despite multiplication of socioenvironmental initiatives by producers' associations. By and large, sunflower and rape, by having a similar potential growth to cotton, impose the same sort of socioenvironmental concerns for their use by the biodiesel chain.

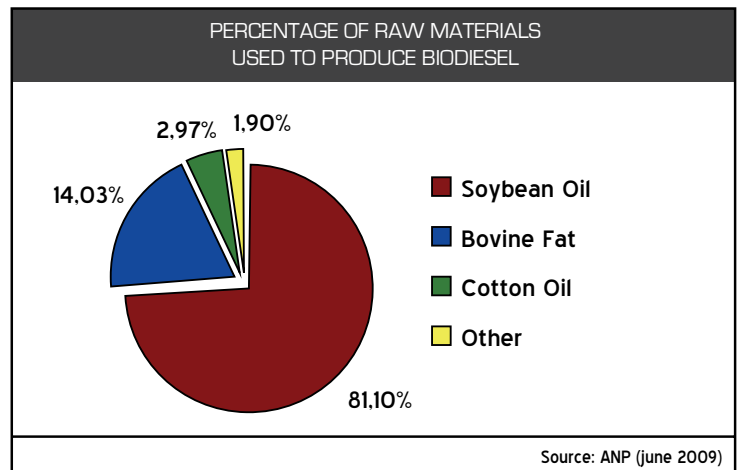
Finally, a note on oil palm. While the planted area in Brazil is stable, the crop started occupying an important space in the agenda of the Ministry of Agriculture, Livestock and Supply (Ministério da Agricultura, Pecuária e Abastecimento, MAPA), which turned it into a tool to advocate changes in the Forest Code. According to MAPA, which wants the law to allow areas with Legal Reserves that have been illegally deforested in the Amazon to be recovered with non-native species, oil palm could immediately occupy 1 million new hectares. However, environmentalists oppose the measure since the legal reserves should protect the Amazon's biodiversity. To carry out such endeavour, we travelled 27.9 thousand kilometres by air and land, including eight Brazilian states: Amazonas, Bahia, Mato Grosso, Pará, Rio Grande do Sul, Rondônia, São Paulo, and Tocantins. Both in distance interviews and in field research, we had the support of partner organizations, which shared with us precious information and contacts. As usual, we take advantage of this space to reinforce our thanks to our sponsors, without which this report would not be possible. Our sincere gratitude to Cordaid, Doen Foundation and Solidaridad.



ANIMAL FAT

INTRODUCTION

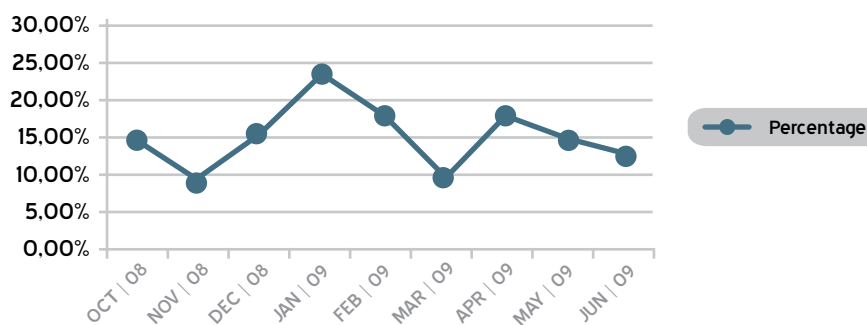
Animal fat (which is almost totally bovine fat) is the second most used biodiesel raw material in Brazil, only behind soybean oil and well ahead of cottonseed oil and oleaginous plants that are the main focus of the National Programme for Production and Use of Biodiesel (PNPB), such as castor bean, rapeseed, or sunflower. In the Biodiesel Monthly Bulletin released by the National Agency for Petroleum, Natural Gas, and Biofuels (ANP), including preliminary data on June 2009, bovine fat accounts for 14.03% of total production, while soybean oil is 81.10%, cottonseed oil means 2.97% and the other raw materials are not even detailed, featured generically as “other fatty materials” and totalling only 1.90% of the biodiesel production in the period (see chart below).



In the nine monthly bulletins on biofuels by ANP available for consultation, which include information from October 2008 to June 2009, the percentage of bovine fat used in biodiesel production varied between 10.70% and 24.54% (see chart below), but animal fat remained all along as the second most used raw material.

The cattle chain in Brazil presents serious social, environmental and economic problems, which will be deeply discussed in the next chapters. By establishing such a significant link with it, the biodiesel industry becomes still more fragile in its supposed tripod based on the sustainability ideal. Which are some of the reasons for the expressive participation of bovine fat as raw material in the national biodiesel production? For the general-coordinator for bioenergy of Ministry of Agriculture, Livestock and Supply (MAPA) Denílson Ferreira, the main reasons would be “availability, competitiveness, and favourable logistics, just as it happens to soybean”. That is, they purely economic justifications.

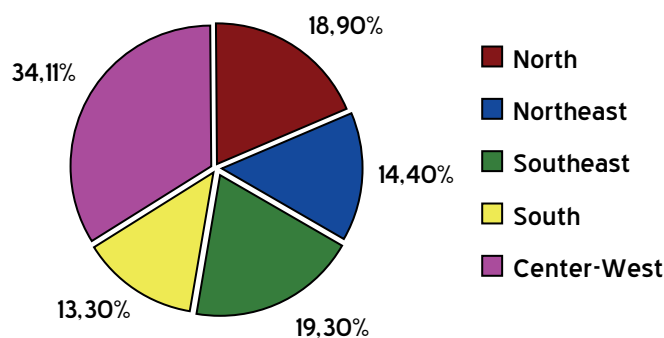
PERCENTAGE VARIATION FOR BOVINE FAT USED IN BIODIESEL



Source: Reporter Brasil (ANP)

Brazil has the second largest amount of bovine cattle heads in the world, second only to the United States. The most recent survey conducted by the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística, IBGE) in 2007 pointed out a total of 199.7 million heads spread in all regions of the country: approximately 34.1% in the Midwest; 19.3% in the Southeast; 18.9% in the North; 14.4% in the Northeast; and 13.3% in the South (see chart below). The current estimate by the Brazilian Association of Meat Exporting Industries (Associação Brasileira de Indústrias Exportadoras de Carne, ABIEC) is similar, of 190 million oxen and cows nowadays, which represents 19% of the world's total.

PERCENTAGE OF BOVINES IN EACH REGION OF BRAZIL



Source: Municipal Livestock Research

► Conflicting estimates

According to data from the Brazilian Service for Technical Answers (Serviço Brasileiro de Respostas Técnicas, SBRT), a network organized by the Ministry of Science and Technology (Ministério da Ciência e Tecnologia, MCT), each animal provides about 15 kilograms of usable fat. The Ministry of Agriculture does not have any survey the amount of bovine fat processed in the country and unofficial estimates vary a lot: the National Association of Collectors and Processors of Animal By-Products (Sindicato Nacional dos Coletores e Beneficiadores

de Sub Produtos de Origem Animal, SINCOBESP) speaks of 1 million tons; SBRT itself and the consulting firm Aboissa Óleos Vegetais work with 800 thousand tons; and ANP and Scot Consulting adopt 200 thousand tons. The degree of informality and the lack of transparency in Brazil's beef cattle industry make it difficult to evaluate which estimate is more reliable. "In 2007, Gessy Lever and Colgate [companies that make hygiene products] used 20 thousand tons of bovine fat a month. Those two alone overcome the 200-ton estimate", argued the manager of the unit of Animal Proteins and Fat of Aboissa, Alberto Luiz Perez. Also in 2007, IBGE recorded the slaughter of little over 24.4 million oxen and cows, which would result in approximately 366 thousand tons of bovine fat available for trading - a value closer to conservative estimates. That information, however, refers only to slaughter in establishments subjected to federal, state or municipal sanitation inspection, leaving aside clandestine slaughter houses and meatpacking places that still exist all over the country.

Historically, the traditional buyer of animal fat has been the soap industry. A study conducted by ABOISSA in 2007 calculated that approximately 61% of fat from bovines, swine, and fowl slaughtered in Brazil were sold to the hygiene and cleaning industries; 13% went to the oilchemical industry; 12% to biodiesel; 10% to animal feed; and 4% were burnt as fuel for boilers. "In 2008, the percentage of bovine fat going to biodiesel production should have fallen, since the price of the ton was high. But the trend is that in 2009 it returns to the 12% level", said Perez. For SINCOBESP technical consultant Alexandre Ferreira, between 30% and 40% of bovine fat now traded in Brazil go to biodiesel production. However, he explained that the industry "does not provide official statistical data" and that this figure is "an estimate based on experience".

Industries that process and sell fat and other animal products, such as meat and bone flour, are called fat-rendering plants. They can either be independent, that is, collect rests of meat and bone in public slaughter houses, smaller meat packing places and butcher shops, or be linked to larger meatpacking companies. The 35 companies that are members of SINCOBESP represent, according to the association itself, about 40% of the independent rendering plants in the country. Ferreira informs, however, that slaughter houses with integrated fat-rendering operations produce 60% of the country's bovine

fat. “The tendency is for independent rendering plants to disappear because of sanitation¹ rules and the fact that butcher shops have less and less meat pieces to offer, since the product now comes processed from slaughter house”, explained professor Antônio José da Silva Maciel of the School of Agricultural Engineering at Campinas State University (FEAGRI/UNICAMP).

► Disadvantages of animal fat

In spite of having a well-distributed production over Brazil's territory, being relatively cheap and having an established logistic structure, animal fat presents a technical disadvantage for biodiesel production, pointed out by the general-coordinator in Development of Production and Fuel Market of the Ministry of Mining and Energy (Ministério de Minas e Energia, MME), Ricardo Gomide: biodiesel from animal fat tends to be more solid in lower-temperature areas. In cold places, its consistency can become similar to that of margarine, which makes both storage and transport difficult, as well as its use in vehicles. “In environments below 40C, fat crystallizes, which can compromise the efficacy of the biodiesel that has that fat as its main raw material. In Brazil, that is a significant disadvantage for the Southern region. In the other regions, it only becomes a problem if there is intention to export it”, explained Maciel.

Lack of standardization was yet another negative aspect pointed out by Gomide and by UNICAMP's Professor Antonio Maciel. “To produce biodiesel, a factor that needs to be well controlled is the amount of water, which in excess can be a problem. There are fat rendering plants that deliberately add water to fat to increase its yield”, Maciel denounced. “Bovine fat has a higher pre-processing cost than other potential raw materials, due to its physical-chemical characteristics that are not as uniform as the other alternatives”, Gomide added. For MAPA Agroenergy coordinator Denílson Ferreira, the most important restriction to the use of bovine fat to produce biodiesel is that “raw material cannot meet high demand” because there are still “few actors to trade large volumes”.

► Prices of bovine fat follow that of soybean oil

Historically, the price of bovine fat in Brazil was around 400 per ton and would vary according to the rhythm of the bovine cattle arroba. With today's structure of the biodiesel national market, the average value of the ton more than tripled and started to be directly influenced by its main competitor, soybean oil. Since the purchase of raw material is the major contributor to the cost of biodiesel production (which usually varies from 0.35 real to 0.50 real per litre), any change in the relative price of soybean oil and animal fat induces producers to use a

higher proportion of one or the other raw material. “Since the end of 2006, the price of animal fat has been following that of soybean oil in Brazil - which, in turn, is influenced by those prices at the Chicago Stock Market and the variation in the US dollar”, revealed analyst Miguel Biegai Jr. from Safras&Mercados consultancy firm.

According to him, in the first months of 2008, the ton of soybean oil reached 3 thousand reais in the domestic market, pushing the price of bovine fat up to 2.3 thousand reais per ton. In the second half of the year, the increasing in the value of the US dollar and the fall in the price of the oil barrel reverted the upward trend in the price of soybean oil and therefore of bovine fat. “Now there is a new expectation of increase, with the raise in the oil barrel price. [US investment bank] Goldman Sacks has recently predicted that the barrel will reach US\$ 85 until December. If that is confirmed, the soybean oil ton in Brazil might reach 2.5 thousand reais, making the price of fat go up”, evaluates Biegai Jr. “There is a threshold, between US\$ 70 and US\$ 75 per barrel, above which the price of oil is decisive for soybean quotations at the Chicago Stock Exchange. So, biodiesel processing companies seek alternative raw materials and tend to justify the use of animal fat”, added the analyst.

Along the year, fat prices also usually vary according to seasons: in winter, demands falls and it devalues. Fabiano Tito Rosa, an analyst with Scot Consultancy, explains that it happens because “sales in hygiene e cleaning industry literally get cold” when it is cold and also because of the already mentioned difficulty to produce biodiesel from fat in low temperatures. According to a study conducted by the company, on July 15, 2009, the ton of animal fat in Brazil was being sold at 1,250 reais - a 17% fall within little less than a month (when temperatures were higher and prices were reaching 1,500 reais).

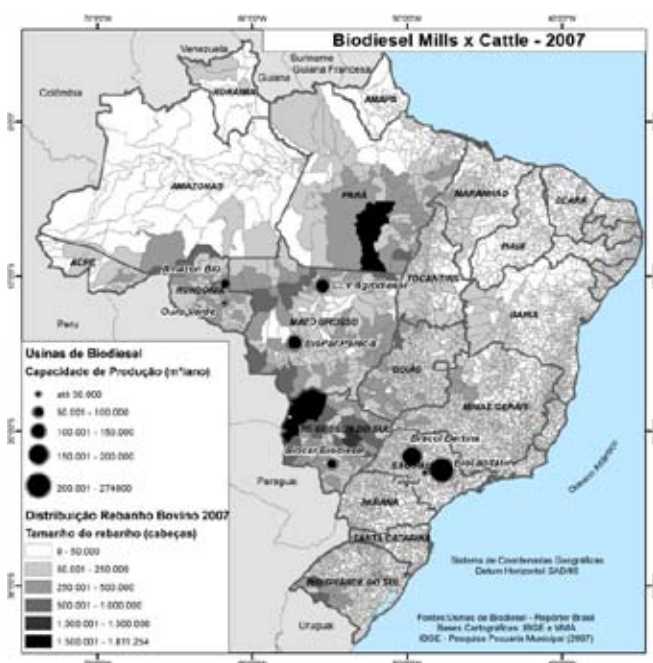
CHAPTER_1 SOCIAL IMPACTS: AGRIBUSINESS DOMINATES THE BIODIESEL MARKET

The 65 biodiesel processing plants licensed by the National Agency for Petroleum, Natural Gas, and Biofuels (ANP) usually have technology adapted to process both vegetal oils from distinct sources and animal fats. According to the previous section, bovine fat represents the second most used raw material for biodiesel in Brazil, well behind soybean oil and well ahead all other fatty materials. Brazil's processing plants usually resort to bovine fat in higher amount when the price of soybean oil increases. But, for eight of them, animal fat is more than an alternative: it is the main raw material (see table below).

BIODIESEL PROCESSING PLANTS USING ANIMAL FAT AS THEIR RAW MATERIAL		
Name	Town/State	Estimated capacity (m ³ /year according to ANP)
Biocapital	Charqueada/SP	274.000
Frigol	Lençóis Paulista/SP	6.000
Bracol/Bertin	Lins/SP	125.700
Ouro Verde	Rolim de Moura/RO	6.000
Amazon Bio	Ji-Paraná/RO	16.200
Biopar Parecis	Nova Marilândia/MT	28.000
CLV Agrodiesel	Colider/MT	36.000
Biocar Biodiesel	Dourados/MS	10.800

Source: Reporter Brasil

Biodiesel production focused on animal fat is concentrated in four states: São Paulo, Mato Grosso, Mato Grosso do Sul, and Rondônia (see map below). No wonder that the largest consumer centre, São Paulo, is home to the two largest plants: Biocapital and BrasBiodiesel (which belongs to the Bertin group, bought in September by JBS Friboi), which use bovine fat from distinct sources. That is also where Frigol is established - the only one that has no license from ANP to trade the biodiesel it produces. In Mato Grosso do Sul, BioCar Biodiesel operates in experimentally. In Mato Grosso, CLV Agrodiesel has the advantage of being located near the largest number of bovine heads in Brazil, while BioPar Parecis is preparing to innovate and investing in chicken fat. And in Rondônia, Ouro Verde and Amazon Bio follow the trend of investments in the state, which favour the cattle industry (see case study ahead).



► Large investments, distant return

Just as it happens with soybean oil, in biodiesel production using mostly animal fat there is a trend towards market verticalisation. Five of the seven processing plants that invest in bovine fat belong to slaughtering

companies, while that which used chicken fat has an exclusiveness contract to use residues from a unit of Perdígão (see case study next). According to evaluation by professor Antônio José da Silva Maciel, the major factor for biodiesel from animal fat to be viable is the use of the fuel in the fleet of the slaughtering company itself. "The main cost of meat in Brazil is transportation. To fatten bovines, there is virtually no cost, since water and grass that are necessary are available in nature", he argues.

So far, however, the only meatpacking company that produces biodiesel for its own use is Frigol, whose plant is located in Lençóis Paulista, SP. It is a small-scale unit with capacity to produce 40 m³ of biodiesel a day. The plant operated only between July and September 2007 and the modest 50-m³ output was used in the company's own vehicle fleet during that period. "We haven't made any biodiesel for over a year, because higher prices of bovine fat made it more profitable to sell our production to the hygiene and cleaning industry", said Márcia Fernandes, head of Frigol's fat rendering plant in Lençóis Paulista.

Frigol processes 50 thousand tons of meat a year in its two units: Lençóis Paulistas and Água Azul do Norte, Pará. Besides selling to the domestic market, it exports to South American countries, Europe, Asia, and Africa. According to Fernandes, the company intends to resume biodiesel production and is in touch with local colleges to establish a technical partnership. However, no date has been set to resume operations. "That will depend on commercial issues, production viability, and the establishment or not of that partnership", explained the coordinator of the rendering plant.

Biocapital is the largest biodiesel plant using mostly animal fat in Brazil. Its licensed production capacity is 274 thousand m³ a year - more than twice the second largest producer BrasBiodiesel, which belongs to the JBS/Berti group. That leadership stands out because the plant, together with AmazonBio, does not belong to any meatpacking company. From 2005 on, when it started experimental biodiesel production (still in the lab), Biocapital tested several raw materials, including bovine fat, chicken guts, swine fat, soybean oil, oil recovered from frying, and cottonseed oil. By the end of 2006, when it started commercial operation, the company chose bovine fat - the only raw material of the 150 thousand m³ of biodiesel that it has produced since then. "That raw material makes up 80-85% of biodiesel's production cost. And the price of bovine fat has been below that of soybean oil", justified Biocapital's executive-director Roberto Engels. He said that the company's goal is to "distinguish itself from the competition", by seeking cheaper raw materials and better logistic facilities. That is why Biocapital's biodiesel plant is located in Charqueada, SP, only 70 km from Paulínia, SP, the country's largest fuel distribution centre. The other investment by the company in biofuels is an ethanol plant

that is under construction in Bonfim, in the state of Roraima. When the company entered the São Paulo Stock Market (BOVESPA) in 2007, the brochure for primary distribution of shares informed that the controversial option for establishing a processing plant in the Amazon was also justified by the search for competitive advantages: to serve with lower prices the market of Northern Brazil, which still has no local ethanol producers.

The biodiesel plant in Charqueada, according to Engels, cost “more than 100 million reais” and had no public or international funding. “If that is based on results from 2008, we won’t see the return of that investment so soon, since the company had losses”, said Engels. He complained that the federal government is granting licences for biodiesel production without considering the demand for the product. “Our national production capacity is of the order of 3.8 million m³, while consumption with B4 [the 4% biodiesel mixture to mineral diesel, mandated by law since July 1st, 2009] is approximately 1.8 million m³ a year. That is almost 110% more!”, he said with exasperation.

Biocapital sustains that the origin of the bovine fat it uses is “confidential information”. The company will only say that it comes from “several meatpacking companies and fat rendering plants”. The higher percentage of biodiesel produced by the company has been sold in ANP auctions, but direct negotiations with distributors are under way. Details of direct sales (such as volume, price and buyers) are also considered by Biocapital as “confidential information”.

► No gain for small-scale producers

It is understandable that the Ministry of Agrarian Development (MDA) has excluded bovine fat from the rules of the Social Fuel Seal - the identification granted to biodiesel companies that purchase a minimum of raw material from small farmers and which entitles them to take part in all ANP biodiesel auctions and also to obtain tax reductions. Even though cattle is an activity practiced by small, medium, and large producers in Brazil, meatpacking companies concentrate the gains from sales of bovine by-products, including fat.

In other words: by and large, cattle farmers receive per animal sold with no difference in price according to the final destination of the meat, fat, bones and guts. “It is very hard to establish market alliances in the meat chain, since there is no dialogue or organization”, regretted the president of Mato Grosso do Sul Baby Beef Association (Associação Sul-matogrossense de Novilho Precoce) Nedson Rodrigues Pereira. Created in 1998, the association focuses on increase prices of baby beef (young bovines with softer meat), which used to be sold

at the price of a conventional bovine meat. Since 2000, its members (it now gathers 200 small, medium, and large producers) are included in the Guarantee of Origin Programme of the Carrefour retail chain, to which they sell about 45 thousand cattle heads per year and obtain prices that are about 7% above the market. “We thought we could earn more only with the quality of the meat. But we soon found out that in order to have a different price, we’d have to meet other demands, specially social and environmental ones”, said Pereira.

In several regions of Brazil, small producers are involved with cattle. Pontes e Lacerda, in the Guaporé Valley, is an area in the state of Mato Grosso where that ac-



tivity is predominant. In 2007, the town had 553,688 cattle heads according to a survey by the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística, IBGE). In the same year, also according to IBGE, its population was 37,910 people. That is: for each resident, there were at least 14 animals! In the region, beef cattle is controlled by large farmers, such as Paulo Cardia, owner of Barra do Prata Agropecuária and the Lagoa do Guaporé farm, where 10 slave labourers were freed by the Mobile Inspection Group last year. “Beef cattle comes from large properties; family farmers get milk cattle”, summarized Fabiana Corrêa de Barros, a technician with the Centre for Alternative Technology (Centro de Tecnologia Alternativa, CTA), a small producers organization created with the support of the Federation of Social and Educational Assistance Organisations (Federação de Órgãos para Assistência Social e Educacional, FASE). “Milk cattle farming has guaranteed market. That is the only product that, even if it does not pay well, has a purchaser at the door”, agreed Fátima Aparecida de Moura, an educator from FASE Mato Grosso, known as Cidinha.

Neighbouring Vila Bela de Santíssima Trindade is the town in Mato Grosso with the largest number of bovine cattle (839,469 heads in 2007) and fourth place in Brazil. The town, which was the state’s first capital, is famous

for the ruins of Igreja da Matriz, a church that is a symbol of colonial slavery: it was erected in the late 18th century by slaves that were not allowed to enter it. Manoel Batista and his wife Lurdes Prado live in an area that has undergone a land regularization process known as Gleba Formosa. They are small farmers and members of CTA. Their ranch has 56 hectares and 105 oxen and cows, created according to the so-called ecological management. Notozulia entreriana, a spittlebug pest that usually torments Brazil's cattle farmers, for instance, is fought in natural ways, using the fungus *Metarhizium anisopliae*. In the property, livestock share space with fruit trees (such as cupuaçu and araçá-boi) and forest species (especially mahogany). "We started to work with SAF [agro-forest systems] in 1996. At the time, the neighbours called me stupid. Now they recognized my success, but won't follow the example because results take long", Batista said.

For Batista and Prado, livestock is a savings account: they are sold only when some extraordinary expenses emerge, such as complicated medical treatment or the wedding of their daughter Maria Gabriela, who lives

in the state capital Cuiabá. Their regular income comes from milk and fruit pulps, which are used in school meals. The city pays 1.10 real per litre of milk, well above the 0.58 offered by the Guaporé dairy from Vila Bela. "Our monthly income is around 1.8 thousand reais with milk and 600 reais with fruits. The only reason we get that is because we are not totally dependant on the dairy" Batista celebrated. Here we have a good environment to live, with high diversity of foods, variety of fruit, our vegetable garden", Prado added.

The agreement for the direct sale to the Vila Bela municipal government was an initiative of the farmers themselves and is a good example of strengthening family



Lurdes Prado's fruit pulp goes to school meals



Ruins of Igreja da Matriz, a church that is a National Heritage Site



Cattle and trees live side by side under ecological management

agriculture, but it benefits only four producers, who take turns every month to provide frozen fruit pulp for municipal schools. "We deliver 40 kg a month. In the months that are not our turn, we sell the pulp in the Pontes e Lacerda square", said Clério Afonso Spíndolas, another member of the group. He and his wife Mercedes Spíndolas, are also cattle farmers with 53 oxen and 15 cows distributed over the 83 hectares of the family's property. "We get from 20 to 25 litres of milk a day. The Guaporé dairy comes to pick it up at the door and pays 0.50 real per litre", explained Mrs. Spíndolas. The couple's monthly income is about 800 reais, half of which comes from trading fruit pulp. The idea of using bovine fat to produce fuel, in turn, is still remote from the farmers.



For Clério Spindolas (right), cattle means savings

CASE | Biodiesel processing plant in Mato Grosso uses poultry fat as raw material

Bovine fat represents "nearly all" animal fat used to produce biodiesel in Brazil, according to the National Agency for Petroleum, Natural Gas, and Biofuels (ANP). Nova Marilândia, a small town in South-western Mato Grosso, can help to change that: it is home to BioPar Parecis, a processing company opened in 2007, which started producing biodiesel at commercial scale in the last quarter of 2008, using mainly soybean oil as its raw material. Biopar is really hopeful, however, for poultry farming: the company has an exclusive contract to use fat from chicken slaughtered at the recently built Perdigão facilities, which should start operations still this semester, with capacity to slaughter 140,000 animals a day.



According to Nova Marilândia's mayor Juvenal Alexandre da Silva, the town's current production is about a million chickens a month - all of them slaughtered at Perdigão plant in Nova Mutum. "If the local poultry packing plant started operating now, it would be enough for little more than 7 days", recognised the mayor. In 2007, Nova Marilândia had 1.44 million male and female as well as young chickens, according to the most recent data by Brazilian Institute of Geography and Statistics (IBGE). The town used to be the state's fourth largest fowl producer, after Campo Verde, Tangará da Serra and Nova Mutum, in that order. Mato Grosso, however, was eighth place at the national ranking of states for number of chicken, which is led by Paraná, followed by São Paulo, Santa Catarina, Rio Grande do Sul, Minas Gerais, Goiás, and Pernambuco.

Therefore, in order to provide for Perdigão's new packing plant, Nova Marilândia will have to enlarge and restructure its poultry farming sector. From the existing 110 companies, 87 did not meet the requirements set by the Ministry of Agriculture, Livestock and Supply (MAPA) and/or European Union rules (the priority market for chicken slaughtered in the area). The packing plant built by Delvido Pereira da Silva, for instance, is 12 metres wide and 72 metres long - and the latter dimension will go to 125 metres, increasing its capacity from 12 thousand to 20 thousand fowl. It is a chicken fattening shed right beside a road, which is forbidden by Normative Instruction 56 issued by MAPA in 2007 that established a minimum distance of 5000 metres between "poultry farming or packing plants" and "local, state, or federal roads". The demand is connected to hygiene concerns: the proximity between a poultry farm and places with busy traffic of people or vehicles, according to the legislation, "might interfere in the fowl's health and well-being and thus in the quality of the product" - what ultimately means a risk for consumers' health.

Adjustment and expansion of poultry farming in Nova Marilândia and around it will demand investments of about 86.5 million reais. According to Mato Grosso's extraordinary secretary for Strategic Projects José Aparecido da Silva (also known as Cidinho), those funds will come from the Midwestern Constitutional Fund (Fundo Constitucional do Centro Oeste, FCO), managed by Banco do Brasil. "Of the 87 poultry farms to be remodelled, 27 will change place and cost 200 thousand reais each. The remaining 60 will have an average cost of 100 thousand reais. And 250 new ones will be built in Nova Marilândia, Santo Afonso, Arenápolis, and Nortelândia at 300 thousand reais each", the secretary explained.

Growth opportunities and risks



Besides expectation regarding large funding from Banco do Brasil, Nova Marilândia does not even have a bank office. The nearest bus station is located in Arenápolis, whose urban centre is 20 km far. Mayor Da Silva ascertained, however, that Banco do Brasil will open an office in Nova Marilândia and that by 2010 the town will have its own bus station. Judging by the paving work undergoing at state road MT-160, near which Perdigão's facilities were built, and the extension of the high power electricity distribution network (the so-called "linhão", or big line), both under construction, the bank office and the bus station are not distant dreams.

Perdigão's new packing plant should create 3 thousand direct and indirect jobs in a town with 2,315 inhabitants (IBGE data on 2007). Nineteen-year-old Lucinele Amorim expects to be one of those benefited: even if the company has not started hiring, she went there with her resumé. With high school education as well as office clerk and Spanish courses, the young woman works in a car wash in Arenápolis and makes 500 reais a month, but she has no regular working papers. "Now these industries are arriving here and we come after them. Any job that comes up is fine, as long as my papers are regular", she justified.

Nova Marilândia's municipal government estimates that its current population is about 6 thousand people. New residents have still not been included in IBGE's census and therefore, did not count for federal government funds sent for education and health. There has been a population explosion since a year and a half ago. Since rumours started about the construction of the packing plant, rent prices began to inflate", revealed Municipal Secretary for Agriculture and the Environment Rogério Aparecido Raimundo.



Lucinele Amorim did not wait for Perdigão to announce job offers and decided to take her résumé

► Family farmers: far way

In spite of Nova Marilândia's evident economic effervescence, BioPar Parecis chose a town 400 km away to make its investment in family farming needed to obtain the government's Social Fuel Seal. According to rules set by the Ministry of Agrarian Development (MDA), processing plants located in the Midwestern region that purchase at least 10% of their raw materials from family farming (that per-



Da Silva promises bank office and bus station and complains that IBGE underestimated the town's population

centage will increase to 15% in the next harvest) are entitled to take part in all ANP biodiesel auctions as well as to receive tax deductions (lower tax rates for PIS/PASEP and COFINS).

The Bogorni Settlement Project, where 16 families are producing with incentive from the company in Nova Marilândia, is located in Ipiranga do Norte, Northern Mato Grosso. "It's a shame that BioPar did not invest in local family farming. I visited their plant six months ago in an attempt to establish a partnership, but it was not successful", complained the president of the Union of Rural Workers of Arenópolis, Joselino Francisco da Silva.

From October 2008 to July 2009, BioPar Parecis's 5,000 m² of biodiesel, sold only in the second round of ANP auctions, since in or-

der to take part in the first round, the company would need the Social Fuel Seal and BioPar has gotten its seal only two months ago. "We are authorised to produce 30 m² of biodiesel a day, but we are enlarging our facilities to 100 m². In a processing plant, investment is permanent: you have to grow in order to dispute the market, otherwise the big ones will eat you up", said BioPar Parecis general manager Celso Lescano Jr. He said that BioPar was built "virtually only with its own resources", with savings of about 50% compared to conventional investment in a unit with daily capacity of 30 m², which would cost about 10-15 million reais". "Our production technology was developed locally, supported by UFMT [the Mato Grosso Federal University], thus cutting our costs almost by half. It already works well with vegetal oils and it needs only an adjustment to animal fat", celebrated the manager.

► Political influence

At first glance, the use of animal fat to produce biodiesel in Nova Marilândia seems to be an exemplary case of partnership between a major poultry packing company and a biodiesel processing plant. But the story has its darker sides: BioPar Parecis's owner José Wagner dos Santos was one of the people indicted by the so-called Sanguessuga (Leach) Operation, which in 2006 revealed a crime ring that specialised in selling overpriced ambulances through frauds in public tenders. He was arrested by Federal Police and charged with being the main mediator of the scheme in Mato Grosso, in charge of establishing contact with city governments. Wagner was charged by Federal prosecutors with forming an illegal gang and influence peddling. The lawsuit, under way at the federal justice, is in its final procedures, that is, Judge Jefferson Schneider is awaiting the final statements by the prosecution and the defence to issue his sentence.

Cidinho, Mato Grosso's current state extraordinary secretary for Strategic Projects, is Santos's brother. When Operation Sanguessuga was carried out, he had been re-elected as mayor of Nova Marilândia (by the Liberal Front Party - PFL, now called Democrats - DEM) and presided over the Mato Grosso Association of Cities (AMM), of which his brother Wagner Santos was an employee. Besides being a state secretary, Cidinho is now a partner of União Avícola Industrial, a company that has a contract with Perdigão to manage its plant in Nova Marilândia until 2011. His wife Marli Becker dos Santos is the owner of Rações GMix, which provides food for fowl that will be slaughtered there.

Controversial and entrepreneurial, Cidinho was responsible for introducing poultry farming in Nova Marilândia in 2001. Eighth years earlier, at 22, he was elected the first mayor of the town (incorporated in December 1991). Until his term was up, diamond mining was the core local economic activity, but it already showed signs of decline. When he returned to the government, in 2001, Cidinho carried out a land reform process and encouraged settlers to invest resources from National Programme to Strengthen Family Farming (Programa Nacional de Fortalecimento da Agricultura Familiar PRONAF) in building poultry farms. "I bought that land for low prices and I distributed 5-hectare plots to unemployed families. The 13.5 thousand reais from PRONAF were not enough to construct a poultry farm, but the municipal government would help with machines, gasoline and basic products", he said. The fowl started to be sold to the Mary Loise packing plant in Nova Mutum, bought by Perdigão in 2004. "At first, Perdigão was not interested in our production, which was associated to settlements and therefore to landless people. I invited the company's officials to visit our farms and they realised that land reform here was not troublemakers' business", Cidinho said.

According to the secretary, Perdigão hesitated again when it came to deciding whether it would build its new packing plant. The governor's political support would have been "crucial" for the company to choose Nova Marilândia and accept to be the guarantor of loans to restructure and build farms. The political alliance between Maggi and Cidinho is actually old: in 2002, the then Mayor named the town's main street "Governor Blairo Maggi" against Brazilian legislation that prohibits naming public spaces or streets after living persons. "I think we have to pay such homage while the person is still alive", sustained the secretary. "I supported Blairo Maggi in early 2002, when he was

up for nomination for state government and had only 5% in the polls. He promised that if he were elected, he would help poultry farming in Nova Marilândia. And he's doing it", added Cidinho.

In May this year, Perdigão and Sadia signed an association agreement, which is now under evaluation at Brazil's Council for Economic Defense CADE). If approved, it will create a business giant that will be the world's largest producer and exporter of processed meat and Brazil's third largest company in terms of exports (after only Petrobrás and mining company Vale). Reporter Brasil got in contact with Perdigão in order to confirm information on the Nova Marilândia packing plant, but their press secretary informed that all officials are on a "silence period" due to a "primary stock offer". Indeed, the Normative Instruction 400 by Securities and Exchange Commission of Brazil (CVM), published in 2003, restricts the provision of strategic trade information by companies that are making a public stock offer, such as Perdigão.

CHAPTER 2 ENVIRONMENTAL IMPACTS: BRAZIL'S CATTLE INDUSTRY ADVANCES OVER THE AMAZON FOREST

Of the 199.7 million bovines counted in 2007 by the Brazilian Institute of Geography and Statistics, IBGE) in the whole Brazilian territory, 13% (or 25.6 million animals) were in Mato Grosso - the state with the highest percentage. The state also has the highest number of livestock heads in the Amazon biome: 17.9 million, according to the Mato Grosso Institute for Agricultural Economy (Instituto Mato-Grossense de Economia Agrícola, IMEA).

The typical landscape of Brazil extensive cattle farming, made up by lots of pasture and some cattle, already dominates at least 74.87 million hectares in the so-called legal Amazon, which corresponds to 15% of the region. The information is included in the report "Time to Pay the Bill", launched in April 2009 by environmentalist NGO Friends of the Earth - Amazônia Brasileira. Amazon Forest and Legal Amazon are not synonyms, but there is a close relationship between the two terms. The Amazon biome occupies the total area of five Brazilian states (Acre, Amapá, Amazonas, Pará, and Rorai-

ma), nearly all of Rondônia (98.8%), half of Mato Grosso (54%), part of Maranhão (34%), and Tocantins (9%). The Legal Amazon, a region established by Brazil's government in 1966 for planning purposes, is larger: it also includes part of Maranhão and the total area of the other eight states.

Researcher Bernardo Strassburg, from England's East Anglia University crossed data from the Ministry of Agriculture, Livestock, and Supply (MAPA) with information provided by National Institute for Space Research (INPE) and found that 69% of deforestation in the Amazon between 1997 and 2006 was due to the cattle industry. The result is part of Strassburg's doctoral thesis, which has not been defended yet. "It's interesting to see that, de-

Cattle is one of the main vectors for deforestation in the Amazon



spite that, cattle accounts for only 16% of revenues associated to deforesting in the region”, the researcher commented.

In 2004, Brazil became the world's largest bovine meat exporter. Keeping the lead, in 2008, 2.20 million tons of bovine meat were sold to the foreign market according to the Ministry of Development, Industry and Foreign Trade (Ministério do Desenvolvimento, Indústria e Comércio Exterior, MDIC). Of the 13 Brazilian states able to export, four are located within the Legal Amazon: Mato Grosso, Pará, Rondônia, and Tocantins. The study “Cattle Farming and Deforesting in the Amazon in the Age of Climatic Changes” (A Pecuária e o Desmatamento na Amazônia na Era das Mudanças Climáticas), published by the Amazon Institute for Man and Environment (Instituto do Homem e Meio Ambiente da Amazônia, IMAZON) in December 2008, showed that participation of the region in Brazilian meat exports increased significantly between 2000 and 2006: it went from 10 thousand 263.7 thousand tons; in relative terms, from 6% to 22% of the country's total. The main purchasers of Amazon meat in the period were European and South-American countries, with 54% and 35% of the volume exported, respectively.

► The siege to a degrading cattle industry in Pará

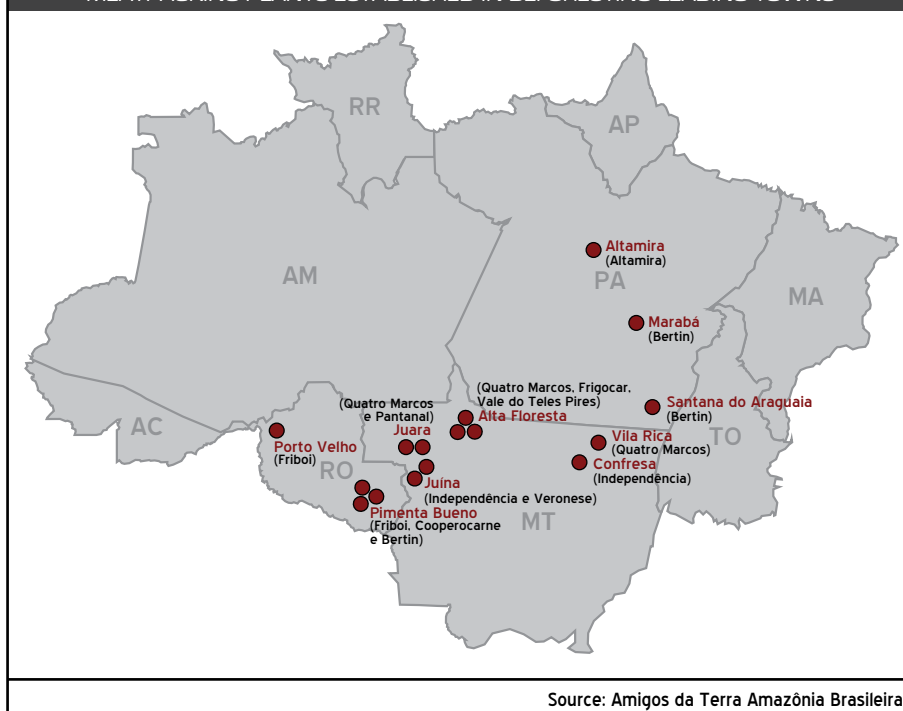
The expansion of the cattle industry in the Amazon, by and large, has been taking place based on irregular appropriation of public land and destruction of the forest. An indication of that is the fact that large meatpacking industries that were installed in the region after 2005 concentrated in areas of expansion of the farming frontier, where centuries-old trees give way to pasture, often with the use of slave labour to “clean” the area. The recent

study by Friends of the Earth showed that there are meatpacking plants under federal inspection in the ten towns that are the deforesting champions listed by the Ministry of the Environment (MMA) in March 2009. Together, they included 16 meatpacking units, ten of which belong to large groups (see map below). Besides, other six plants installed in the surroundings are provided by deforesting champions, as is the case of the Bertin meatpacking unit in Tucumã, PA, which buys cattle from farms located in São Félix do Xingu, PA – the town that, not by chance, accumulates three national top posts: the largest number of bovines, the largest area with destroyed Amazon forest, and the highest number of cases of slave labour found.

In Pará, in June this year, based on tracking of production chains conducted in a partnership with the Brazilian Institute for Environment and Renewable Natural Resources (IBAMA), federal prosecutors filed 21 public civil lawsuits asking for 2.1 billion reais of compensation from large farm owners and meatpacking companies (such as Bertin and Minerva) which trade livestock raised in illegally deforested farms. Prosecutors also notified 69 companies that used to resell meat, leather and other bovine products, and demanded that they severed trade relations with the providers denounced, at the risk of also being charged with environmental crimes.

The three large retail chains notified (Pão de Açúcar, Carrefour, and Wal-Mart) readily followed prosecutor's recommendations. Under pressure, after a month of negotiation, meatpacking companies and the Pará state government signed Conduct Adjustment Commitments (Termos de Ajustamento de Conduta, TAC) with federal prosecutors. The agreements established that the companies will only buy livestock from farms whose owners conclude the process of land regularization of their estates within up to five years, immediately stop illegal deforesting, and obtain environmental licensing from State Environment Department (Secretaria Estadual de Meio Ambiente, SEMA) within at least two years (for that, they must reforest their properties to meet the required 80% of legal reserves). Meatpacking companies will also inform the origin of their meat to consumers and the state's federal prosecutors, so that they can certify that there is no slave labour, environmental crimes, or landgrabbing perpetrators among providers. The state government, in turn, committed itself to computerize the record of rural properties and the Electronic Registration of Livestock Transit within a

MEATPACKING PLANTS ESTABLISHED IN DEFORESTING LEADING TOWNS



Source: Amigos da Terra Amazônia Brasileira



Cattle and pastures mark amazon landscape



Pará's cattle is associated to environmental crimes

year. An independent audit, together with a commission formed by ten prosecutors, will inspect the fulfilment of the agreements annually.

Right after TACs were signed, the Pão de Açúcar Group has taken orders for meat from the units of Bertin in Pará, while the president of Brazil's Association of Supermarkets (ABRAS), Sussumu Honda, said in an interview to journalist Miriam Leitão that it would be unfair if the retail sector kept a commercial veto on meatpacking companies. Wal-Mart and Carrefour spoke out to say they would keep the embargo and would only do business in Pará after agreement and alignment on the audit plan proposed by the retail sector. Amidst the controversy, Pão de Açúcar and ABRAS reversed their decision and kept the embargo until negotiations were carried out.

In late August, during the International Workshop on Solutions for Deforesting and Greenhouse Gas Emissions caused by Cattle Expansion, held in São Paulo, Wal-Mart's sustainability vice-president Daniela Di Fiori, revealed that ABRAS hired consultancy company SGS to draw a certification plan for meatpacking companies. The proposal, still under construction, is to demand that companies register their direct providers still this year, as well as cattle fattening farms, and guarantee that they have no environmental or labour liabilities. "We will conduct a gradual process. We want to get to the producers but we cannot do this now without strengthening the links in the production chain", she justified. "Wal-Mart, Carrefour and Pão de Açúcar will only buy meat from certified companies and our intention is that smaller supermarkets adopt the same measure", added Di Fiori, saying also that the three largest meat groups in the country (JBS Friboi, Bertin, and Marfrig - the two first ones are undergoing a merger process) had access to the programme draft and joined

the initiative. Another speaker at the event, Michael Conroy, a certification expert (author of "Branded!"), criticized ABRAS for not involving civil society in constructing the process of certification. "History shows that certifications made by companies tend to failure", commented Conroy. "Another mistake is certifying the meatpacking company rather than the meat. That way you link your whole brand to the company's reputation, without guaranteeing that all its processes and products are correct", he added.

Of the 21 farms sued for illegal deforesting in Pará this year, according to the investigation by federal prosecutors and IBAMA, 13 were providers of the Bertin group, namely: Itaipavas, Santa Fé, Santa Rosa, Colorado, Espírito Santo, Vale Sereno, Cedro, Maria Bonita, Santa Ana, Gameleira, Sapoti, Parasul, Santa Tereza do Araguaia, and Paragoiás (on the relationship between those environmental crimes and BrasBiodiesel, see case study below). Besides Bertin, another meatpacking company that owns a biodiesel plant and appears in the public civil investigation as co-perpetrator of environmental crimes is Frigol - which, according to the previous chapter, produced fuel only for the company's own fleet. Frigol has two units: one in Lençóis Paulista, SP, where the biodiesel plant is located, and the other in Água Azul do Norte, PA. However, the head of the fat rendering plant near Frigol's unit, Márcia Fernandes, sustained that it does not use bovine fat from Pará. "All our biodiesel was produced with local animal fat from the rendering plant de Lençóis Paulista. We don't use fat that comes from Pará", she stated.

► The production chain compromised

The connection with negative environmental impacts is not a feature only of biodiesel plants belonging to meatpacking companies. Biocapital, located in Charqueada, SP, for instance, purchased in 2008 bovine fat from the units of Quatro Marcos in Vila Rica and Juara, MT, the latter recently leased by the JBS Friboi group. Vila Rica's Quatro Marcos was even shut down by the Federal Justice due to a gas leak that intoxicated 14 workers. Its Juara unit, in turn, had its operation closed by IBAMA for lack of environmental license. To make thing worse, Rosana

Sorge Xavier, the second physical person that most deforested in Brazil, according to the list released last year by the Ministry of the Environment (MMA), is a member of the family that controls the Quatro Marcos Group and in July this year entered the Dirty List of Slave Labour, periodically updated by the Ministry of Labour and Employment (MTE).

Even the plants to which animal fat is a supplementary raw material do not escape problems related to the use of fat with compromised origin. Biotins Energia, located in Paraíso dos Tocantins, TO, used 90% of soybean oil on average, to produce biodiesel. According to its industrial manager Hugo Fabiano Dominiqui, the other 10% are divided between other fatty materials available in the area, specially jatropha and bovine fat. In March this year, 280 people working under slavery conditions in planting and harvesting jatropha were freed from the Bacaba farm in Caseara, TO - a property of Saudibras Agropecuária e Empreendimentos, which has commercial relations with Biotins. Regarding bovine fat, at least one of its

providers has already been denounced for environmental and tax-related crimes.

The Co-operative of Producers of Meat and Meat Products of Gurupi (Cooperativa dos Produtores de Carne e Derivados de Gurupi, COOPERFRIGU), which sells bovine fat to Biotins, was even closed down for throwing untreated effluents into the Jandira creek and resumed operations only after signing a Conduct Adjustment Commitment (TAC) with state prosecutors. COOPERFRIGU is also the target, since 2005, of a lawsuit for tax-related crimes, still under way at the Federal Justice. The public civil lawsuit filed by federal prosecutors asks for the extinction of the co-operative "created with the sole purpose of not paying federal taxes and thus causing damages to the state". Chief federal prosecutor in Tocantins Álvaro Lotufo Manzano explained that COOPERFRIGU was constituted in 1998 by stockholders of the Safrigu meatpacking company, their relatives and employees, but started to function in the company's same address and equipments. A fiscal audit conducted by the Federal Revenue Service in 2004 concluded that the creation of the co-operative aimed only at not paying taxes, using distinct legal treatment to which co-operative members are entitled. Damages to public funds, only during the period audited (March 1999-December 2002), amount to about 25.5 million.

► Obstacles to inspections

According to data from EMBRAPA Satellite Monitoring, vegetation of 18% of Brazil's territory would need to be recomposed to meet the legal demand for Permanent Protection Areas (such as river and lake banks or highly sloped areas) and the maintenance of Legal Reserves (which varies from 80% of the rural estate in the Amazon Biome to 20% in the Atlantic Forest). In other words, under the current legal environmental restrictions, about 1.5 million km² have been illegally deforested in Brazil. The president of the Environment Commission of Brazilian Federation of Agriculture and Cattle Industry (Confederação da Agricultura e Pecuária do Brasil, CNA), Assuero Veronez, recognises the irregularity, but lobbies to change the environmental legislation. "If federal prosecutors from other states repeat what has taken place in Pará, it will be a tragedy. In the South and Southeast of Brazil, the situation is a lot worse than in the Amazon. Here 80% of the properties do not have the 20% of Legal Reserve demanded by the legislation, said Veronez during the Workshop Sustainable Cattle Farming, held in July in São Paulo, in a lecture entitled "Conflict between sustainable cattle farming and the Forest Code".

While CNA elected the pressure for change in the Forest Code as its priority for 2009, state and federal environmental protection agencies have few structur-



Biotins: fat has environmental and labour-related problems

Hugo Dominiqui, Biotins' industrial manager



al conditions to carry out their mission. The IBAMA unit in Cáceres, MT, for instance, is in charge of controlling 12 towns of the so-called Greater Cáceres Area, which total 48.8 thousand km² where beef cattle is one of the main economic activities. The region is considered dangerous, near the Bolivian border, where bootlegging of timber, wild animals and drugs is common. “We have five employees and no car. When we need one, we borrow it from the Chico Mendes Institute [a federal agency that manages conservation units]”, said environmental technician Luiz Benevides, who has worked with the IBAMA unit in Cáceres since the agency was created in 1989. That is: strictly speaking, there is one IBAMA employee for each 9.76 thousand Km² in the Greater Cáceres Area – and that employee does not even have a car to move about in the area. “When there are major denunciations, inspectors come from Cuiabá. That reduces the risks for us who live here. The violators know our families”, Benevides justified.

Besides the lack of structure, corruption is another problem that hampers environmental control. In Tocantins, the head of the IBAMA Division of Control and Inspection Lenine Barros Cruz declared that even when he leads actions in other states, he demands that all inspectors come from his division.

Special aid to the Ministry of the Environment (MMA) Flávio Montiel, which served as IBAMA’s Inspection Director for six years, recognized the agency’s structural problems. During the Workshop on Solutions for Deforestation and Greenhouse Gas Emissions Caused by Cattle Expansion, he presented data showing that in Brazil’s Northern Region there is one inspector for each 11,797 km² (see table below). “In 2003, that situation used to be worst. When President Lula took office, 80% of IBAMA had at most secondary education. Now we are increasing the amount of servants and improving their training. Still this year, we will have a public selection to hire three more fiscals, all of them with college education”, Montiel sustained.

► Impact mitigation

A recently launched international campaign proposes that citizens from the whole world stop eating meat at least one day a week. The aim is to reduce the greenhouse effect emissions caused by the cattle industry, resulting from associated deforestation not only for pastures, but specially to produce grains used for animal feed, not even considering the so-called enteric emissions (ruminants’ digestion accounts for 22% of total

methane emissions). The proposal is supported by celebrities such as Paul McCartney, but crashes with the constant increase in the world consumption of bovine meat.

In Brazil, environmental organizations concerned with cattle industry’s damaging impacts (such as NGOs Imazon and Friends of the Earth Amazônia Brasileira) advocate the increase in productivity of pastures as the core strategy to revert the tendency towards deforesting. According to data from Brazilian Association of Meat Exporting Industries (ABIEC), Brazil’s cattle industry presents low productivity: the average animal-per-hectare rate is 1.15, due to the predominance of extensive farming over low-quality natural pastures; and the production turnover is a little over 22%, that is, about 44 million cattle heads slaughtered a year.

A good example of how productivity can be increased comes from the Ouro Verde farm, located in Brejo Grande, Pará. Since 2001, with the adoption of simple techniques such as pasture rotation (with no additional inputs), the farm’s average annual productivity grew 2.5 arrobas of meat per hectare. “If that is applied to other areas, it is possible to liberate pastures for agriculture. That is evidence that the cattle industry can increase productivity without deforesting, by using the farm’s own resources”, advocated Marcelo Pimenta Mascarenhas, general director of Exagro, a consulting firm hired by Ouro Verde’s owner André Luís Rofino.

Funding is, by the way, another key point to improve practices of Brazil’s cattle industry. In 2008, direct operations by Brazilian Economic and Social Development Bank (Banco Nacional de Desenvolvimento Econômico e Social, BNDES) with the meat processing industry reached 5.9 billion reais – the same amount the bank invested in the industrial segment. From the amount applied in the Amazon, according to report by Friends of the Earth – Amazônia Brasileira, less than 6% went to establishing and renewing pastures.

Since July last year, Resolution 3545 do National Monetary Council (Conselho Monetário Nacional, CMN) prevents (public and private) banks from providing credit to producers in the Amazon that do not prove the legal ownership of their land (based on the Rural Estate Registration Certificate) and the environmental regularity of the activity for which they ask funding (based on the Single Environmental License issued by environmental state agencies). But the effectiveness of the measure has been hampered both by its restriction to the Amazon biome and by the fact that, to obtain credit, merely asking for the license to the environmental authority has been enough (rather than its actual concession).

NUMBER OF INSPECTORS PER REGION		
Region	Inspectors	Area (km ² /fiscal)
North	281	11.797
Center-West	219	7.361
Northeast	334	4.632
Southeast	141	6.576
South	102	5.658

Source: Ibama (MMA, 2009)

CASE | Rondônia's cattle industry marked by scandals and propaganda

The Fund for Supporting Animal Health in Rondônia (FEFA-RO), an organization created in 1999 by local cattle farmers, is preparing to launch an ad campaign to publicise the industry's good results in the region. The discourse contrasts both with a recent study by the Brazilian Agricultural Research Corporation (EMBRAPA), which underscores the relationship between cattle and deforestation in the state, and the start of the so-called Operation Abate (Slaughter), by which Federal Prosecutors and Federal Police revealed a criminal ring involving public servants and the main meat packing companies in Rondônia. That turbulent context involves two biodiesel processing plants in the state that have been using bovine fat as their only raw material: Amazon Bio, located in Ji-Paraná, and Ouro Verde, in Rolim de Moura.

Amazon Bio is the result of investment by the transport and tourism company União Cascavel (EUCATUR). However, according to its manager Marcelo Salvadori, EUCATUR sold Amazon Bio to the Brazil Bio-fuels business group. "We can work with vegetal oils, but in this area bovine fat is the only raw material available at the necessary amount", explained the manager. Amazon Bio has an estimated annual capacity of 16.2 thousand m², but produced only 57 m² between February 2008 - when it got its operation license from National Agency for Petroleum, Natural Gas, and Biofuels (ANP) - and May 2009. "The plant was not operational due to the high cost of fat and the low price of biodiesel", Salvadori explained. Amazon Bio bought 2.5 thousand m² of biodiesel at the 14th ANP auction in late May and resumed production to meet the deadline for delivering the product by September.

Ouro Verde has lower production capacity: 6.12 thousand m² of biodiesel a year. Doctor and cattle farm owner Volmir Dionísio Rodegheri, one of the company's owners, also owns the Bom Jesus Hospital and the Margem meat packing plant in Moura (formerly called Regional). "The last ANP auction where we were able to buy 120 m² of biodiesel was the 12th one [in late November 2008]. After that, we decided to cancel production, since low prices of biodiesel make the sale of our bovine fat to São Paulo's Bertin our best option", said the farm owner.

Born in the state of Santa Catarina and raised in the countryside, Rodegheri migrated to Rondônia 30 years ago in search of land. He complained that "cattle does not create much income" and he said he is a cattle farmer because "it's easier". "Agriculture is complicated, it involves labour and pesticides", stated the businessman. The doctor has a developmentalist view typical of agribusiness, where the forest is seen as an obstacle to economic growth: "Brazil's slaughtering capacity is now 70 million animals a year, but we have been slaughtering only 30 million. That is, we have space to grow, as long as they stop that environmental campaign", he said.

Margem was one of the meat packing plants investigated in Operation Abate in June this year. According to denunciation by Federal Prosecutors, its unit in Ariquemes was authorized to export meat without proper sanitation conditions after bribing servants at the Federal Agriculture Administration, a regional agency under the Ministry of Agriculture, Livestock and Supply (MAPA). Other four meat packing plants installed in Rondônia would also have been favoured by the criminal scheme: Quatro Marcos (formerly Cear), Amazon Meat (also known as Santa Marina), FrigoPeixe, and JBS Friboi (the largest in Brazil and the world's first in slaughtering capacity - 47.1 thousand animals a day). Ac-

cording to the investigation, the JBS Friboi unit in the state capital Porto Velho was artificially increasing the weight of its meat by adding water to the product at the cooling chamber. The prosecutor in charge of the case, Reginaldo Pereira da Trindade, said that "there is a general disposition to favour meat packing companies in Rondônia".

"I do not know of any involvement by our providers in such a corruption scheme", replied Salvadori. He informed that Amazon Bio purchases raw materials from three meat packing companies located in Ji-Paraná (Tangará, Rondosafrá, and Frialto), as well as from Irmãos Gonçalves (in Jaru) and Independência (in Rolim de Moura), all of them subjected to federal inspections. "I never purchase fat from Friboi", underscored the manager. According to the coordinator of the Regional Labour and Employment Administration in Rondônia, Wilmo Alves, the providers of Amazon Bio mentioned by Salvadori, except Rondosafrá, have already been inspected. All of them practised irregularities, for example, they include non-payment of insalubrity premium and non-provision of individual protection equipments (IPES) to employees.

► The natural state of cattle farming?

The core image of the campaign "Rondônia: the natural state of cattle farming", to be launched by FEFA-RO, is that the state has the potential to multiply its number of cattle heads without deforestation, by raising productivity levels. According to the Brazilian Institute of Geography and Statistics (IBGE), in 2007, Rondônia had a little over 11 million cattle heads. Last year, the state was 5th in Brazil's ranking of meat exporters, both in weight (99.2 thousand tons) and in value obtained from sales (US\$ 348 million). But when one looks at the percentage of the state's exports related to the beef cattle industry, Rondônia is Brazil's first place. "Meat accounts for almost 60% of our exports, which used to be dominated by lumber", celebrated Roberto Andrade Grecellé, a veterinarian and the campaign's coordinator.

According to the report "Time to pay the bill", released in April this year by environmentalist NGO Friends of the Earth - Brazilian Amazon, Rondônia was the state where live cattle prices increased the most: from early 2007 to December 2008, the increase was 46%, compared to 32% in São Paulo (the largest exporter). "Cattle is the basis of our economy because it provides easy and quick money", says the state head of the Brazilian Institute for Environment and Renewable Natural Resources (IBAMA), César Luiz Guimarães. "Most cattle farms

Roberto Grecellé presents campaign "Rondônia: the natural state of cattle farming"



are small or middle-sized properties", he added. Information provided by the Rondônia's Silviculture and Husbandry Agency (IDARON) stresses his opinion: out of the 101 thousand properties dedicated to cattle farming, 90.6% have up to 200 hectares.

The Amazon biome covers 98.8% of Rondônia's territory. The Environmental Code establishes a legal reservation of 80% of the property in that biome (an area that cannot be deforested). Since the state has concluded its Ecological Economic Zoning, that percentage can be reduced to 50% in areas of established occupation. In April this year, EMBRAPA Rondônia released preliminary results of the study "Environmental, economic, and social impacts of beef cattle industry".

By and large, the study showed that the environmental legislation has been systematically broken by the state's cattle farmers: the highest concentration of bovine cattle is precisely in towns where over 80% of the forest has been destroyed. The study also pointed out the beginning of a process to reduce cattle activities in Rondônia's south cone, where degraded pastures are giving way to mechanised rice and soybean plantations. According to the Rondônia's State Environmental

Development Department (SEDAM), 33.57% of the Forest have been already deforested.

"Rondônia has 925 areas barred by IBAMA. The highest concentration is by the BR 364 federal road (between Rio Branco and Porto Velho) and at the state border with Mato Grosso, along BR 174", said IBAMA's superintendent. He also pointed out the illegal presence of cattle at the Bom Futuro National Forest (FLONA) - a conservation unit created in 1988, with 272 thousand hectares, about 200 Km from Porto Velho. "In May, we carried out an operation there involving 367 agents from IBAMA, the Chico Mendes Institute, the State environmental Police, the Army, and INCRA [The National Institute for Colonization and Agrarian Reform]", said Guimarães. "Currently, about 28% of the FLONA have already been deforested, with an occupation of 3.5 thousand people and 35 thousand animals", he explained. During the inspection, farmers were notified to remove their cattle within 180 days, but no fines were applied. "Some people look for deforesting, we'd rather speak of 66.43% of the state that are preserved and the forest is intact", argued Grecellé. "Cattle farming in Rondônia is not sustainable today, but it is willing to be", underscored the veterinarian.



CHAPTER_3

LABOUR RELATED IMPACTS: CATTLE
FARMING LEADS THE RANKING OF
SLAVE LABOUR CASES

São Félix do Xingu, PA, as we saw in the previous chapter, has Brazil's largest number of bovine cattle heads (IBGE/2007) and the largest area of destroyed forest (MMA/2008). It is also the town where the number of livestock grew the most between 1996 and 2006. No wonder why it is the champion of the shameful nationwide ranking of slave labour: between January 1st, 2002 and June 30, 2009, it had 108 cases according to the Land Pastoral Commission (CPT).

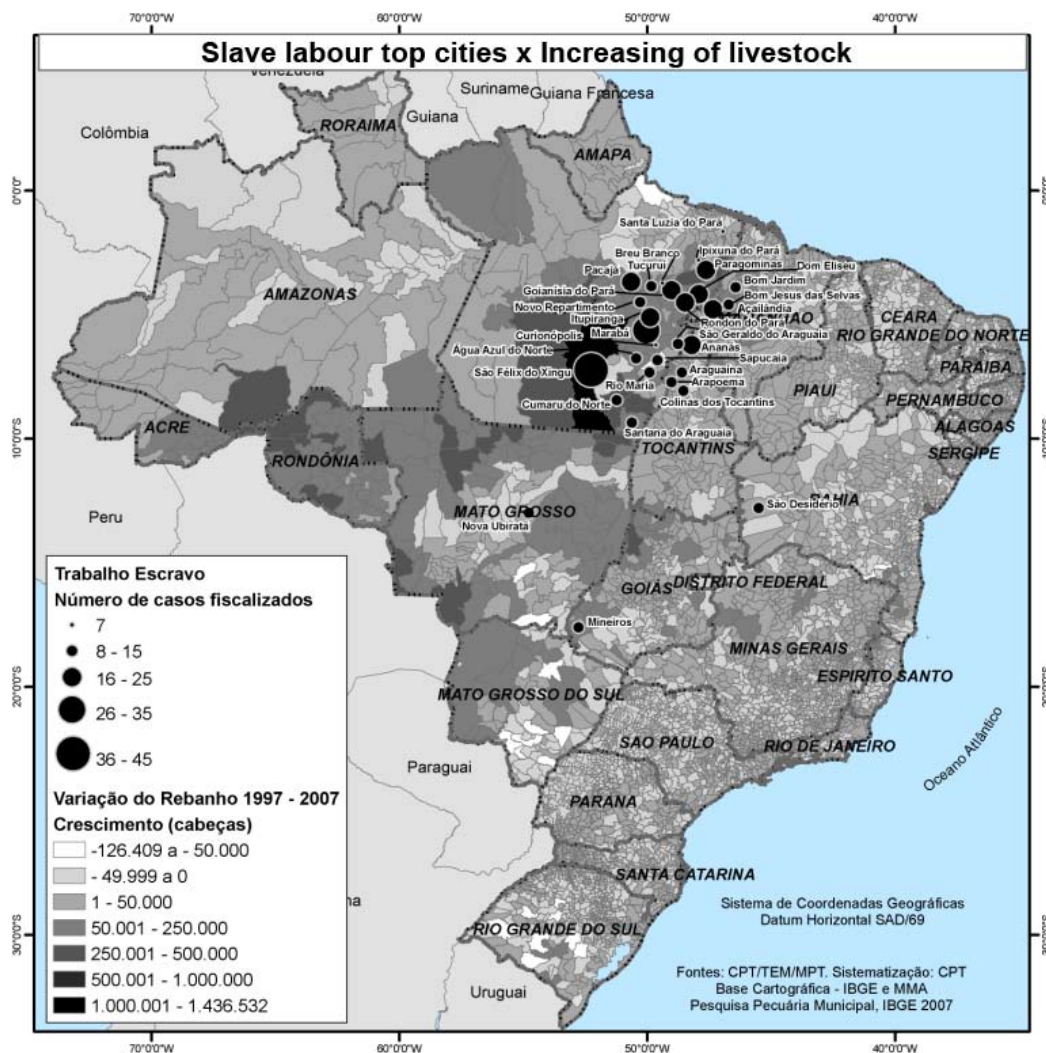
Most cases of slave labour caught in the act in the cattle industry take place when areas are being opened or recovered, in the activity popularly known as "roço da juquirá", when labourers "clean" the deforested area to plant pasture. That was the case of the 38 people subjected to slavery who were freed from the Bandeirante Farm, in São Félix do Xingu, in May 2008. The place was so isolated that the Mobile Inspection Group led by the Ministry of Labour and Employment (MTE) needed to lift 15 of those workers with helicopters; the other 23 had been sent to the

Cowboy in Novo Repartimento, PA: the town is included in lists of slave labour and increase in number of bovines



neighbouring town, Xambioá, TO - a manoeuvre by employer Ernoel Rodrigues Júnior to deceive inspectors.

The relationship between increase in bovines and degrading exploitation of labour is not exclusive to São Félix do Xingu. Crossing the two lists (the 30 Brazilian cities with at least seven cases of slave labour inspected between January 1st, 2002 and June 30, 2009 and the 30 cities with the fastest growing number of bovines between 1996 and 2006) provides revealing information (see map below).



Besides São Félix do Xingu, other five towns appear in the two lists: Açailândia, Maranhão; Cumaru do Norte, Novo Repartimento, Paragominas, and Santana do Araguaia, Pará. Considering that Brazil has 5,564 towns and cities, that coincidence is quite significant.

Cattle farming has led the national slave labour ranking: according to CPT, in 2008 there were 85 cases caught in the act (40% of the 214 cases inspected); in 2009, from January 1st to July 22, there were 30 new cases, which amounts to 51% of the total in the period (see table below). When the criterion for classification is the number of workers freed, cattle is second only to the sugar-alcohol industry (which, in spite of having fewer cases, employs more people in planting and harvesting sugarcane). In 2008, of the 5,244 labourers released from slavery, 1,026 or 20% worked in activities such as cleaning of areas, pasture planting, and cattle farming; in 2009, until July 22, other 190 people under slavery were freed - 9% of the total of labourers freed in the period.

One of those most recent cases took place in the Lua Cheia Farm, in Bom Jesus do Tocantins, PA. Inspec-

OCCURRENCE OF SLAVE LABOUR PER ACTIVITY						
Atividade	Reported Cases	%	Inspected Cases	%	Workers Freed	%
Deforestation	0	0%	0	0%	0	0%
Ranching	56	56%	30	51%	190	9%
Reforestation	10	10%	7	12%	94	5%
Extractive sector	5	5%	2	3%	67	3%
Sugarcane	5	5%	1	2%	951	47%
Crop precaution	12	12%	10	17%	467	23%
Charcoal	7	7%	5	8%	196	10%
Other Plantations	4	4%	3	5%	48	2%
Other or ni.	1	1%	1	2%	20	1%
Total	100	100%	59	100%	2033	100%

Source: CPT

tors from the Pará State Labour Administration (SRTE/PA) and labour prosecutors rescued ten people, including a woman, from degrading labour when cleaning areas. Ironically, inspection took place in May 4-13, 2009, when the signature of the Áurea Law (in 1888), as the law of slave freedom is popularly known, is celebrated. Those workers had been lodged in canvas and straw huts on dirt floor, with no sanitation or showers. They used to drink rainwater stored in an improvised container - a darkish and stinky liquid. At work, they used no individual protection equipments (IPE) and had to pay 20 reais for the pair of rubber boots that was supposed to be provided free of charge by farm owner Pedro Andrade da Silva.

► Labour-related crimes within the biodiesel production chain

On July 21 this year, the MTE updated the so-called dirty list - a federal government list that currently points out 174 physical and legal persons charged in slave labour inspection operations. Those featured on the list are denied federal credit and suffer commercial restrictions by companies, associations and social organizations that signed the National Pact for the Eradication of Slave Labour. The update includes 16 employers, among them Rosana Sorge Xavier, a member of the family that controls the Quatro Marcos meatpacking company. In 2005, the mobile inspection group freed 16 people from a property of the company - the Santa Luzia farm in Nova Bandeirante, MT, an area dedicated to beef cattle.

In March 2008, the Quatro Marcos Group joined the National Pact for the Eradication of Slave Labour, as part of a Conduct Adjustment Commitment signed with federal and state labour prosecutors from Mato Grosso. However, nine months later, Quatro Marcos was excluded from the agreement after a decision by the Pact's Monitoring Committee, which includes Repórter Brasil, Ethos Institute - Business and Social Responsibility, the International Labour Organization, and the Social Observatory Institute. The reasons for the exclusion were the serious labour problems found in their chain of providers and in the group's own companies. Besides the gas leak that intoxicated 14 people at the Vila Rica, MT, unit, reported in the previous chapter, another example mentioned in the Monitoring Committee's public note was the fatal accident occurred in February 2008, when a mechanic died at service at the Alta Floresta, MT, meatpacking plant, after being electrocuted, falling and fracturing his cervical spine. In 2009, the company was definitely excluded from the Pact.

Labour-related crimes of the Quatro Marcos Group cause damage to biodiesel production. As reported in the previous chapter, the Biocapital processing plant in Charqueada, SP, bought fat in 2008 from at least two units of the group, located in Vila Rica and Juara, MT. Contamination of the biodiesel plant's production chain, however, is not always so direct. BioPar Parecis, which has already been the object of a case study, started producing biodiesel in the last quarter of 2008. So far, the main input has been soybean oil, but animal fat from chicken slaughtered by Perdigão in Nova Mutum, MT, accounted for about 10% of the raw material, according to manager Celso Lescano Júnior. However, in July 2008, Perdigão meatpacking plant in Nova Mutum purchased corn from the Vovô Ernesto Farm, located in the same town, which belongs to the Bom Futuro Group. Six months before that, 41 workers were rescued from

degrading conditions by the Mobile Group led by state prosecutors at the Vale do Rio Verde Farm, in Tapurah, MT - an area leased by Bom Futuro. The business group

and the farm in question have not entered the dirty list yet because that only happens after an administrative process based on data presented by inspectors.



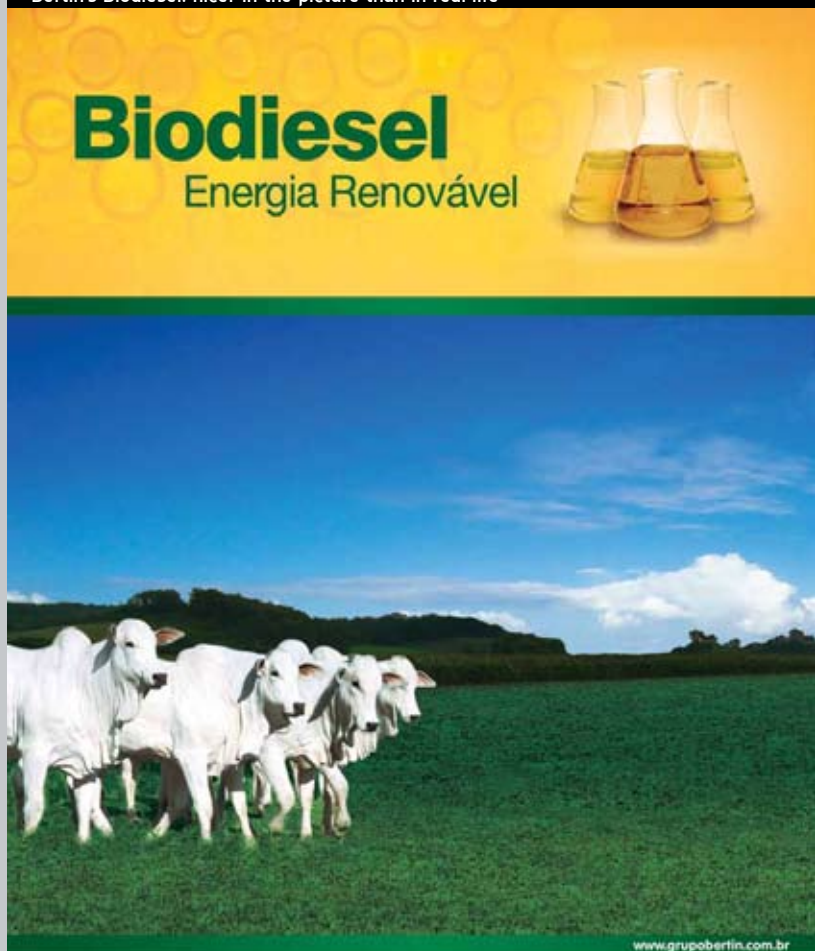
Slave labour chain: corn fed chicken that provided fat to BioPar Parecis

CASE | Barbecue Fuel: Biodiesel made by Bertin has a dirty production chain

In May 14-17, 2009, the 80 galleries of the Art Biennial, at São Paulo's Ibirapuera Park, were lighted by biodiesel-powered electricity generators. Brasbiodiesel, a company belonging to the Bertin Group and located in Lins, SP, donated for the second year in a row 6 thousand litres of the "green" fuel to the São Paulo International Art Fair - a marketing strategy based on the sustainability discourse. What the promoters of the event did not imagine is that, less than two months later, Bertin, the purchase of which has just been announced by its competitor JBS Friboi, would be the focus of environmental and labour-related scandals that challenged the image of its biodiesel.

Bertin is an agribusiness giant in the area of foods, leather tanning, individual safety equipments, animal food products, and cleaning. The business group has meatpacking plants in the states of Pará, Mato Grosso, São Paulo, Rio de Janeiro, Minas Gerais, Maranhão, Mato Grosso do Sul, and Rondônia, as well as units in China, Hong Kong, and Italia. It is now Brazil's largest leather exporter and the second largest exporter of processed meat. The decision to invest in biodiesel production was made in 2005, according to Brasbiodiesel director Rogério Barros. The announcement of the investment (estimated at 42 million) excited the market, especially because that would be the first large company to invest in using animal fat as raw material. Its installed production capacity, initially at 100 thousand m²/year of biodiesel, has already been enlarged to 125 thousand m²/year. The plant opened in August 2007 with the presence of President Lula, which made people laugh by calling the fuel "barbecue biodiesel". In a far less joyful context, the same joke was repeated almost two years later by André Muggiati, coordinator of Greenpeace's Cattle Campaign, when the report "The cattle spree" (A Farra do Boi) was launched (it will be detailed in the next section). Bertin has been acting as a trader in the bovine fat market, even before the construction of Brasbiodiesel - the group's hygiene and beauty products brand is called Ox, and glycerol resulting from animal fat pro-

Bertin's Biodiesel: nicer in the picture than in real life



www.grupobertin.com.br

Atento aos inúmeros benefícios que matrizes energéticas alternativas trazem aos panoramas econômico, social e ambiental, o Grupo Bertin investe no Biodiesel. A Usina, na cidade de Lins (SP), comporta um processamento anual de 110 milhões de litros, a maior capacidade instalada no País, que utiliza como matéria prima 100% do sebo bovino.

BRASBIO DIESEL
Uma empresa do Grupo Bertin

cessing is the base for producing several toilet soaps. By investing in the biodiesel market, Bracol Holding (created to manage Bertin's companies) said it would use only animal fat as raw material. With the increase in its prices, however, the percentage of soybean oil used by Brasbiodiesel has been growing. "Our blend can vary from 100% of fat to 50%-50% of fat and soybean oil", said Barros, without saying which the plant's effective production so far or its percentage of bovine fat is. Another goal widely publicized by Bracol - of using biodiesel in its companies' trucks - has not been achieved either. Brasbiodiesel's production has been directed to trading, through auctions promoted by ANP. In the most recent auction, held in May, Brasbiodiesel got to deal 19 thousand m2 of biodiesel, to be delivered by the end of September. "We intend to use biodiesel in our own fleet, in a mix above the one currently used in the market [the current legal mandatory mix is 4% of biodiesel into regular diesel]. We are conducting scientific tests to make a safe decision, but the main focus of our business is the market", justified the company's manager.



Of the 21 farms denounced by Pará's federal prosecutors for illegal deforestation, 14 were providers of the Bertin group

► Environmental crimes

The negative impacts of cattle in the state of Pará gained international prominence after the release of report "The cattle spree" by Greenpeace on June 1st this year - the same day federal prosecutors in the state made public that they had filed public civil lawsuits against cattle farmers and meatpacking companies that trade livestock from 21 illegally deforested farms (of which, as we have seen in this chapter, 14 were providers of the Bertin group). When the report was launched, André Muggiati, a member of the organisation's Cattle Campaign, pointed out the connection between livestock from properties illegally deforested and bovine fat used by Brasbiodiesel as raw material. "The Itacaiunas farm, of the Santa Bárbara Group, deforested 1,560 hectares in 2008. It is a place for calves that will be fattened in other places, including the São Roberto farm, which provides meat and fat to Bertin's unit in Lins", he explained.

Pará has been the main focus for public denunciations against Bertin. But Mato Grosso, Brazil's largest cattle producer and which concentrates 70% of its livestock in the Amazon biome, is yet another Achilles' heel for the business group. Pantanal, a meatpacking company located in Várzea Grande, MT, for instance, sells fat to companies belonging to Bracol Holding. It has recently announced that it would take part in the programme of digital tracking of the Minas Gerais-based retail chain Verdemar, encouraging its 400 providers to

install an electronic chip in each animal. At the time, Pantanal's president Luiz Antônio Martins told the press that they did neither work with providers installed in the Amazon nor buy cattle from farms included in the Dirty List of the Ministry of Labour and Employment (MTE) or IBAMA's list of embargoes. The fact, however, is that Pantanal has bought cattle from at least one farm in Juara (a town in the Amazon biome) and from Agroindustrial Arica as well as from Nilton Sell, even after they had areas embargoed by IBAMA.

► The financial system

In 2007, the World Bank's International Financial Corporation approved a 90-million dollar loan to the Bertin unit in Marabá, in south-eastern Pará. The loan was tied to the presentation of a socioenvironmental plan in which the company committed itself to not using cattle from farms with new deforestation. In June, after denunciations by Pará's federal prosecutors and Greenpeace, IFC announced the termination of the contract with Bertin. Company officials said that the end of the agreement was due to the world economic crisis. IFC officials explained that the interruption had been agreed in the previous month. The truth, however, is that besides bad press, Bertin gained a 60-million dollar debt and will not receive 30 million dollars from the World Bank

► Good practices?

As a response to recent scandals it has been involved in, Bertin started to show on its webpage the internal control of the origin of the meat it purchases. The proposal is simple: each client, by entering the purchase receipt number, can consult date and meat processing batch, as well as find out data on producers (name of the farm and farmer). With such information, it is possible to access the webpages of IBAMA and the Ministry of Labour and Employment to make sure that one is not purchasing products from areas banned for environmental crimes or slave labour practices identified by the respective agencies. "We have adopted for years the criterion of featuring in the lists to cancel providers. So, we have already excluded 141 that were already on the list of banned areas and 24 others for being on the Dirty List", sustained Barros. The practice is consistent with the Bertin's adhesion to the National Pact for the Eradication of Slave Labour, according to which companies commit themselves not to trade products from providers that use slave labour. Bertin is also part of the Working group for Sustainable Cattle Farming, which discusses principles and criteria to improve the sector's socioenvironmental practices, as well as being a signatory of the Business Pact for Sustainable Funding, Production, Use, Distribution, Trading, and Consumption of Bovine Cattle Products from the Amazon in the City of São Paulo, a result of the study "Sustainable Connections: São Paulo-Amazon", launched last year by the Sustainable Amazon Forum and Nossa São Paulo Movement in a partnership with Reporter Brasil and Papel Social Comunicação.

Recently, another fact raised doubts about the sustainability of Bertin production chain. A mobile group against slave labour freed 28 labourers from a farm that sold grass to the company. The grass is used to feed the cattle in a neighbouring farm, also owned by José de Paula Leão Júnior, the farmer accused of exploiting slave labour. The Santa Luzia Farm, where the crime was caught, is located in Araguaçu, southern Tocantins. The operation, conducted by inspectors of the Ministry of Employment and Labour, Labour prosecutors and federal police agents,

started on July 31 and went until August 7. According to Klinger Moreira, an auditor who coordinated the mobile group, denunciations by environmental agencies led the inspection group to the place: in early July, the Tocantins environmental police and IBAMA notified Leão Júnior for illegal deforesting. Labourers freed were working on "roço de juquirá", as the cleaning of an area for pasture is known. They were lodged in corrals, not paid regularly, and subjected to exhaustive working hours. One of the victims was only 15 years old and applied pesticides without the protection mandated by law. Labour Prosecutor Marcos Antônio Almeida, a member of the mobile group, said that workers slept among animal dejections. "People would fight for space with mice", he said.

Comapi is the company belonging to Bertin that had a contract for temporary use with Leão Júnior to use the Santa Maria farm (neighbour to Santa Luzia) during the so-called livestock transit: the period between the purchased of the livestock, fattened by other farmers, and slaughter. It signed a Conduct Adjustment Agreement (TAC), committing itself with Labour Prosecutors to include in future agreements a breach of contract clause regarding exploitation of slave labour by the partner. Besides, Comapi was obliged to hire an independent audit within up to six months, in order to monitor the socioenvironmental impacts of the areas where it raises cattle or from which it purchases products.

In an interview to Repórter Brasil, Bertin vice-president Fernando Falco guaranteed that Comapi will terminate its temporary use contract with Leão Júnior. According to him, the contract ended on July 1st and Comapi's deadline to take the cattle out of the area was September 30. The executive also said that "the information about the environmental problem" came to Bertin's board only "with that of the labour problem." Repórter Brasil asked Bertin for a visit to the plant in Lins, which was even scheduled, but was cancelled after the public lawsuits filed by Pará's federal Prosecutors came to light.

Labourers released by the group were lodged in corrals



CHAPTER 4

FINAL REMARKS AND RECOMMENDATIONS

Animal fat is hardly associated by public opinion to biodiesel production, even though it is the second most used raw material in Brazil, only after soybean oil. Biocapital, for instance, does not usually boast that its processing plant located in Charqueada, SP, is the largest in the country to use 100% of bovine fat as its raw material. The federal government, both in President Lula's speeches and in the National Programme for Production and Use of Biodiesel (PNPB), does not expose animal fat either, preferring to highlight oleaginous plants considered strategic for family farming, (such as sunflower, palm oil or purging nut, studied in this report), even though they had reached less than 2% of the raw material used to produce biodiesel by June this year, according to data from the National Agency for Petroleum, Natural Gas, and Biofuels (ANP).

The explanation for the silence might be in the serious social, environmental, and labour-related problems of the cattle industry in Brazil. Associating the biofuel chain to those negative impacts would certainly damage the good image of "clean fuel" that businesspeople and public managers have been trying to create. Hiding the relationship between cattle farming and biodiesel production in Brazil from consumers, on the other hand, means deceiving with false sustainability talk. When a truck driver fills the tank with the mandatory 4% mixture of biodiesel into regular diesel, it is supposed that this is contributing to mitigate the effects of the so-called global climate changes by reducing greenhouse effect gas emissions. What the driver probably does not know is that a significant part of that biodiesel (the percentage varied from 10.70% to 24.54% between October 2008 and June 2009) has been produced with bovine fat - and that it is not a coincidence that the Brazilian towns with the highest deforestation rates are also those with more cattle and inspected cases of slave labour.

It is crucial, therefore, to respect the right to information guaranteed by the Federal Constitution and reinforced by the Consumer Protection Code. Government, biodiesel processing plants, and fuel distributors should create mechanisms to inform citizens which raw materials are really being used in the production of biodiesel. In the same vein, in June this year, Repórter Brasil, together with the Brazilian Institute for Consumer Defense (Instituto Brasileiro de Defesa do Consumidor, IDEC) and NGO Vitae Civilis - Institute for Development, Environment and Peace, sent President Lula a letter asking for the establishment of a tracking system that guarantees Brazilian consumers the information about the origin of the meat. The document detailed the demand, divided in two items:

► *A public and free system for traceability to guarantee the controlled origin of products and by-products of the bovine industry production chain to avoid consumption of products from environmental, land, and labour-related crimes.*

► *A proper and clear information system on labels of products that contain bovine meat, showing the rural property where it was produced in its first stage in the production chain, in order to guarantee consumers' conscious and responsible choice.*

In Brazil, the federal government has tools that have already made public the names of employers and producers that have committed labour and environmental violations: the registry of employers caught in the act using slave labour, known as "dirty list" of the Ministry of Labour and Employment (MTE), and the list of areas banned by the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA). However, although both lists are relevant, they do not show who the clients of those violators are. In other words: only with the lists provided by the MTE and IBAMA, consumers have no way to know whether or not they are part of the slave labour or illegal deforestation when they buy a product.

However, the federal government has other tools that, if they are integrated among themselves and with MTE and IBAMA registries, would be able to guarantee consumer information about the origin of the product. The main tools related to cattle are: data from Livestock Transit Registrations and the Federal Revenue Service's databank.

Social control over funding of economic activities is also crucial to minimize negative impacts of Brazilian cattle industry. That is why Repórter Brasil is a member of BNDES Platform - a group of organizations and social movements interconnected since 2007 in order to put pressure on Brazilian Economic and Social Development Bank (BNDES, the only long-term fund provider of economic infrastructure in the country) to adopt social and environmental criteria to examine, approve, and monitor its loans.

The degree to which BNDES is associated to the expansion of Brazil's bovine cattle is shown by the following figure: in 2008, the bank's direct operations with the meat processing industry reached 5.9 billion reais - as much as all other investments in the manufacturing industry. Among the demands of BNDES Platform already presented to the bank's board, we underscore those with direct impact on the cattle industry: improvement of the information policy about the project's environmental classification, criteria for approval, risk assessment evaluation, implementation of the Socioambiental Protocol of Intentions on Socioenvironmental Responsibility signed by BNDES in August 2008; the creation of a policy to es-

establish compensations for social and environmental liabilities generated by projects already funded; strictness in applying the bank's social clauses, which provide for the previous cancellation of funding in the case of human rights violations.

Still in the financial arena, it is necessary to include other biomes and increase enforcement of Resolution 3545 of the National Monetary Council (CMN), approved in July 2008. As seen in chapter 3, it forbids banks (both public and private) from providing rural credit to Amazon producers that do not prove that land ownership is legal (through the Rural Estate Registration Certificate) and the environmental regularity of the activity they seek money for (through the Single Environmental License granted by state environmental agencies). When enforcing the measure, however, banks have limited themselves to demand the application for the licence to the authority in order to grant the loan.

Finally, we need to encourage practices that promote a cattle industry that is less degrading and socially fairer, such as the experience of ecological management of pastures and bovine cattle farming under an agroforest system presented in the second chapter, conducted by family farmers associated to the Centre for Alternative Technology (CTA) in Mato Grosso's Guaporé Valley. The use of the term 'sustainable cattle farming' cannot be considered without diversifying production (intercropping between food cultures and cattle farming, for instance), rural extension (in order to promote techniques that cause less damage to the environment and to workers) and more balanced trade agreements (that do not make small producers hostages of low prices paid by meatpacking companies, but rather promote fairer trading networks directed to local consumption).



OIL PALM

INTRODUCTION

A year after the release of the first Biofuel Watch Centre (BWC) report on several aspects of oil palm farming in Brazil, virtually nothing has changed. Better yet, projects for the crop's expansion - both government-driven and private - remain as a plan for the future or have been interrupted, as is the case of changes on the Forest Code that would allow replacing part of the native forest in the Amazon's legal reserves by exotic species, or the establishment of 20 thousand hectares of palm in Tefé, state of Amazonas, by a company linked to the Malaysian government.

In 2009, a more sober assessment of the industry by the government - in this case, EMBRAPA Agroenergy (The Brazilian Agricultural Research Corporation - energy division) - estimates the palm area at 70 thousand hectares, when last year the estimate was 90 thousand hectares. But those figures are not precise, since data survey about the crop by the National Supply Company (Companhia Nacional de Abastecimento, CONAB) will be finished only by the third quarter of 2009.

Pará is still Brazil's largest oil palm producer state, with over 60 thousand hectares planted according to estimates by researcher Edson Barcelos of The Amazon Farming Development Institute (Instituto de Desenvolvimento Agropecuário do Amazonas, IDAM). Bahia, the second largest producer, has only 8 thousand hectares of palm planted and 30 thousand hectares of native plants, whose production is exploited in extractive style and processed manually, points out the Executive Commission for the Planning of Cocoa Farming (Comissão Executiva de Planejamento da Lavoura Cacaueira, CEPLAC).

As for other states, according to the Ministry of Agrarian Development (MDA), state governments of Amapá, Rondônia, Acre, and Amazonas have projects to establish the crop, but most of them are still in the business planning stage. For now, Barcelos says, Amazonas has about 800 hectares of oil palm (areas researched and monitored by EMBRAPA), and Roraima has around 100 hectares planted by the company Biocapital.

CHAPTER_1 OIL PALM IN THE AMAZON

► Expansion

Depending on the Federal Government's plans, oil palm has its place secured in the new occupation of the Amazon. Since early 2008, it gained importance in the agendas of the Ministries of Agriculture, Livestock And Supply (MAPA) and the environment (MMA), and EMBRAPA Agroenergy, always between controversies and agreements.

According to the MAPA, palm expansion projects are part of Brazil's agroenergy policies - based on the argument that the country still imports palm oil, a situation that is allegedly reversible by increasing production and using the product as biofuel - but they are at the core of the debate about changing the Forest Code, advocated by the so-called "ruralist" parliamentary Congress group (as pointed out by the Biofuel Watch Centre in 2008). The segment, supported by Minister of Agriculture Reinhold Stephanes, wants to change the law regarding mandatory recovery of legal reserves in the Amazon (now at 80% of properties) to allow 30% of illegal deforested areas to be recovered with exotic species, such as oil palm, eucalyptus, or pines.

Until the first quarter of 2008, the MMA, headed by then minister Marina Silva, resisted the project, in accordance with the stance advocated by environmentalist organizations opposed to changes in the Forest Code. Later, already out of the ministry (which she left in April last year, to return to her seat as Senator for the state of Acre), Silva remained critical to palm farming in the Amazon, warning about the dangers such as environmental catastrophes resulting from deforesting caused by that crop in countries like Malaysia and Indonesia. According to the former minister, "the law [the Forest Code] says that recovery should be done with native species for the obvious reason that the aim is to reforest the place from which the forest should have never been extirpated". The ruralist congressmen's project, she concluded, ends up rewarding those who deforested¹.

Another stance has been adopted by the MMA under the command of the new environment minister, Carlos Minc. In August 2008, after several conflicts with the Ministry of Agriculture, Minc yielded and agreed to the use of exotic species (especially palm) in the process of restructuring legal reserves, only pondering that the project should be defined in more detail. By late August, however, the matter was under discussion at the House of Representatives with no advancement or consensus, and still awaited definitions.

As for Federal plans for oil palm farming made in Brasília, minister Reinhold Stephanes (MAPA) even spoke of 10 million hectares of palm in the Amazon². More modest, the head of EMBRAPA Agroenergy Frederico Durães works with an initial perspective of a million hectares established according to the crop's zoning and states' Economic Ecological Zoning (ZEEs).

The first step, Durães explains, has been taken with the conclusion of an agroecologic zoning of palm (a technical framework that includes studies on the crop's potential, areas that will receive government incentives, areas where planting is not allowed, etc) negotiated with private segments, public agencies, and state governments, and only awaits the federal government's signature. But other legal frameworks, such as Economic Ecological Zoning in Amazon states (the ZEE is an assessment of land use that divides it into zones based on analyses of natural resources, environmental aspects, socio-economy and legal frameworks), and the crop's Agricultural Zoning for Climate Risk (an analysis that points out the best time to plant in each town, regarding the cycle of cultivars as well as soil and water conditions), to be produced by the MAPA, are still to be worked out.

In the so-called Legal Amazon, for now only the states of Rondônia and Acre have their Economic Ecological Zonings. Mato Grosso and Amazonas are wait-



Ruralist bill wants oil palm in Amazon degraded areas

ing for theirs to be validated – after approval by the State Parliament, they undergo an analysis by Congress and the National Environment Council (Conselho Nacional do Meio Ambiente, CONAMA), and then go to the final presidential signature. Pará, in turn, has a macro-zoning (a tool that is a lot less detailed than regular zoning) and includes the creation of two regional ZEEs (West ZEE, covering 19 towns under the influence area of the BR 169 federal road, and East/Northern Amazon River ZEE, with 109 towns).

The expectation of government segments and ruralist congressmen that oil palm actually comes to occupy larger areas in the Amazon is based on previous events such as the case of the state of Rondônia, where ZEE has already reduced the legal reservation of anthropized areas from the original 80% to 50%. The reproduction of that model in other states is the desire of both the Ministry of Agriculture and EMBRAPA Agroenergy. According to its head, Frederico Durães, the project for palm expansion, which takes changes in the Forest Code and prominence of ZEEs for granted, includes deforested areas that, according to the current legislation, should be reforested with native species. But it guarantees that public policies can still restrict the crop according to environmental and food security criteria, the existence of Conservation Units and Indigenous Lands, among other factors.

► Environmental, social, and economic aspects

In order to advocate palm farming in the Amazon, the MAPA has adopted the sustainability language based on promoting occupation of deforested and anthropized areas with a crop with less impact on the biome (while it is an African plant, palm can keep biogeochemical cycles similar to those of the Amazon forest, thus minimizing erosion, surface water flow and CO₂ emission responsible for worsening the greenhouse effect).

According to environmentalist organisations, however, such line of reasoning has several flaws. Firstly, as pointed out by Greenpeace, anthropized areas in the Amazon are usually “disputed” between cattle and soy-

bean. Researcher Bernardo Strassburg, from England's East Anglia University, crossed data provided by the Ministry of Agriculture, Livestock and Supply (MAPA) with information by the National Institute for Space Research (Instituto Nacional de Pesquisas Espaciais, INPE) and saw that 69% of deforesting in the Amazon between 1997 and 2006 was due to the cattle industry. According to NGO Friends of the Earth – Amazônia Brasileira, over 74 million hectares (nearly 15% of the Legal Amazon) have been incorporated to that industry³. On the other hand, the Amazon produces 15% of Brazil's soybean in 1.6 million hectares⁴.



Cattle, the strongest deforesting vector in the Amazon: producers want expansion onto “degraded areas”

Since cattle and soybean farmers have been arguing that, in order to preserve the forest, those industries will be expanded only over areas already deforested, Greenpeace estimates that the arrival of oil palm in that competition will generate a lot of economic activity in search of “sustainability” over little and already degraded land.

Another concern by environmentalists and researchers is the productive model to be adopted for palm. According to EMBRAPA Agroenergy, from the structural perspective, palm farming in the Amazon needs large, contiguous areas and will develop according to the plantation system (large scale monoculture).

According to experts in that biome, such as Amazonas Federal Uni-

Oil palm monoculture, such as Agropalma's, is a virtual threat to Amazon's biodiversity



versity (UFAM) researcher José de Castro Correia, the region's lack of land ordering is an obstacle to that model - only about 20% of its territory are georeferenced. Regarding environmental problems, however, the need to apply large amounts of pesticides to the crop will necessarily turn monocultures into a threat to Amazon ecosystems. Moreover, even with palm's biological adaptability to the biome, that structure not only offers high risks to its sensitive biodiversity - specially if it comes to occupy part of what should make up the legal reservation in case there are changes to the Forest Code - but will also lead to cutting parts of the forest located between degraded areas. That is, just like cattle and soybean now, palm will also be an important deforesting vector in the future.

From the labour perspective, oil palm farming has good potential for job generation, especially in plantation management and harvesting. In large areas, such as those of Agropalma in Pará - the largest company in Brazil, with 37 thousand hectares of oil palm in Moju and Tailândia, in north-eastern Pará - the estimated demand for labour is one worker per 10 hectares. Currently employing about 4 thousand rural workers, Agropalma is the area's largest employer.

Payment, in turn, varies a lot according to the employer: the Tailândia Union of Rural Workers reports that an Agropalma employee is paid on average 510 reais a month. In Igarapé-Açu, in turn - a region of medium-size producers, most of whom provide palm oil fruits to Palmasa, the payment is not higher than the minimum wage (465 reais a month).

Projects to plant oil palm in areas of family-based farming and isolated communities, like experiences developed by EMBRAPA Western Amazon in the state of Amazonas⁵, however, might be restricted to small areas of oil production for energy generation (see Alternative use: energy generation from vegetal oils), since the perspective that palm becomes an economic alternative for family farming in the Amazon is challenged by EMBRAPA Agroenergia. According to Durães, the only option to small farmers who do not join market economy is partnership deals with companies (integration system) - a format already encouraged by Agropalma. Currently, as reported in 2008 by BWC, the company has 150 integrated families in the Arauaí community and other 35 in the Calmaria II settlement - both in the town of Moju, PA.

According to the Federation of Agriculture Workers from the State of Pará (Federação dos Trabalhadores na Agricultura do Estado do Pará, FETAGRI), the monthly income of farmers that already have scale production - palm trees start producing only after its fourth year - such as the Arauaí community - where each family has 10 hectares, is 1,300 reais, which is considered satisfactory. One of the negative aspects of that partner-



Small farmer plants oil palm for Agropalma in the Arauaí, PA. community

ship, however, is a debt to the National Programme to Strengthen Family Farming (Programa Nacional de Fortalecimento da Agricultura Familiar, PRONAF), regarding a loan given to start plantations and the maintenance funds for the family in the four first years: at the Calmaria II settlement, where each integrated settler cultivates six hectares of palm, that debt is about 27,000 reais, to be paid over eight years. Another negative aspect, according to FETAGRI, is the dependence on Agropalma for 25 or 30 years - the duration of integration contracts. Finally, they say that the difficulty to plant other crops parallel to palm also contradicts the characteristics of family farming, whose main aim is food production.

According to EMBRAPA Agroenergia's Frederico Durães, "It is still early to evaluate palm's social and environmental impacts", but the programme's sustainability will have to be guaranteed by public policies. In any case, Durães concludes, the palm project's success in the Amazon will depend on large investment in seedling production (still not enough for the current demand), genetic research, and infrastructure for production, transport, and processing - the fruits cannot be stored or transported over long distances and have to be processed within 24 hours after harvesting, for the oil not to get rancid. In case there is also an option for palm in family farming, all that structure will have to be reproduced at smaller-scale (micro-processing plants) in communities, says Durães.

Apart from planning and political battles, oil palm is now planted at commercial scale (not considering Bahia's "spontaneous" palms) and the industry's companies are still concentrated in Pará.

As the only company to produce biodiesel from palm, Agropalma has been using most of the biofuel in its own fleet of vehicles, having delivered to the National Agency for Petroleum, Natural Gas, and Biofuel

els (Agência Nacional do Petróleo, Gás Natural e Biocombustíveis, ANP) only 2,625 m³ in 2008 and 1,036 m³ from January to July, 2009. In the same period, for instance, Petrobras' processing plant in Quixadá, Ceará, which started operating in mid-2008, delivered 4,791 m³ and 17,771 m³, respectively.

The strategy to produce fuel for its own fleet should be adopted also by the mining company Vale - one of the largest in the world - located in the area of Carajás, PA. In June this year, it announced the creation of a consortium with Biopalma in the Amazon (which was the subject of a BWC study in 2008 because it was occupying slave descendants' areas - quilombos - in Concórdia) to plant 60 thousand hectares of oil palm. According to Vale, "the enterprising is located in an area of about 130 thousand hectares, in Centre-northern Pará (Moju, Tomé-açu, Acará, Concórdia do Pará, and Abaetetuba). Out of that total, 60 thousand hectares will be used to plant palm. The rest (70 thousand ha) is part of the legal reserve and will be reforested and protected by the consortium". From 2014 on, the company intends to be self-sufficient in fuel production with a 20% biodiesel mixture into fossil fuel to be used in its motor vehicles and trains.

COMPANIES OPERATING IN PARÁ			
Company	Town	Unit	Capacity
Refinaria CRA	Belém	Ton/day	400
Denpasa	Sta. Bárbara do Pará	ha	1,750
Codenpa	Sta. Isabel do Pará	ha	2,700
Yossan Refinery	Sta. Isabel do Pará	Ton/day	100
Dentauá	Sto. Antônio do Tauá	ha	3,500
Palmasa	Igarapé - Açu	ha	4,200
Mejer	Bonito	ha	4,300
Colônia Japonesa	Tomé-Açu	ha	2,200
Marborges	Moju	ha	3,800
Agropalma	Tailândia	ha	37,300
Total	Refinery - Ton/dia		500
Total	Hectares - ha		59,750

Soure: Agropalma - 2007

CASE | Partnership with Malaysia in Tefé, AM, shall be dismissed

Em 2008, uma das In 2008, one of the places visited and studied by the Biofuel Watch Centre (BWC) was Tefé, a town located in the heart of the Amazon, by the margins of River Solimões⁶. Tefé was chosen after the announcement of a partnership between the Amazonas state government and Braspalma - Brazil's representative at Malaysia's land development authority. It included the concession of 100 thousand hectares to the enterprising - 20 thousand hectares for palm in an area now occupied by family farmers and 80 thousand hectares for the legal reservation.

After little more than a year, the project seems to have been buried by the state government because of a series of social, land, and environmental problems - which had been predicted in last year's BWC report - and might become an example of the difficulties to be faced when establishing large-scale palm farming in the Amazon.

During the first debates between the state government and Braspalma, at the first stage of the new palm project, the idea was to occupy the areas belonging to the bankrupted Empresa Amazonense de Dendê (EMADE) - an enterprise abandoned back in the 1980s. In the 1990s, especially because of a severe drought in 1998, followed by a remarkable flood of the Solimões River in 1999, many populations living by the river left its banks and established themselves by the EMADE road, which had been left from investments made on the failed project.

According to the Amazon Working Group (Grupo de Trabalho Amazônico, GTA) - a network gathering over 600 social organizations in the Amazon and which started to monitor negotiations between the government and Braspalma, the first challenge made by local organizations was related to the destination of over 2 thousand

people who live in the area allegedly to be used by the company, and who "depend of the production of manioc flour and vegetal extractive products for their survival."

Small farmers did not receive their land property documents in Tefé



According to Aginaldo Queiroz, GTA's coordinator in Manaus, in mid-2008, the government announced that a survey would be conducted on the region's land by the Amazonas Land Institute (Instituto de Terras do Amazonas, ITEAM) to assess the occupation situation and later concession of property rights. However, in the following months, the GTA was informed that in general, ITEAM would not be aiming to regularise land ownership, but rather surveying farmers' availability to integrate into Braspalma's palm project. The Port of Tefé, under construction at the Solimões River, by the limits of the EMADE area, would be exclusive to Braspalma, and the roads leading to it would be privatized.

That new train of events ended up disturbing the municipal administration, which had been excited at first by the possible investment and attraction of resources by the project. That situation changed the executive's stance. According to a member of the Tefé government, what had been sold was not what was being delivered: "The project started with the possibility of land regularization: people were registered, they (farmers) created a high expectation - we really believed that the long-awaited land reform would happen; farmers would have land, a (palm fruit) production process and a future income strategy - and, best of all, palm could be intercropped with traditional agriculture (some poor things still believe it)".

About the development of negotiations between the state and Braspalma, the description of the project's intentions proceeds: "Land is owned by the company, not by farmers; farmers are put in agrovillages and will work under a CLT regime (what will become of our aged agriculture along that process?); the project area covers the water sources of all creeks near the town; the EMADE and the port that the National Department for Transport Infrastructure [DNIT - Departamento Nacional de Infra-Estrutura de Transportes] is building in Tefé will be for Braspalma's private use".

According to Tefé's Environment Secretary Carlos de Sá Ferreira, there are also legal obstacles for the agreement between the state and Braspalma/Felda: first, the Emade area is divided into 4,063 hectares on the left side and 6,669 hectares on the right side of the road constructed according to the original project. Since both areas have over 2,500 hectares, the law prevents the Amazonas state government from making any concession without previous approval of land grants by Congress. On the other hand, ITEAM cannot manage any donation or concession procedure of those areas since they are located 100% within Tefé, and the town is entitled to establish any such procedures. Last, Tefé's Organic Law only allows for the transference of land use - rather than donation - under concession or precarious licence, for a limited period (given public benefit), by municipal decree.

"Note that any process for concession of a public area must include a public tender; in the case of the Novo Horizonte macro-zone (where the Emade area is located), most land has already been donated to physical and legal persons in Tefé, and there are few municipal public areas", Ferreira concluded.

The land mess and the fact that, according to the GTA, about 12 thousand hectares of native forest would have to be deforested to start the palm project, led the government to review the agreement with Malaysia. According to ITEAM technicians, governor Eduardo Braga (PMDB), in an effort to sell an image that the state is concerned with socioenvironmental sustainability, evaluated that the onus of environmental and social problems would be higher than the bonus of foreign investments in the Amazon.

Officially, ITEAM sustains that the government is not satisfied with the proposal presented by Braspalma and decided to stop negotiations until the company presents a "more consistent project". As soon as it has the "final formulation", according to ITEAM, the project will be released for debate by civil society. There are no deadlines for those two stages.



Local leader Raimundo Neves points to the area where the Port of Tefé shall be built - it would be privatized to Braspalma

CHAPTER 2

ALTERNATIVE USE: ENERGY GENERATION FROM VEGETAL OILS



Canoe is the main vehicle of communities living by the rivers

While the federal government has been encouraging, through the National Programme for Production and Use of Biodiesel (Programa Nacional de Produção de Uso de Biodiesel, PNPB), projects and research on the production of biodiesel to serve the country's vehicle fleet, several universities have studied the use of oil from palms such as macaúba (*Acrocomia aculeata*), dendê (*Elaeis guineensis*), tucumã (*Astrocaryum vulgare*), inajá (*Maximiliana regia*), murumuru (*Astrocaryum murumuru*), uricuri (*Syagrus coronata*) e babassu (*Orbignya barbosiana*), among others, in generating energy for isolated communities in the Amazon. Those experiences aim at replacing fossil diesel with vegetal oil as fuel for electricity generators, which are palliatives to state energy policies, since, according to the Ministry of Mining and Energy (Ministério de Minas e Energia, MME), for Amazon's isolated communities - whose number is unknown - "it would be difficult to offer the conventional system (network extension)" of the federal government's programme of rural electrification Luz para Todos⁷.

One of the core assumptions of those projects is lowering the price of alternative energy production. According to São Paulo University's Brazilian Reference Center on Biomass (Centro Nacional de Referência em Biomassa, CENBIO), "in Brazil, rural electrification in remote areas is predominantly based on isolated systems with diesel-powered generators - a solution that has proved not to be very satisfactory as the purchase and transportation of diesel to those places as well as equipment maintenance are too expensive for the local contexts. As a result, there are several idle diesel-powered generator groups spread over the Amazon region, due to lack of fuel and maintenance".

Still according to CENBIO, "in natura vegetal oils are a natural alternative to replace diesel, the main energy source for communities where there is no electricity network,

taking into consideration, among other factors, the technical possibility of burning them in diesel-powered generators, the availability of a large number of oleaginous species, the edaphic-climatic aptness of high-productivity oleaginous species, and the possibility to conduct cooperative farming for energy production and local sustainable development". From the social viewpoint, says CENBIO, "the difficulty of supplying electricity prevents organized economic activities that are potentially income- and job-generators from surviving in the interior of the

Amazon. That fact has a direct impact on local life conditions and the Human Development Index (HDI). Electricity supply for isolated communities is therefore, one of the ways to improve living conditions for the population as well as making them part of larger society by providing the possibility of productive activities associated to energy generation".

CENBIO's first experience with energy generation from vegetal oil was conducted between March 2003 and December 2004 at the Vila Soledade community, located by the River Moju, 12 km from the town with the same name in the state of Pará. According to CENBIO, "the core aim was to test, under field operational conditions, for a relatively long time, the functioning of a conventional diesel-powered engine using in natura palm oil as fuel". In the project, a diesel-powered generator group of 115 kVA (generating 72.500 kWh/year at 0.382 real/kWh) was installed in the community. It should work for six hours a day (from 5pm to 11pm) and provide electricity to 165 families and the community's public school.



Residents of Vila Soledade: energy generated by palm oil

According to Brasília University researcher Victor Hugo da Silva Rosa, who evaluated the Project in his doctoral thesis⁹, the total of 449 thousand reais for the project were provided by the Ministry of Science and Technology/FINEP, under a grant by the Energy Sector Fund (Fundo Setorial de Energia, CT-Energ). At first, Agropalma also sponsored it by providing 40 thousand litres of in natura palm oil as well as containers for its transportation.

Without palm plantations or processing structures for the plant, after the research ended the community started paying operational and maintenance costs of the project as well as the purchase of palm oil from Agropalma at 0.87 real/litre, which reduced the energy generation from six to four hours a day. When programme Luz para Todos arrived at the town Moju - and to that community - in 2006, electricity generation with palm oil in diesel-powered generators was abandoned.

Another initiative by CENBIO in the community of Igarapé-Açu, also in Moju, which included palm planting and oil extraction by family farmers, is not operational for lack of funds and because the municipal government has not fulfilled the agreement to plant palms.

According to the coordinator of those experiences at the time in Moju, Orlando Cristiano da Silva, generating energy in isolated communities is still a major challenge. After Luz para Todos, several regions considered "isolated" by CENBIO received rural electrification, such as Vila Soledade and the quilombola (slave descendent) community of Santa Maria de Mirindeua, also at the margins of the Moju River, which had been considered by CENBIO as a candidate to receive the project that was later displaced to Igarapé-Açu.

Nevertheless, there are still "extremely isolated" communities with potential to replicate the experience of Vila Soledade, says Da Silva. According to the researcher, however, such a project is sustainable only if it guarantees the complete cycle of the community process, from planting the palm (or providing access to it through extractive activities) and oil processing.

► Oil price overcame energy Project in Carauari, AM

About 780 km from Manaus, in the state of Amazonas, the small community of Roque, in the Extractivist Reserves (Reservas Extrativistas, RESEX) Médio Juruá, in Carauari, was the place for yet another experience on rural electrification conducted by the Amazonas Federal University (UFAM).

The Roque community is at a 7-day boat travel from Manaus, or 13 hours (on rabeta) and 3 hours

(on voadeira - a canoe with a more potent engine) from Carauari. In 1998, the largest and more troubled among the 12 RESEX communities, Roque (then including 36 families) ended up chosen to establish a project to use native oleaginous such as andiroba (*Carapa guianensis*) and the aforementioned uricuri, and murumuru. In 2000, the initiative gave rise to a Project for energy generation from andiroba oil.

According to UFAM researcher José de Castro Correia, who coordinates the project, the work included an initial survey on the palm population around the community and assessment of their production capacity, which indicated an estimated potential to produce 50 tons of oil per year. After that assessment, a structure for energy generation was installed at Roque that, during a year, served the entire community for four hours a day.

The short life of the energy project based on andiroba oil was not a result of failures in its execution, but rather of an increasing interest in the product by the cosmetics markets. According to Castro, the high demand for the oil started to reward the community in such a level - the product reached a peak value of 21.50 reais per litre - that buying diesel at 3.30 reais/litre to generate energy became a good deal.

The Roque Community at the heart of the Amazon: light changed life



Nowadays, the community has a complete structure for oil production (drying, breaking, heating, extraction, and filtering) with processing capacity of 1,500 kg of andiroba and murumuru seeds a day, whose oil is purchased by Cognis, a Manaus-based company, which resells it to São Paulo's Natura cosmetics industry.

Energy generation - even from fossil diesel - eventually changed the community, which now has paved and lighted streets as well as a high school. Virtually all houses have electric appliances and the number of residents has increased - several of whom come from Carauari attracted by new income generation opportunities.



Andiroba is new income source for the community

After the experience in the community of Roque, a new initiative for energy autonomy is under development at the Nova Esperança community, located by the border of the Médio Juruá RESEX. Based on the extraction of urucuri oil (which does not have an alternative market) and on family-based sugarcane farming, the project includes energy generation with pure oil for about 500 families and biodiesel and ethanol production for the other engines. According to researcher José de Castro Correia, the community already has facilities to produce 300 litres of biodiesel and 200 litres of ethanol per day. Castro explains that the project aims at replacing gasoline - whose cost is about 5.50 reais/litre - with ethanol (about 2.00 reais/litre) to be used in boat engines, and then selling the biodiesel.

► High cost still hampers mass energy projects

One of the main obstacles to large-scale alternative energy generation projects from vegetal oils is their high implantation costs. According to UFAM's Castro, the biodiesel processing unit at the Nova Esperança community alone cost about 200 thousand reais (the ethanol unit cost half of that - 100 thousand reais). He says that the litre of biodiesel made from urucuri, for instance, has an average final cost of 4.50 reais, totalling the price of oil, labour, chemicals, ethanol and glycerine for transesterification, among others.

Another experience, now based on oil extracted from babassu and implemented by the Rondônia Federal University (UNIR) at the Nossa Senhora do Seringueiro community in the Rio Ouro Preto RESEX in Guajará-Mirim, Rondônia, cost more than 1 million reais, considering all implementation stages of the project, machinery,

and infrastructure. According to its coordinator Artur Moret, such high cost takes into account the mistakes of a research project whose aim was, above all, studying the feasibility and the best forms to establish such initiatives in the state.

Located by the margins of the Ouro Preto River, the RESEX, created by Decree 99166, of March 13, 1990, covers about 200 thousand hectares in the towns of Guajará-Mirim and Nova Mamoré. To the north, it borders with the Lage Indigenous Land and the Guajará-Mirim State Park; on the east, the Uru-eu-wau-wau Indigenous land; on the south and west, the State Biological Reservation of the Ouro Preto River and the Pakaás-Novos Extractivist State Forest. It is a typical example of an isolated community in the Amazon: to get to tiny Nossa Senhora do Seringueiro from Guajará-mirim - the closest urban centre - several farms have to be crossed through dirt roads (about two hours' travel) and, after arriving to the river, 40 more minutes on a boat.



Extractivists in the Nossa Senhora do Seringueiro community

The Nossa Senhora do Seringueiro community has 12 families now living on small plantations - rice, manioc, banana, coffee, cupuaçu, and jatobá - as well as chicken farming and production of manioc flour. They knew little or nothing about the use of babassu - a native palm with a massive presence in the region's deforested areas. Therefore, making them familiar with the plant was one of the major challenges to UNIR researchers who started working there in 2004.

According to Moret, preliminary field research, previous to the installation of improvements and machines (crusher and oil purifier, and generator engine),

started by georeferencing babassu palms (counting all plants within a radius of 900 metres from houses), which reached 7 thousand trees at production stage. Later, a house was built for the generator, together with a brick shed where all other machines were installed, as well as freezers for fruit pulp - an activity planned as an income alternative for the community.



Babassu palms were georeferenced

Energy generation actually started in 2008 and serves, during two hours/day, only one of the houses and the school, since there are no resources available to extend transmission lines to the other consumption points.

Local leaders Francisca and Napoleão Rodrigues own the only house provided with electricity. Well kept, with a large porch and a wide living room, the couple's house is the community's meeting point in hours of rest and leisure. "When there was no electricity, we had nothing to do, we only worked and worked... Now we have television, radio, fridge. We usually turn the generator on at 7pm and everyone gathers here", Mr. Rodrigues says.



With electricity, the community had access to domestic appliances and soap operas

Besides leisure, electricity also brought new income perspectives. The community already produces homemade glycerine soaps and Mrs. Rodrigues is developing work on biojewellery made out of babassu bark. According to her, the families also sell oil: "With 10 kg de almonds, we make 5 litres of oil; 2.5 litres go to the generator, we sell other 2.5 litres at an average price of 10 reais per litre".

Mr. Rodrigues thinks that life has improved after the energy project, but he is still concerned because people leave the RESEX, especially women. "There are a lot of men left by their wives here. Those women go away, leaving their husbands and children, and go after a better life in town. Afraid of getting hurt again, men don't remarry. Even the schoolteacher is a single man", he regrets. Now energy means hope to revert the scenario of migration from the community.

In order for the energy's benefits to reach the other houses, researcher Artur Moret explains, new and high investments will be needed on underground transmission lines. Evaluating the projects' total costs, he says that the highest one was training residents (which lasted three years and demanded constant travels by the UNIR team, based in Porto Velho - 400 km from Guajará-mirim - to the RESEX), and included training in associational organization - the project is developed with the Low Ouro Preto River Association of Rubber Latex Agro-Extractors (Associação de Seringueiros Agro-Estrativistas do Baixo Rio Ouro Preto) - management of native oleaginous species (besides babassu, the community work with cupuaçu and andiroba) and basic training for the maintenance of equipments and machinery.



Community received training to operate machines

According to Moret, the development of economic activities complementary to agriculture depends now on the community's initiative. The more they collect babassu, the higher the oil production and energy time will be. The low cost for the purchase of regular diesel needed to start the generator is shared by users, but the vegetal raw material has a very low cost (0.60 real/litre). According to the researcher's estimates, electricity generated from babassu oil has an average cost of 1 real/KwH.

CHAPTER_3 FINAL REMARKS AND RECOMMENDATIONS

As seen in this report, oil palm has recently expanded more in government discourses than in plantations. Used to spearhead the advocacy of changes in Amazon's Forest Code, whose advocates use oil palm as a banner to allow the recovery of legal reservations with exotic species, most of illegally deforested areas will be "reforested" with eucalyptus - which might mean an environmental disaster for the biome and for biodiversity.

We should bear in mind that according to researchers from several institutions, such as EMBRAPA, the Amazonas Federal University and the Amazonas Institute for Sustainable Farming and Forest Development (Institu-

to de Desenvolvimento Agropecuário e Florestal Sustentável do Amazonas), production of oil palm seedlings is still low to meet the existing demand. In case of a quick change in the forest code, as ruralist congressmen want, that element alone would already prevent the use of the crop. Eucalyptus, in turn, with a guaranteed market in Pará's pig iron plants (in need of alternative sources for charcoal production) and expansion projects in the paper and cellulose industry - such as Suzano, which has a formal agreement with mining company Vale involving the plantation of 120 thousand hectares in southern Maranhão - will probably be the main option to occupy degraded areas on a short and medium term.

Another factor to be weighted before adopting policies to expand oil palm over the Amazon is the need for immediate processing of production. Since the fruit cannot be stored or transported over long distances because of its quick deterioration, industrial units will have to be built before or together with plantations, which demands an investment that has not been assumed by the private or the public sector.

From the labour point of view, oil palm is a potential job creator, as has already been seen in projects such as Agropalma, in Pará. One of the companies most concerned with linking its image to socially correct practices, Agropalma has been careful to keep lawful relations with its employees and is seen as a model in Pará. However, experiences with other labour-intensive crops, such

Moret (right) and the UNIR team



as sugarcane - and even jatropha, as seen in this report, have shown the risks for labour precarisation and degradation or slavery for workers.

On the other hand, despite being an income alternative, integrating family farmers into business projects also creates high debts, whose impact can only be evaluated a few years from now (existing projects are recent and make it difficult to assess possible positive or negative economic impacts). As pointed out by the Biofuel Watch Centre (BWC) in the 2008 report on oil palm, food crops end up on the second burner or extinguished in that sort of partnership.

As for the use of oil palm to generate energy in isolated communities, experiences already carried out prove the extremely positive effect on resident's quality of life, but also expose the need for more investments - better yet, the creation of a national policy of long-term budget and planning.

In view of the elements listed above, we consider that state and federal governments as well as parliaments should be careful when spreading policies for oil palm expansion. There should be caution to pass changes in the Forest Code that might affect the recovery of the illegally deforested native forest, and more so if those changes open the possibility for establishing monocultures with major environmental impact such as eucalyptus.

It sounds strange that palm's agroecologic zoning has not been widely debated by society, since, according to the government itself, only business, state governments, the federal government, and research institutions linked to it participated in the construction of the legal framework. Therefore, the rules for palm plantations have to be open to adjustment by interested social and environmental organizations and movements, even after their approval by the President.

Considering the possible accumulation of environmental liabilities caused by extensive oil palm plantations in the Amazon and given the risk of deforesting in areas that stand in the way of the plantation model, it is desirable that public investments are mostly directed to meet main needs of Amazon communities, such as electricity generation from vegetal oils.

Oil palm can be a vector for both development and deforesting, for land concentration and possible labour irregularities. Before a public policy is defined for the crop, the government should assess the possibilities already in the horizon. In Bahia, as pointed out in the last BWC report on palm, there is a culture of small-scale processing, which can be improved and transferred to Amazon communities, whether they are isolated or not, for them to produce the oil - thus adding value or obtaining the product for consumption.

It would not be recommendable to introduce in the Amazon the plantation agricultural model, responsible for the degradation in biomes such as Cerrado, Atlantic Forest, Pampa, and others.

INTRODUCTION

During the 2008/09 harvest, cottonseed kept its minority participation among raw materials used by Brazil's biodiesel industry. According to data from the National Agency for Petroleum, Natural Gas, and Biofuels (ANP), cottonseed oil accounted for 3% of the total of raw materials processed in June 2009 - the last available data. Not surprisingly, soybean oil was the absolute leader, with 81% of the total used in the same period.

Most of the 65 plants licensed to produce biodiesel in Brazil are technically able to process cottonseed oil, but few of them do it. That is explained by several reasons, among them the higher availability of soybean in the market - the country harvests 3.5 million tons of cottonseed in this harvest, compared to 57.1 million tons of soybean. Besides, processing companies have to dispute cottonseed with vegetal oil industries and farmers, who use it as animal feed. All those factors help increasing the price of cottonseed oil over soybean's, keeping the former about 10% above the latter and making its use to make biodiesel more difficult.

However, that does not prevent companies such as Comanche Clean Energy, with US capital, from making biodiesel from cottonseed oil. The company's unit in Simões Filho, a town in the metropolitan area of Salvador, BA, is one of the main users of that raw material in the country. According to the company's directors, cottonseed is bought from large producers in the region of Luís Eduardo Magalhães and Barreiras, in Western Bahia, and oil extraction is outsourced. Every year, between six and eight thousand tons of cottonseed oil are transformed into biodiesel at Comanche, which makes it the second most used raw material by the company, after soybean oil.

While large cotton farmers are already able to enter the biodiesel production chain, the same is not true of family farmers. According to Arnaldo Campos, income generation director of the Ministry of Agrarian Development (MDA) and its representative at the board of the National Programme for Production and Use of Biodiesel (PNPB), today's high technification of the cotton cultivation system drives small producers away. Cottonseed's production costs, according to consulting firms, might be over 6 thousand reais a year in some Brazilian regions, over three times the value needed to plant soybean, discouraging the expansion of the crop in small scale.



Located in Simões Filho, BA, Comanche produces biodiesel from cottonseed oil



In spite of minority participation, cottonseed oil can and already has achieved its share in the biodiesel production chain, even though it is a complementary one. That condition demands that businesses, governments, and civil society organizations pay more and more attention to socioenvironmental conditions for cotton production in the country, since its areas are distributed over at least 14 Brazilian states, including several agricultural frontiers. The picture is mixed. While states such as Mato Grosso have advanced in certification despite enduring problems, others are still beginning and downplay the serious social and environmental irregularities. Those issues will be debated and exemplified along this analysis.

CHAPTER 1 ENVIRONMENTAL AND LABOUR-RELATED IMPACTS

Increase in production costs and market downturn as a result of the international financial crisis damaged Brazil's 2008/09 cotton harvest. Planted area was reduced by 21.8%, to 842.3 thousand hectares in the 2008/09 harvest, and might be reduced even more in the following harvest. According to data from the National Supply Company (CONAB), the area planted in Mato Grosso, where 45.9% of Brazil's cotton comes from, was reduced by 27.9% in the current harvest, to 387.4 mil hectares. As the second largest producer, the state of Bahia saw its planted area fall less - 10.3% - to 283.2 thousand hectares. Conversely, plantations increased in states where cotton still has a minor presence, such as Maranhão, Paraíba, Rio Grande do Norte, and Ceará - all in Northern Brazil.

DEVELOPMENT OF AREA PLANTED WITH COTTON (IN THOUSAND HECTARES)		
Estados/Safras	2007/08	2008/09
Mato Grosso	541.8	387.4
Bahia	315.6	283.2
Goiás	72.5	57.3
Mato Grosso do Sul	44.1	36.9
Minas Gerais	20.6	14.9
Maranhão	12.3	12.8
Piauí	14.6	10.0
Rio Grande do Norte	7.9	9.0
São Paulo	16.7	7.2
Paraíba	4.0	6.5
Paraná	6.5	5.5
Ceará	4.5	3.2
Alagoas	11.6	3.1
Pernambuco	3.1	2.5
Brasil	1077.4	842.3
Source: 11º Levantamento de Safra Conab Agosto 2009		

The expansion of cotton over north-eastern agricultural frontiers, especially Cerrado areas, is a cause for concern by environmentalists. The biome, similar to African savannas, does not have the media appeal of the Amazon or the Atlantic Forest, in spite of its rich biodiversity. Besides, its plain areas, with high incidence of sunlight and regular rainfall, have attracted large agricultural enterprises that take advantage of environmental laws that allow deforesting up to 80% of a farm's area, while the limit in the Amazon is only 20%.

In a joint work of satellite monitoring on the use of soil in seven towns in Western Bahia - cotton's main agricultural frontier in the Northeast - the non-government-

tal organization The Nature Conservancy (TNC), Brasília University (UnB), and the federal government got to estimate the size of environmental degradation in that area at the end of 2008. Technicians sought to identify rivers, roads, native vegetation areas, and farming activity, urban nuclei, irrigation, reforestation, and sluices.

In the seven towns studied, the largest devastation area is in Luís Eduardo Magalhães, which is considered a regional example of development. It has 43% of its soil with native vegetation, 42% with agriculture and 7% with cattle - the rest having distinct occupation, such as urban areas. In an opposed situation in terms of conservation is Cocos, where native vegetation still covers 83% of the soil, compared to 0.6% of agriculture 5.5% and of cattle. In towns that stand out for their cotton production, such as São Desidério, first place in the national ranking, and Barreiras, fourth place, the situation is as follows: the former has 57.5% of its native vegetation, 29% of agriculture, and 7% of cattle; the latter has 60%, 23%, and 8%, respectively.



Deforesting in the Cerrado biome in the town of São Desidério, BA

SOIL OCCUPATION IN WESTERN BAHIA TOWNS IN 2008 (IN %)			
	Agricultura	Pecuária	Vegetação nativa
Luís Eduardo Magalhães	42.0	7.0	43.0
São Desidério	29.0	7.0	57.5
Barreiras	23.0	8.0	60.0
Jaborandi	19.0	7.5	64.0
Correntina	17.0	11.0	67.0
Riachão das Neves	10.0	9.0	67.0
Cocos	0.6	5.5	83.0

Source: TNC

One of the major problems with western Bahia's environmental liabilities is that the vegetal cover was often cut down with no authorization by public agencies. The size of the damage was exposed by Operation Veredas, conducted by the Brazilian Institute for Environment and Renewable Natural Resources (IBAMA) in November 2008. The 40 inspectors who took part in it issued 73 violation notifications and interdiction orders, mostly for irregular deforestation. A total of 33.7 million in fines was applied and 57.9 thousand hectares of land were embargoed. According to Vânia Maria Passos dos Santos, IBAMA's environmental analyst in Barreiras, the operation revealed the region's situation of environmental calamity, also caused by cotton producers.

Besides the environmental issue, Western Bahia also faces labour-related problems. The region stood out in the last update of the slave labour "dirty list" - the federal government list of employers caught in the act exploiting people in conditions analogue to slavery - in July 2009.

Made by the Ministry of labour and Employment, the six-monthly update confirmed 16 inclusions (13 for the first time and three after cancellation of preliminary court decisions that kept them out of the list). They included Regis Francisco Ceolin, owner of Condomínio Agropecuário Ceolin, which operates in Western Bahia, Companhia Melhoramentos do Oeste da Bahia (CMOB) and employer Paulo Kenji Shimohira - later excluded by a preliminary court decision. On CMOB's land located in the Estrondo Farm, which traditionally operates on mining, 39 workers were freed when they were collecting roots to allow production of soybean in October 2005. At the same Estrondo Farm, but in a distinct area known as Indiana Farm (under responsibility of Paulo Kenji Shimohira), 52 people that made cotton weeding were freed.

Currently, the dirty list of slave labour includes other employers of the cotton industry: Antônio Odalto Smith Rodrigues de Castro (83 workers freed), from the Gurguéia Irrigated Area, in Alvorada do Gurguéia, PI; Carlos Newton Vasconcelos Bonfim Júnior (124), from the Brasília Farm, in Alto Garças, MT; João Henrique Meneghel (68), from the Guará do Meio Farm, in Correntina, BA; and Rio Pratidão Agropecuária Ltda (111), from the Correntina Farm, in Jaborandi, BA. The names will enter the "dirty list" after conclusion of administrative process triggered by the situation found by labour inspectors. Those who are listed are denied federal credit and suffer trade restrictions by hundreds of companies that signed the National Pact for the Eradication of Slave Labour.

Between September and October 2008, inspectors from the Ministry of Labour and Employment freed slave labourers at the Tabuleiro Farm, in São Desidério, BA, owned by Agrícola Xingu S/A. According to Labour Prosecutors, the company is a subsidiary of Multigrain,

whose partners are Japanese company Mitsui, US co-operative CHS and Brazilian PMG Trading AS, and is one of the large producers of soybean, corn and cotton in Brazil's Northeast. One of the largest lint processing units in the world also belongs to the company and is located in São Desidério. The group plans the construction of a biodiesel plant, which could process cottonseed.

Besides the slave labour case, the history of violations of labour rights by Agrícola Xingu S/A also includes eight non-fatal labour accidents between October and November 2008 and two fatal accidents that were not officially communicated by the company and led to the death



Cotton bundles of Agrícola Xingu S/A, a Multigrain subsidiary company

of employees Josemar Freire da Silva and Jurandir Gomes Pereira. Given the irregularities, labour prosecutors got to sign in July 2009 a judicial agreement with the company to regularize employees' hiring as well as safety and health conditions. As compensation for moral damages to workers as a group, Agrícola Xingu had to pay 522 thousand reais, to be reverted to public works or donations. For individual moral damages, a total of 78 thousand reais were paid to 13 workers whose rights were violated.

That history of violations did not prevent Agrícola Xingu S/A from succeeding in the cotton market. In 2008, the company exported its product to clients such as Copaco, Plexus, Toyoshima, Toyo-Cotton, ICT-Cotton, and Volcot. In the Brazil's domestic market, the company's lint went to Vicunha Têxtil, with units in several Brazilian states, Fiação Itabaiana, from Ribeirópolis, SE, and Fiação Pé de Serra, from Ararapina, PE.

CHAPTER_2

SOCIOENVIRONMENTAL INITIATIVES

Given the clear socioenvironmental problems found in Brazil's agricultural borders, a series of initiatives involving governments, producers, and environmentalists start getting real. In Western Bahia, the partnership to favour environmental regularization involves the Bahia Association of Farmers and Irrigators (Associação de Agricultores e Irrigantes da Bahia, AIBA), the federal and state governments, public prosecutors and environmentalists. According to Afonso Dalla Pria, an Agribusiness and Conservation expert with the NGO The Nature Conservancy (TNC), the project is based on an experience by TNC in Lucas do Rio Verde, Mato Grosso, in 2006. The aim is to register producers with environmental liability, specially deforesting, and guide a process to recover the areas.

The project's first stage, which took place between April and July 2009, did not work. The NGO intended to register 1,000 producers from three towns in the area - Riachão das Neves, Luís Eduardo, and Barreiras - but only 200 qualified. According to Dalla Pria, several farmers were afraid they would be self-incriminating for their environmental liability and become the target of lawsuits. In order to collaborate then, they proposed an arrangement with Bahia's state government, which was achieved only in the following months. Firstly, an agreement was signed between the Brazilian Institute for Environment and Renewable Natural Resources (IBAMA) and the state government about inspection operations, in order to widen the influence of state legislation on environmental issues. The intention was to assure that agreements made in Bahia were not overthrown in Brasília.

After the agreement with IBAMA was established, the state government crated a legal framework - the rules of the game, in Dalla Pria's words. In July 2009, it promulgated State Law 11478, which allows for the reduction of up to 90% of fines for environmental irregularities committed by farmers as long as they joined the regularization project. For TNC, that multi-sector agreement advances to reproduce a "success" programme conducted by the organization in permanent protection areas. TNC plans to guarantee the transparency of the process in Western Bahia by directly registering producers along the second half of this year.

Another initiative about legal regularization that will reach Bahia refers to payment for the use of river and underground water. That fee is provided for in Law 9433 of 1997, known as Law of Waters, but it is now applied only to two large water basins in Brazil - that of the Paraíba do Sul River and the Piracicaba, Capivari, and Jundiá (PCJ). The news is that the charge should start among users of the waters of the São Francisco River by 2010, according to the river's Basin Committee the National

Water Agency (Agência Nacional de Águas, ANA). The money collected from irrigator farmers, sanitation companies, and industries should fund preservation projects for the region's water sources.

The values to be paid by water users have already been approved by the São Francisco Basin Committee: in collecting untreated water, 0.01 real per m³; in consumption, which accounts for the amount of water collected that does not return to the river, the price increases to 0.02 real per m³; and it will be higher in case of launching dejections or contaminated water, reaching 0.07 real per kg of organic charge. According to ANA's manager for Water Resources Use Fees, Patrick Thomas, now the basin committee and the agency itself are formulating the phase of establishing the fees, with the provisional hiring of a company to manage resources; estimated 20.6 million reais should be collected a year, which can be used in projects such as sewerage treatment stations and dissemination of more sustainable agricultural models.

The fees will be charged firstly from producers that collect water directly from the São Francisco River. On a second stage, it will reach those that use wells or water from its tributaries. In the area of the Grande River, for instance, which crosses western Bahia before disemboguing in the São Francisco, the basin committee of that river has already started the debate on the fee. According to Thomas, that process of debate takes time and the start of the charge could still take long.

Differently from the São Francisco, which is considered as belonging to the Union since it crosses more

than one state - it starts in Minas Gerais and goes through Bahia, Pernambuco, Alagoas, and Sergipe, before disemboguing in the ocean - the Grande River is responsibility of the state, since its source and mouth are within Bahia's territory. Underground waters collected for irrigation are also subjected to charges and, according to the law, they are always controlled by states. In western Bahia, irrigated agriculture represents 5% of the area planted. It is 80 thousand hectares by 800 pivots, within a total of 1.5 million of hectares planted. It is one of Brazil's largest irrigated areas.

In spite of advancing debates on sustainability of agricultural production, environmentalists are concerned. Martin Mayr, a member of NGO 10Envolvimento, based in Barreiras and which is included in the São Francisco River Basin, considers values to be charged too low. According to him, a large part of the 20 million to be collected tend to be spent only in maintenance of bureaucracy, between servants and offices needed to charge the fees - which will be made not only in Bahia, but in all states crossed by the river.

In Mato Grosso - Brazil's largest cotton producer - the main initiatives of social responsibility are taken by the Social Cotton Institute (Instituto Algodão Social, IAS). The organization, linked to the states' producers, gives the "Social Conformity Seal" to cotton producers that meet 95 requirements proving they meet labour legislation. In the current harvest, 207 properties were evaluated and 180 of them qualified; in the 2007/08 harvest 217 were inspected and 190 received the Seal; and in the 2006/07 harvest, 197 properties of those 234 inspected were qualified.

According to Félix Balaniuc, IAS' executive-director, 85% of Mato Grosso's cottonseed already receive the Seal. With that certification, the state producers still did not receive a higher value for their product, but are able to enter more demanding markets such as Europe. Currently, 60% of the cotton harvested in Mato Grosso is exported. To fund the IAS, producers pay 1 real per hectare produced. The Institute intends to start the properties' environmental certification soon. For that, it is awaiting the environmental zoning of the state. Initiatives like that of Mato Grosso's cotton industry are still at beginning stages in other producer states.



River crosses western Bahia and its water is used for irrigation

CHAPTER_3
FINAL REMARKS

In spite of the reduction in the area planted with cotton in the current harvest, nothing indicates that Brazil will lose its condition as one of the protagonists in the world's cotton industry. With the much awaited recovery of trade between countries after the world economic crisis, producers tend to recover idle areas and open new frontiers for the product. Besides lint market, the growing demand of the biodiesel industry for cottonseed oil opens a new possibility for the cotton production chain, demanding that the agricultural and fuel industries start thinking about social and environmental sustainability of their activities.

Therefore, the debates on the preservation of the Cerrado grow in importance. It is in that biome, which has already lost 48.2% of its original cover, according to official data, that cotton plantations have expanded in recent years. Now, the rhythm of Cerrado devastation is about 20 thousand km² a year - twice as much as the Amazon. Because of that, the federal government launched in September of 2009 a conservation plan focused on that biome. Satellite monitoring data from 2002 and 2008 indicate that areas with higher degradation are precisely in farming areas in Western Bahia, at the border between Goiás and Tocantins, and in northern Mato Grosso. The plan includes repression, territorial ordering, creation of conservation units and implementation of basin plans. A total of 400 million reais is estimated to be necessary until 2011.

It is the duty of social organization to inspect the complete execution of that government plan, as well as monitoring social responsibility initiatives now supported by several producers' associations. Even though such mobilisation by a more knowledgeable segment of producers, many projects still lack transparency and community participation in their making, implementation, and control, at the risk of priority being given more to the public image of the farming industry than to effective changes in ongoing productive processes. Likewise, charging for the use of water in farming activities is certainly important, not only to fund projects to preserve water sources, but also to encourage their rational use. However, environmentalists point that the low value of the fees is a problem to reach the real goals of the Law of Waters. A debate on that subject has to be started, at this moment when basin committee all over the country start the discussion about the fees.

INTRODUCTION

A year and a half “pinhão-mansô” (*Jatropha curcas*) was registered at the National Cultivar Registration, which gave it status of species and allowed the production and trading of seeds in January 2008, the crop still divides opinions regarding its short-term commercial viability in Brazil.

According to public agencies such as EMBRAPA Agroenergy, The Minas Gerais Farming Research Agency (Empresa de Pesquisa Agropecuária de Minas Gerais, EPAMIG, a pioneer in the study of *Jatropha*) or the Ministry of Agrarian Development (MDA), research findings so far are neither conclusive nor enough for the creation of public policies for that crop.

The private sector, in turn, preferred not to wait. According to the president of the Brazilian *Jatropha* Producers Association (Associação Brasileira de Produtores de Pinhão-mansô, ABPPM), Mike Lu, the area planted with *jatropha* in the country doubled in the last 19 months, jumping from 20 thousand hectares in January 2008 to 40 thousand hectares in July 2009.

On the other hand, Lu says that conditions for the expansion of the crop “have never been better” because of the increase in public investment in research and characteristics that make it more attractive in the renewable energy market - it is a perennial plant with no use in the food market and it can be stored for a long time. On the other hand, Lu point out an increasing demand for the product in the international market, more specifically in the commercial aviation industry, since *jatropha* biokerosene has been considered one of the best vegetal components of a fuel consumed at about 250 billion litres. “*Jatropha* biokerosene has characteristics similar to fossil kerosene, which allows its use without changes in traditional engines. It also reduces consumption and pollution. That is a fantastic potential (for *jatropha*)”, says ABPPM’s president.

Rural producers, in turn, show their contradictions. Shortly after *jatropha* emerged as a commercial crop in Brazil, two cases of labourers under degrading conditions were denounced by authorities in *jatropha* farms - in November 2008, in the area of Bioauto MT Agroindustrial LTDA, in Mato Grosso, and in March 2009, at the Bacaba Farm, which belongs to Saudibras, in Tocantins.

On the one hand, an unprecedented experience in Pará gathers over 4 thousand families of small farmers and settlers under a project to plant jatropha intercropped with food cultures, which promises an average income of 9,000 reais/year in one of the poorest and most conflictive regions of the state.

In any case, jatropha still does not have a market out of its own productive cycle, since the whole production is resold as seeds for new plantations. The only processing unit that allegedly uses a small amount of jatropha as raw material is Biotins, in Tocantins (the main provider of the Bacaba Farm, caught in the act using slave labour in March this year and which, because of inspections, stopped its operations). Therefore, Brazilian biodiesel from jatropha, so far, exists only in future projects.

CHAPTER_1 PUBLIC POLICIES FOR JATROPHA WAIT FOR DEVELOPMENTS

Enthusiastic about several agroenergy crops proper for family production, such as castor bean, sunflower and rapeseed, Brazil's Ministry of Agrarian Development (MDA) has adopted a suspicious stance regarding jatropha.

According to Arnaldo Campos, MDA's biodiesel programme coordinator, there is not enough information about jatropha's behaviour under distinct climates, soil and rain conditions, about management, pest and disease control techniques, implantation costs (which, according to producers such as Saudibras, may vary from 400 to 800 reais per hectare) and plantation maintenance, as well as about its productivity under distinct conditions and in different regions, among other questions. That not only hampers the crop's zoning - which would allow, for example, access to agricultural insurance - but also the creation of loans and the establishment of a minimal price for jatropha grain and oil through the Programme for Price Guarantee to Family Farming (Programa de Garantia de Preços para a Agricultura Familiar, PGPAF).

According to Campos, the most concrete measure taken by the government regarding jatropha is the provision of funding for research agencies such as the Minas Gerais Farming Research Agency (EPAMIG) and Brazilian Agricultural Research Corporation (EMBRAPA). With no definitive knowledge on pest risks or even on the sort of intercropping with food cultures that is viable for jatropha, Campos explains, it is essential that the government remains cautious.

As a research institute that has conducted some of the most advanced studies on jatropha, starting back in the 1980s, Minas Gerais' EPAMIG adopts a stance that is

as cautious as the MDA's. According to researcher Nívio Poubel Gonçalves, "there are no findings that would recommend planting jatropha above experimental scale. There is no reliable information on the system of economic exploitation, the plant is still under domestication, we need studies about planting and nutrition configurations, information on the occurrence of pests and diseases, and to establish a market for its seeds".

Echoing her colleague, agronomist and phyto-technician Heloisa Mattana Saturnino, who also conducted research at EPAMIG, adds: "Jatropha curcas is originally from Central America; it has been introduced and cultivated domestically in all Brazilian states, but in larger areas it needs a lot of tillage handling, soil correction, proper fertilization, irrigation and careful pest and disease control. The plant survives in places with little water and poor soils, but in order to be highly productive, it needs a lot of inputs and proper soil moisture, whether through irrigation or good rainfall".



A research pioneer, EPAMIG recommends cautious about commercial plantations

Equally reticent about commercial plantations, EMBRAPA is increasing investments in studying the crop. This year, 14 million reais were given network research. According to EMBRAPA Agroenergy's general chief Frederico Durães, 150 of the institution's researchers are involved in a scientific research project that includes

partnerships with 10 countries and studies 200 types of jatropha from several regions of the American continent.

Headed by EMBRAPA Agroenergy, the company is also building an active germplasm bank for jatropha at EMBRAPA Cerrado, which should be used in character distinction studies and improvement programmes based on 26 botanic descriptors and cultivar creation.

The idea, Durães explains, is to foster and produce cultivars adapted to the distinct conditions found in Brazil and specific demands, such as elimination of jatropha's toxicity due to the presence of forbol ester - a substance that prevent its use for jatropha cake for livestock. "But we still wait for the results to be able to recommend anything", says Durães.

CAPÍTULO_2 IMPACTS

► The labour issue: jatropha area increases and workers already suffer impacts

With or without guarantees and public policies, or recommendations by research institutions, producers decided to cast their dice and bet on the good commercial perspectives for jatropha, which, they hope, will multiply soon. As a result, commercial plantations are increasing in rural areas.

The Bacaba farm, in Tocantins, plants 4 thousand hectares and has been notified for using slave labour



According to the president of the Brazilian Jatropha Producers Association (ABPPM), Mike Lu, the crop already occupies 40 thousand hectares in the country and should expand rapidly. Well organized, the sector has been mounting its pressures on the government. In a document released in late 2008¹⁰, apparently impatient with the lack of concrete results of public-driven studies on jatropha, ABPPM asked President Luiz Inácio Lula da Silva for the creation of a PAC (Programme to Accelerate

Plantations - a reference to the federal government's Programme to Accelerate Growth, also known as PAC) for the crop and listed ongoing experiences to prove current and future success. Among the most important enterprises, ABPPM lists:

► **1. Fusermann:** *with 1,600 hectares of jatropha trees over two and a half years old in Barbacena, Minas Gerais, and surroundings, including many family farmers and with technical support provided by the Viçosa Federal University - UFV, the Minas Gerais Farming Research Agency - EPAMIG, and EMBRAPA Cow Milk - CNPGL, it helped approve resources from FAPEMIG, CNPq and other research funding institutions for projects to study jatropha in several agronomic areas, especially genetic improvement, pests and diseases, harvesting and seed technology, carbon credits, use of the jatropha cake as organic fertilizer, cake detoxification, and intercropping of jatropha in the plantation-cattle-silviculture system. For two years, the company also carried out training of technicians, extension professionals and rural producers on the agronomic and economic aspects of the jatropha culture, with lectures, field days, courses and two Seminars on Biodiesel and Jatropha in 2006 and 2007. Its industrial crushing facilities and its operational experience will be used to export jatropha for the first time.*

► **2. Biojan:** *belonging to the CIE group, it has 140 hectares of jatropha planted in Janaúba, northern Minas Gerais, with over four years of experience in producing certified seeds, and now highly engaged in research on mechanizing harvesting and improving of jatropha. It has already requested the registration for the cultivar with EPAMIG in Nova Porteirinha, MG, to the Ministry of Agriculture, Livestock and Supply (MAPA).*

► **3. Curcas Diesel Brasil:** *the company belongs to ABPPM president Mike Lu. It has a seed farm and family farmers integrated to the Biodiesel Programme of Terras do Sol Consortium, with the Jales municipal government, in the state of São Paulo, as well as a project to plant 5,000 hectares of jatropha intercropped with peanuts, only with family farming, within the São Luís Bio Programme, in São Luís, Maranhão, supported by the Maranhão State University - UEMA.*

► **4. TD New Energy:** *located in Manga, MG, engaged in production of sunflower seeds, syrup sorghum, castor bean, and jatropha, using totally irrigated plantations.*

► **5. Bioauto:** *belonging to the CIE groups, it has 3,600 hectares of over jatropha trees two year olds in Nova Mutum, Mato Grosso, and major partnership with local family farmers.*

► **6. Saudibras:** *It has 6,000 hectares, of which 4,000*

hectares are extensive plantations of *jatropha* at the Bacaba Farm and 2,000 hectares with family farming in Caseara, TO; it has three years of experience and development of genuinely Brazilian field technology, having contributed decisively to establishing a system of cultivation, training technicians and local family farmers. It has strong support from the Tocantins State Department of Agriculture, Ruralists and Banco da Amazônia, which pioneered the funding of *jatropha* in Brazil, since other state banks did not. It also receives research support from Tocantins Federal University - UFT.

According to ABPPM's Mike Lu, since there are no technologies for mechanised harvesting yet - despite research advancements trying to adapt coffee harvesters to *jatropha* - the crop is highly proper for family production systems on the one hand and labour demanding, on the other, specially because seed maturation takes place asynchronously (the same plants has seeds in distinct stages of maturation, which demands permanent harvesting).

According to researchers consulted by the Biofuel Watch Centre (BWC), it is still not possible to establish a precise relationship between management of *jatropha* and labour demand, but Lu estimates that, within an average spacing of 160 plants per hectare, one worker manages three hectares including cleaning the area and harvesting. The president of the co-operative COOPERCAU, from Novo Repartimento, Pará, estimates that a



Pará farmer manages up to 10 hectares of *jatropha*

for a year, on average, without losing their oil level and germination capacity, the plant's perennial condition, the possibility of intercropping with food crops or forage species to feed livestock, the possibility to plant it in areas not proper for other crops, such as slopes and unused spaces around houses, among others, have led a large part of major enterprises to seek partnerships with small. On the other hand, two cases of extensive *jatropha* plantations have already presented labour related problems in recent years.

As reported in March 2009 by the News Agency of NGO Repórter Brasil¹¹, in November 2008, inspectors from the Mato Grosso State Labour Administration (Superintendência Regional do Trabalho e Emprego no Mato Grosso, SRTE/MT) found 24 people subjected to degrading labour conditions in an area belonging to the company Bioauto MT Agroindustrial LTDA.

Irregularities found by SRTE include wooden dormitories with no side walls, lack of closets to keep workers' belongings and foods improperly stored. There was also no drinking water or bathrooms. The employees had to improvise a shower using water from a nearby mine, where they also got water for daily consumption. They did not receive any individual protection equipment (IPE) either.

The employer signed a Conduct Adjustment Commitment, (Termo de Ajustamento de Conduta, TAC), proposed by labour prosecutor Raulino Maracajá, where he committed himself to no longer breaking labour legislation and buying a truck that will be used by authorities to increase labour control activities, as compensation for collective moral damages. Besides, each worker shall receive 2,000 reais for individual moral damages. Workers have also been paid their legal rights for contract termination.



Jatropha fruits do not ripen homogeneously

five-member family manages a maximum of 10 hectares in order to avoid damages to other productive activities in a family property.

Jatropha's characteristics that make it proper for family management, as the already mentioned asynchronous maturation of fruits, the possibility to store them

Another company notified for not following labour laws was Saudibras, owner of the Bacaba Farm in Caseara, Tocantins. As Repórter Brasil¹² also informed, in March 2009 the rural inspection group of the Tocantins State Labour Administration (SRTE/TO) rescued 280 people from labour analogue to slavery at Bacaba (see case study below).

The Bacaba farm and the partnerships established with family farmers and settlers in Caseara, who produce jatropha for the Biotins processing company in the neighbouring town of Paraíso do Tocantins, were the subject of study in the second report by BWC in 2008 (Brazil of Biofuels - Palms, Cotton, Corn and Jatropha). At the time, most of small farmers complained of lack of results from their plantations (low production and gains), and of debts. Back to the region because of the rescue of workers this year, the BWC verified that the situation remains and has worsened, according to statement collected among partner settlers.

CASE | Caught in the act using slave labour, the Bacaba farm cancels activities and leaves workers unemployed in Tocantins

The farming company Saudibras¹³ is based in Tocantins and has operated in the state for over 20 years. Until late 2008, it directed most of its investments towards 3.2 thousand hectares of jatropha at its Bacaba farm, and to other 10 thousand hectares of jatropha in areas belonging to partner family farmers. Having been, at first, one of the main references in cattle in Tocantins, about four years ago it changed the focus of its business to the provision of vegetal oil to its partner Biotins - a processing plant with production capacity of 9,720.0 m³/year and probably the only one that uses jatropha to produce biodiesel - according to Hugo Fabiano Dominiquini, the company's industrial manager, 90% of the raw material for biodiesel is soybean. Animal fat, jatropha and others make up the other 10%.

Biotins processing plants uses jatropha to produce biodiesel



In mid-March 2009, an anonymous denunciation led to an inspection operation at Bacaba by the Tocantins State Labour Administration (SRTE/TO), together with Federal Prosecutors and Federal Police. Then, 280 people were rescued from labour conditions analogue to slavery. According to inspectors, irregularities found at the farm included charging for working tools (boots, heavy knives, gloves, and other individual protection equipments - IPEs) and even drinking water, and working days of up to 12 hours. The value charged for the equipments was unlawfully discounted directly from workers' payments, so that they did not reach 465 reais (the minimum wage).

According to Humberto Célio Pereira, inspector who headed the operation, there were no sanitation bathroom facilities at working fronts, and workers had to use the woods as toilets. Women, he said, "did not feel comfortable because of the presence of men and would remain the whole day without urinating". Meals were eaten on the floor, with no proper space or protection against the weather. Lunches served by the company were not properly stored, workers were transported in an unauthorised bus in very bad shape, and only 127 had proper working registrations (Carteira de Trabalho e da Previdência Social, CPTS).

"The working environment was very bad and broke many items of labour legislation. That is why we chose to take workers out of the place", Pereira explained.

At the time, Saudibras' lawyer Ari José Santana Filho denied that the company charged workers for IPES and other basic items, but he admitted "minor irregularities, easy to be fixed", such as the place for meals in work fronts and safety belts at the bus.

As a result of the operation, 42 violation notifications were applied and contract termination fees owed by Saudibras were set at about 450 thousand reais. Labour Prosecutors also proposed a public civil lawsuit against the company, besides the lawsuit regarding the crime of reducing people to conditions analogue to slavery, provided for in Section 149 of Brazil's Penal Code.

► Unemployment

The inspection operation was a hard blow to Bacaba and, when the BWC returned to Caseara in July this year, it found a complex situation and several disagreements. According to the farm's manager Sidney Domingos, Bacaba "had some 380 employees before the problem with labour prosecutors. Now there is nobody. The farm is nearly idle, everyone [the workers] is on notice. On the 22 [of July], all of them will leave, and then it stops for completely".

Domingos criticizes the inspection operation: "The Ministry of Labour exaggerated. The only thing that was wrong was eating outside, and the chemical bathroom problems. The food was good, it was not rotten, and nobody was selling water either". According to the manager, since the Ministry of Labour blocked all of the company's bank accounts, Saudibras has no way to pay the employees who remained, "so it has to let them go, too", regrets Domingos, who was on notice in July and would go to work with Biotins to intermediate partnerships with small farmers.

In Caseara, former Bacaba employees also regretted the end of operations. As one of the few income and job generators in the region, the farm created strong paternalistic ties with the town, which causes disgust to some workers such as cousins Irawilson Cabral da Silva, 25 years old, and Maria Ivonete Belém da Silva, 39 years old. "They said there was slave labour, but we could go there and come back every day, there was a bus for that", Irawilson da Silva protested. And he went further: "They wanted to screw up the farm. They put us to eat under the sun and took pictures". His cousin echoes him: "We had working papers, we worked from Monday through Friday, and we usually had weekends and holidays off. We would go to the farm only when harvest was good - who doesn't want to make some extra money?".

Raphael de Sousa, 19, who had been working for four months at Bacaba in harvesting jatropha, thinks that the Ministry exaggerated. "I used to deal with pesticides. I think the Ministry was too rigorous. We have never been slave labourers; we worked because we wanted to. Now I have to manage it somehow, the city helps with food, friends help to pay the rent. And my wife is pregnant".

Even the president of the Union of Rural Workers and a town councillor by PPS, Aldir Costa, complained about the inspection. "We don't approve of the Ministry's actions. Why didn't they give the

Rafael, Irawilson and Maria Ivonete regret job losses



company some time to adopt the necessary measures instead of terminating the contracts of all workers? Now there are 300 people unemployed. In a town with a population of 5,000, that has a major impact on the economy".

Humberto Célio Turino and Ricardo Fujita, labour inspectors that took part in the operation at Bacaba, are unequivocal: 42 violation notifications were issued, each of them referring to a problem found at the farm. For each problem, which is under analysis, a process is open where the company can defend itself. The law was enforced - contracts were terminated and a lawsuit was started against Saudibras - and any agreement would leave years of violations without punishment. "Our work is not of prevention; it is repressive. Considering the conducts found, we requested the individual termination of contracts (Section 483 of CLT, paragraphs A and C). Employers would be happy to keep employees in such a situation [degrading or slave], awaiting for inspections and then to correct it. They know what the legislation says, they know what they have to do", says Turino.

About charges that inspectors would have set up the illegal conditions, Fujita explains that attempts to discredit the work of inspectors are common. "We are used to dealing with that. The operation included the Tocantins Labour Administration, federal police and federal prosecutors. Those are institutions with a lot of responsibility and they would never do that [set up situations]. We have nothing to gain from that".

► In settlements, the situation worsened

In the settlements where farmers have closed deals with the Bacaba farm and Biotins to produce jatropha, the precarious situation of plantations, found by the BWC in 2008, worsened in 2009.

Living in the Califórnia settlement, Amujaci Martins Costa harvested only 75 kg in 1.5 hectares in 2008. "This year we have not even harvested, I don't know if it was the pruning or the sleet, which came in the same week, but nobody harvested this year at the Califórnia settlement", she explains. She also complains that the companies have not fulfilled partnership agreements. "I did not get the money to

clean the ground. There were others that received it, but I didn't. We don't know what happened; we know that Bacaba had the [slave labour] problem, maybe that's the reason. But we would like to know how that is and how it's going to be. There is a contract signed and all that, and if we don't deliver the production, we still have to pay [de debts from establishing the plantations]".

Francisco Carvalho Lima, 44, from the União II Settlement Project, planted jatropha in a partnership with Biotins, but says he is disappointed. He produced 30 kg of jatropha in 2008; in 2009, in turn, almost nothing. "That's is a slow thing, I think it's weak. Well, they said it would be good after the fourth year (in their first contacts with settlers, Biotins and the Bacaba farm promised and average production of 800 kg per hectare in the first year, 1.8 thousand kg/hectare/year in the second, 3.000 kg/hectare/year in the third year and, from the fourth year on, 4-6 tons/hectare/year)". About the promised technical support, Carvalho also has his complains: "At first they used to come often to the property, now they kind of disappeared, they almost don't come".



► Socioenvironmental issue: jatropha as a source of "ecological income"?

Encouraged by numerous proposals to transform environmental sustainability into good business in times of global warming, jatropha producers have advocated the inclusion of the crop in reforestation projects, the Ecological ICMS¹⁴, and carbon sequestration/credit. ABPPM has even asked the government for a plan that has jatropha as a reference "to establish a nationwide programme for carbon credit".

The inclusion of jatropha plantations in the international carbon market is not a Brazilian invention and has been highly encouraged in Africa and Asia. According to researchers from Iowa State University, in the United States, the average CO₂ uptake by a jatropha plant is 8 kg/year, which, when planting about 150 trees per hectare, yields 1.2 tons of carbon/year. Financial return might not be exceptional due to the high oscillation of carbon prices in the international market - according to the World Bank, the average price of the ton in 2008 was 16 dollars. But over an 8-month period, for instance, it varied from 46 dollars in July 2008 to 10.2 dollars in February 2009. In any case, depending on the area planted, carbon

could generate additional income if placed in that market, producers say.

But the carbon market is only a detail of the ecological discourse surrounding jatropha. In areas of family farming, the crop can be among those to be used to recover legal reserves and, since it is a native species from the American continent, it is often considered proper for reforestation with positive impact.

Therefore, an experience developed in the region of Novo Repartimento and Marabá, south-eastern Pará, received the OK from the International Tropical Timber Organization - ITTO) to raise funds in the international market by developing one of the largest experiences with jatropha and family farmers in Brazil, as described in the case study below.

CASE | Jatropha and family farming in the Amazon: an alternative to cattle?

While some projects for intensive jatropha monoculture have already shown labour-related problems, as reported above, in south-eastern Pará, the Jatropha Forest Consortium (Consórcio Florestal Pinhão-manso, CFPM), based in Novo Repartimento and related to the Cooperative of Cocoa Producers and Agro-pastoral Development of Novo Repartimento (Cooperativa dos Produtores de Cacau e Desenvolvimento Agropastoril de Novo Repartimento, COOPERCAU), chose to develop plantation in a decentralised way, with small farmers, in 150 settlements and 50 areas of land regularization in the towns of Novo Repartimento, Marabá, and Itupiranga.

Involving now about 4 thousand families, the CFPM is a daring project: by the end of 2010, it intends to gather 10 thousand small farmers and settlers, who should provide the raw material to produce about 220 thousand tons of oil for biodiesel, based on 140 million jatropha plants. According to COOPERCAU, after plantations are consolidated, families' monthly income is expected to be around 500 reais.

The project also includes reforestation 100 thousand hectares of anthropized (deforested) areas with 24 million native trees (castanheira, copaíba, faveira, guanandi, bolra, cabriúva, frejó, etc) in order to

recover legal reservations and for oil extraction, as well as intercropped production of rice, manioc, sesame, cocoa, beans, sweet potato and other food and energy crops. The project currently has 20 million jatropha plants effectively planted, 3.5 thousand corn, sesame, and rice plantations, 3 thousand manioc plantations, 3 million favão (Parkia) trees effectively planted - a production arrangement distinct from the region's tradition.

Dominated by extensive cattle farming, south-eastern Pará, the epicentre for land related conflicts and environmental crimes in the state, also shows high concentration of land reform settlements (over 400). Most families live without electricity and suffer from bad roads, which makes farming extremely difficult.

In the meanwhile, public policies such as PRONAF A (loans for land reform settlers) encourage cattle also in family farming. According to settlers, that is the only sector to which Banco do Brasil provides funds in the region. After years of that activity, the result is increase in deforesting and land exhaustion in pasture areas, besides the inclusion of small farmers in the list of environmental law violators of the Brazilian Institute for Environment and Renewable Natural Resources (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis, IBAMA).



Jatropha drives family farming in Novo Repartimento, PA



Family in the Tuerê settlement live under extreme precarious circumstances



COOPERCAU'S João Lima examines jatropha tree produced by settler

► Forest recovery

Created originally as a reforestation project for commercial forest essences, COOPERCAU, through its president João de Souza Lima, "discovered" jatropha in 2005. Some farmers in the region have already cultivated it for medical purposes or to produce oil to make soap. With the increase in the biodiesel market, João Lima developed the idea of CFPM as a counterpoint to cattle. The proposal was selected by the Institute for Forest Management and Certification (Instituto de Manejo e Certificação Florestal e Agrícola, IMAFLORA) in 2006 and sent by Brazil's Ministry of Foreign Relations (Ministério das Relações Exteriores, MRE) to the International Tropical Timber Organization (ITTO) - a cooperation agency that aims at "promoting the conservation and sustainable management, use and trade of tropical forest resources".

In May 2007, ITTO approved and sanctioned the project, thus allowing to raise funds from public institutions and with foreign private enterprises. "We even sought support from federal agencies and national institutions, such as Petrobras, but we had no return. On the other hand, several foreign companies from Holland, Germany and Russia came to us, interested in investing in the project. But we ended up closing the deal with Spain's Biocarburantes Peninsulares, with which we signed a 28-year contract to provide jatropa oil for biodiesel. We also established a future sale", says Lima.

COOPERCAU received a 22-million-real advance payment for the future purchase, which allowed them to invest in their own structures - a crushing facility, transportation barges, nine storage sheds, and four mills in partner settlements, 11 trucks and 29 motorcycles to work in the field, as well as 110 hectares of land to develop their own experiments and seedlings. That money also supports families, who receive about 1.4 thousand reais to start plantations.

According to João Lima, 6 million reais had been invested by June 2009 only in direct support to family farmers. That amount will be gradually discounted off as production is delivered to the co-operative. According to COOPERCAU's accounting, besides labour, 275 thousand sacks of corn seeds, 210 thousand sacks of rice seeds, 180 thousand tons of manioc roots and 8 thousand tons of sesame seeds, as well as the 20 million seedling of jatropa. The project also provides technical support through a group of technicians who live in the communities and work in a system similar to "family doctors", and the co-operative guarantees the purchase of the whole production to partners.

► Expectations

Economic results predicted by COOPERCAU are not modest at all. Considering the 4 thousand families already integrated, results are expected to be of 2 million reais from corn sales (100 sacks at 20 reais each), 3 million from rice (150 thousand sacks at 20 reais), 15 millions from manioc (150 thousand tons of roots at 100 per ton), 4 million from sesame (8 thousand tons at 500 per ton), besides the production of jatropa and favão, totalling 24 million in the 2008/09/10 agricultural period.

The co-operative has sold corn, sesame, and rice meal to buyers from Rondônia, and manioc flour to the National Supply Company (CONAB). For now, the production of jatropa is still used as seed to expand the project, but as soon as the crusher starts operating, the oil will be sent to Spain as well as sesame oil (the latter with a three-year contracts after which the co-operative will be free to seek other markets).

COOPERCAU is also working on the Rural Environmental Registration of partner family properties with the Pará State Environmental Department (SEMA), the National Institute for Colonization and Agrarian Reform (INCRA) e the Agency for Technical Support and Rural Extension (Empresa de Assistência Técnica e Extensão Rural, EMATER). That will allow checking, for instance, the degree of deforesting of properties' legal reservation - the first 300 farmers of CFPM received their documents in late June this year.

According to João Lima, the idea of CFPM is to include the areas of jatropa and forest essences in the process of environmental regularization, which the law provides for in the case of family farming. "We assume that



CFPM team in a meeting with Tueré settlers

no property has vegetal cover for a Legal Reserve, or that it will have to be totally recovered. Therefore, since land reform parcels have 100 hectares, with the 10 hectares of jatropa and 5 hectares of native species of CFPM, within three years we will have over 18% of the reservation recovered. That is, in three years we take a huge step towards what has 30 years to be regularized".

According to COOPERCAU's president, the process will also help the inclusion of CFPM in public policies and attract other state investments such as research, technical support, infrastructure (especially roads, housing, sanitation) and loans.

► Settlements

The son of a small farmer from Tucuruí, PA, João Lima was already known to farmers when he presented the CFPM idea. For years, he travelled countryside areas around Novo Repartimento providing accounting services, making project for funding and co-operativism for farmers' labour unions and associations. Familiar with the economic and social poverty of the region, he was careful when assessing the capacity of farmers related to jatropa,

since the food security of families has to be guaranteed in the first place. Consequently, he explains, jatropha should be planted on a maximum 10 hectares, as an extra income source. “Ten hectares of jatropha is the area that a five-member family can manage with no damage to their other productive activities, so they can harvest it in their free time”, adds the co-operative’s president João Lima.

The Tuerê Settlement, in Novo Repartimento, PA, is the largest in Latin America, with about 6 thousand families. Some of them were settled after the Eldorado dos Carajás massacre, in April 1996, when 1.5 thousand people linked to the Movement of Landless Rural Workers (MST) occupied the PA-150 state road in Eldorado dos Carajás, PA, to demand land reform and 19 farmers were murdered by the police during an eviction operation.

Many of the original settlers have left because of the major precariousness of school, transport, roads, health, and electricity facilities. Given irregularities such as abandonment and re-concentration of parcels, INCRA and federal prosecutors announced in June 2009 that they will start a “Programme to moralize Land Reform” in the Tuerê settlement.

Born in Grajaú, MA, Francis da Silva is one of those who arrived at the Tuerê seven years ago, long after the settlement was opened. He bought a small 50-hectare parcel with his wife Rosangela. They have a 10-hectare plantation where they intercrop rice, manioc, corn, beans, banana, and jatropha in the best agroecologic style. “Before coming here, we used to live in Jacundá, PA, where we worked as sharecroppers. It’s much better here, even for us, who are so small. You see, in Jacundá a day’s work paid 5 reais, and here it can pay up to 20”, says small farmer Da Silva.

Jatropha’s income promises create expectations. With a production that is still small, the Da Silva family does not feel the economic results yet. But they believe that, considering the pace of production increase, it will be possible to reach six-tons/hectare when the crop is stabi-

lized. For Francis da Silva, who has been planting native species such as cedar, tonka bean e mahogany, abundant food and better perspectives are an incentive to invest in the work.

Also as “second-hand” settlers, Tocantins-born Maria and Evandro Alves de Araújo arrived at the Tuerê five years ago. They bought a parcel from a settler and started planting. Like Da Silva’s, it includes rice, beans, corn, cupuaçu, banana, manioc, and cocoa.

Differently from the Da Silvas, whose property is located near Tuerê’s main road, however, the Araújo family lives with the brutality of the abandonment and loneliness imposed by the lack of structures. The vicinal road leading to their property is virtually unusable and only CFPM’s potent trucks and motorcycles can struggle to pass the several mires along the way. The little wooden house does not have electricity, there are no neighbours living nearby and the couple’s teenage daughters are terrified every day when they think of the six kilometres of woods they have to cross to go to school. Fear of violence and rapes is high. And loneliness, with no friends, no lighting, not a single radio, no TV and sometimes not even oil for the lamp, is almost unbearable, says Mrs. Araújo.

Despite Mr. Araújo’s joyful manners - with the scarce visits, he is understandably talkative - and the enthusiasm he displays with the abundance and easy production of the region, when the subject is income, dismay makes the farmer stop talking. “We produce, but we don’t sell. There is no way to transport it. Sometimes I put some rice over the donkey and travel 10 km to sell it, but the payment is too low. Come to think of it, of money itself we make some 200 reais a year. That discourages one to plant”, he explains.

Enthusiasm comes back when the subject is jatropha. From his area came the CFPM’s first seeds. “One day I heard about jatropha on the radio, I had a tree on the yard, and I decided to plant some 3 thousand others by myself”, he explains. After talks with João Lima and the consolidation of the COOPERCAU project, the area increased, and since his plantation is already two years old, production yields the family up to 500 reais a month. “Jatropha has to be cared for” says Evandro, who leaves one day a week to harvest the product.

Almost half a day on a dirt road from Evandro’s house, Valdecir Almeida Ferro is a “de facto settler” at the Rio Gelado settlement, near Tuerê. Ferro joined CFPM with other 14 local farmers and now he is the only one left. With a jatropha area of almost two years, he is harvesting about 200 kg a month. “João Lima came here talking about jatropha, I liked it. Manioc is no good here because wild pigs eat it all. Cleaning jatropha is hard work and not



Francis da Silva intercrops jatropha with rice, corn, beans, and manioc



Evandro and Maria Alves by the tree that generated the first seeds for CFPM



everyone can stand it, but for me the project is very exciting” Valdecir. “Excitativo”, he says, is the attention given by COOPERCAU, “which has never left me in need of anything”. “In winter [during the March-May rains, when the region gets isolated], they used to come here to get my production even if it was only 45 kg”.

► Alternative?

When one travels on settlements’ roads - or on what has been left of them - the landscape is a non-stop repetition of open wounds in the forest, skeletons of huge burnt cashew nut trees, trunks of trees that were cut down, pastures sprinkled with babassu palms (which are considered a plague of poor land in the region) and thin cattle.

Sunken in a mire of the road is a cattle truck - the population’s only means of transport. Mud-covered men seek stones and tree trunks to unloose the vehicle. Women and children wait in resignation. In the small village of Nova Descoberta, in the Rio Gelado settlement, electricity has not arrived yet. Because of the impossibility of travelling on the roads, in May gasoline’s prices went up to 8 reais per litre and children did not go to school for three months. And a motorcycle ride to the “street” - as they call the urban centre of Novo Repartimento, PA, the “big city”, may cost 50 reais “per leg”.

A project such as COOPERCAU’s CFPM can really make a difference in this context? Valdecir, in turn, is concerned about the prices paid for jatropha. “Today one kilogram costs 1 real, but later they will pay only 0.30. I’m not sure it will be worth it”.

João Lima explains that as long as COOPERCAU buys jatropha for seeds, the price will remain high - more than what is paid for any other oleaginous plant in Brazil, according to the coordinator of the biodiesel project at the Ministry of Agrarian Development (MDA), Arnaldo Campos. When production is consolidated, João Lima adds, the price will adjust to Petrobras’ list for oleaginous plants’ prices, which now is 0.30 reais. Even so,

he estimates that jatropha can yield up to 9 thousand reais per year to farmers - which does not include the additional income of food cultures also bought by COOPERCAU.

“Biodiesel only works out if raw materials are cheap and do not increase the selling price at gas stations. We believe in jatropha for several reasons: it is a perennial, native plant; the more you harvest, the more production is stimulated; cleaning up the area demands about 40 days per year, which I consider relatively little; the whole family can take part in harvesting, thus integrating women and youth to the project; and differently from castor bean, palm, rapeseed, sunflower and even soybean, jatropha has no other market than biodiesel, which guarantees stable prices for lack of competition”, adds João Lima.

Visited by Repórter Brasil, social movements that act in the area - such as MST e o Movement of Dam Affected Peoples (Movimento dos Atingidos Por Barragens, MAB) - said they have no deep knowledge of the project. According to the MAB, “if there is income generation for farmers, it can be good”. The MST, in turn, said that once again producers are subordinated to a private enterprise that will dictate the rules and will benefit from their work.

Anyway, according to João Lima, over 7 thousand farmers have registered at COOPERCAU. In the streets of the villages, those who do not belong to CFPM at least have heard about it and want more information. The co-operative’s support team, made up by 28 young agricultural technicians, worked for a year without pay, but, according to coordinator Ney Ralison, now wages are good and everyone dedicates themselves to the project as much as they can.

The experience is still little known by public agencies that deal with biodiesel in Brazil, such as the MDA itself. Can the CFPM’s model be replicated in other regions of the Amazon? Is it a real alternative to deforesting caused by cattle and to the poverty of that region of conflicts and violence? João Lima believes that the situation can only be reverted with massive public policy in-

vestment. While it does not come, he uses COOPERCAU to pressure for better roads (they would make residents' lives easier, but also CFPM's) and for residences with international institutions, and even to enter the international carbon market through the World Bank. "The future of the project, adds João Lima, "depends mainly of the permanence of the families on the land. And that will only happen if their lives improve".

CHAPTER_3 FINAL REMARKS

In spite of the warning by the government and research institutions that jatropha's commercial development is still risky because of the lack of scientific information about its behaviour under distinct climate and soil conditions, and phyto-sanitation issues that have not been studied enough, the private sector has invested in the crop. That investment, regardless of public policies, might either help the consolidation of jatropha in Brazil or cause damages mainly to family farmers involved in projects based on unwarranted expectations - such as in the case of low productivity already seen in settlements in Tocantins.

While more investments are needed in the study of the crop, private enterprises have to take on the onus of possible failures in jatropha projects, especially when there is involvement by small farmers. Therefore, the private sector should pay the projects' bills, which include possible debts of its partners.

On the other hand, any Project that includes family farming as producer of raw materials should take care of the food sovereignty of its partners, allowing and encouraging the cultivation of food crops, as in the case of the experience in Novo Repartimento, Pará.

Jatropha has the advantage of being possibly the only raw material for biodiesel that does not have alternative markets, which can guarantee stronger prices and market in the medium and long run. But any commercial project must consider the need to guarantee the destination of production over that medium and long run, in order to give the project stability.



SUNFLOWER AND RAPESEED

INTRODUCTION

Participation of sunflower and rapeseed in Brazil's biodiesel production is still insignificant. However, both crops are gradually getting stronger as alternatives to produce biofuels in the country, with different perspectives and impacts. Raising interest both with family farming and large producers, sunflower and rapeseed have enthusiastic advocates in research institutions and government agencies in charge of biodiesel programmes. That must be underscored, even though they are no match for soybean yet.

In order to understand more about the recent increase in both crops in the country, BWC-Repórter Brasil travelled to Brazil's southern region to know experiences that are part of the crop's expansion - an expansion that led to the need to create mechanisms to monitor the respective productions. For that, the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística (IBGE) provides at its Automatic Retrieval System (SIDRA, Sistema IBGE de Recuperação Automática) information on sunflower since 2005, while CONAB is studying the possibility to include rapeseed in its surveys about Brazil's grain harvest soon.

While sunflower and rapeseed have advanced in terms of area in Brazil, their dimension is still tiny compared to the area planted with soybean - a dispute that is still completely unbalanced regarding the country's biodiesel production. While soybean should have an 80% share of the 1.6-1.7 billion litres predicted for Brazil production in 2009, "participation by sunflower and rapeseed oils are almost insignificant". The opinion is offered by Ricardo Gomide, general-coordinator of the Department for Renewable Fuels of the Ministry of Mining and Energy. According to Gomide, given such low share, sunflower and rapeseed are not even in the Department's lists about raw materials used to produce biodiesel in Brazil - they are grouped with other fatty materials.

In terms of area planted, while soybean reached about 21.7 million hectares in the 2008/2009 harvest, sunflower had 78.3 thousand (CONAB data from August 2009), and rapeseed reached 35 thousand hectares, according to EMBRAPA researchers. That is, the area planted with sunflower can barely reach 0.4% of soybean's, while rapeseed is almost 700 times smaller.

Even though soybean keeps a firm hold in its hegemony over Brazil's agribusiness - and as a raw material for biodiesel processing companies - some segments al-

ready look to sunflower and rapeseed's possibilities. Some experiences face problems, even creating conflicts between those involved. That was seen, for instance, in the biodiesel chain for sunflower in the state of Rio Grande do Norte, creating disagreements between small farmers, Petrobras and the state government.

► Initiatives in Brazil

On the other hand, more or less successful initiatives advance, corroborating the discourse of those that underscore sunflower and rapeseed as crops with a high medium-term potential.

That is what can be seen, for instance, among producers in Campo Novo dos Parecis, in Mato Grosso, where the area planted with sunflower multiplies every year, having reached reasonable 5,000 hectares in the 2007/2008 harvest, according to IBGE.

In Southern Brazil, interesting initiatives related to sunflower have multiplied in the three states of the region, even though the major projects, such as that of Paraná's government with COPEL, municipal governments from the southwest of the state and co-operatives of family farmers are still focused on soybean.

According to researcher Ana Claudia Barneche, from EMBRAPA Temperate Climate (based in Pelotas, RS), between Santa Rosa and São Borja, producers have expanded the sunflower area both for biodiesel production and for vegetal oil. In that region, located in the west of the state, near Argentina, the climate has proved unfavourable, even hostile to soybean, since there are lots of droughts. For sunflower, in turn, it has not been such a major problem.

In São Borja, for instance, out of 60 thousand hectares currently destined to agricultural production, 6 thousand hectares are estimated to be used for sunflower - with productivity of about 2 thousand kg/ha. A few years ago, sunflower was practically nonexistent among local producers. Considered high-quality noble oil by local farmers, sunflower oil produced there is used mainly for human consumption, through local food industries.

In the region of Santa Cruz do Sul, RS, the Association of Brazilian Tobacco Farmers (Associação dos Fumicultores do Brasil, AFUBRA) is now seeking to work with the idea of diversifying the production of their members. Within a scenario where less dependence by producers on the tobacco industry is desirable, AFUBRA started in 2006 a project to plant sunflower and produce biodiesel from its oil.

In Laranjeiras do Sul, Paraná, the Movement of Small Farmers (Movimento dos Pequenos Agricultores, MPA) intends, by the end of the year, starts crushing sunflower already planted by producers linked to the movement, in order to conduct research and other initiatives related to sunflower. After achieving the concession of a piece of land from the neighbouring town of Porto Barreiro, PR, to install a small processing plant, producers intend to begin research and use of the oil in two fronts. Farmers should use it as cooking oil as well as testing it as fuel for tractors and trucks of co-operative members.

Still in the south, BWC-Repórter Brasil has received constant information about initiatives by organisations as UNAIC and the MPA towards cultivation and study of several species to produce oil in general and biodiesel specifically. Resorting to research and cultivation of species such as castor bean, hantsley, jatropha, sweet potato and others, the organizations have been quite cautious with results and investments. That can be explained both by the concern not to take a step that is too big for them and not to follow the agribusiness logic of producing according to the limits of monoculture - and also because of structure and conjuncture difficulties related to the project.

Differently, another reality has gained force in the South, where large biodiesel processing plants in the region work with more structured co-operatives of small farmers to receive from them a large part of their raw material. That is the case of BSBios, from Passo Fundo, RS, which receives an estimated 40% of its raw material from family farmers (members of large local co-operatives). One of the ten largest biodiesel plants in operation today in Brazil (according to data from the National Agency for Petroleum, Natural Gas, and Biofuels - ANP), BSBios has soybean as its core basis to produce the oil. However, it is starting to make a relevant use of rapeseed - bringing with it numerous family producers. That investment can bring excellent results for both parts, but also generate high losses to farmers in case problems emerge with the crop.

CHAPTER_1

THE SUNFLOWER CHAIN IN BRAZIL

In recent harvests, the area planted with sunflower had been increasing constantly, at 10% to 15% a year. However, in the 2008/2009 harvest, the crop experienced a fall of nearly 30% in its planted area. In the Midwest - the main producer region, the fall reached 43.4% over 2007/2008. In Goiás, it was stronger (-73.3%), from 21.7 thousand hectares to 5.8 thousand hectares. In Mato Grosso do Sul, the decrease was from 5.4 thousand hectares to 2.4 thousand hectares (-55.6%) and in Mato Grosso - the state with the largest area planted with sunflower - the fall was from 60.4 thousand hectares to 41.6 thousand hectares (-31.6%).

SUNFLOWER AREA IN BRAZIL	
Area 2005/2006	66.9 mil hectares
Area 2006/2007	75.4 mil hectares
Area 2007/2008	111.3 mil hectares
Area 2008/2009	78.3 mil hectares

Source: Conab

According to CONAB analyst Manuel Carvalho, the fall in sunflower production is due to a series of increases: "increase in the US dollar over the Brazilian real, increase in the price of inputs, costs of production...". According to him, in Argentina sunflower oil was sold at the peak for about 1,500 US dollars per ton. With the increases in input prices in recent months, "it is about 800-900 dollars".

Carvalho says that in the 2008/2009 harvest sunflower "lost area to soybean, to corn, to several crops". He underscores that such variations take place especially because of production and sales prices of each grain. "It's a question of price; that is producers' strategy of production: they go to what has lower costs and sells more".

Even so, the 29.6% fall in national production between one harvest and another is still impressive, and more for a crop that has been researched by EMBRAPA since the 1980s.

César de Castro, EMBRAPA Soy researcher for soybean and sunflower, the major weakness of sunflower production today in Brazil is access to technology. "It doesn't help to master the necessary mechanisms for cultivation if the user public at large do not know it", he criticises. While the soybean chain is developed in all its links, with research, trade, and technology transfer, sunflower still has several of those links weak - something that must be overcome in general by enterprises, by the State and by the media - and logically by government assistance agencies themselves.

Besides difficulties for technology transfer, César de Castro explains that in some regions plantations have been targeted by enthusiastic (and hungry) bird flocks that get their food from sunflower seeds planted in towns in Paraná and Rio Grande do Sul, for instance.

Sunflower also faces challenges by some diseases, such as alternaria and sclerotinia. More than the pests, which any other crop has to face, sunflower's situation is worsened by the lack of proper products to control diseases. That is because it often simply lacks products registered for the control of certain pests. For example: the same insecticide that is registered for soybean cannot be used on sunflower areas if it does not have the specific registration for the crop. "And for companies themselves that is often not interesting, since registration is highly complex, costly, and sunflower's area is still relatively small compared to soybean's", explains Castro - thus reaffirming one more influence exercised by soybean over the other crops.

Studies on sunflower had a major drive in Brazil in the 1990s. Even though the issue of biodiesel had already been thought of in mid-80s, still during the military dictatorship (1964-85) as a response to the petroleum crises, it was the emergence of world biodiesel markets that brought such project back to Brazilian soil - and policies. EMBRAPA itself created a specific unit for that, EMBRAPA Agroenergy.

According to César de Castro, the recent bio-fuel boom has made several people to desire to plant something that might enter that new market. Therefore, it is his understanding that in some regions "sunflower goes very well". For instance, in the Midwest, but, since it is a crop that adjusts well to the climate conditions almost all over Brazil - from Rio Grande to Roraima, he says - it has brought interesting perspectives both to farmers in Mato Grosso and small farmers in north-eastern states. "In Mato Grosso there are highly specialised producers with major machines, while others are harvesting manually in small plantations, seeking alternatives in settlements, etc."

For Castro, manual harvesting is an inglorious task, but farmers have been doing it and developing it". While that shows the risk of the crop be the target for future overexploitation of labourers (and even of cases of slave labour, such as those seen on coffee, tomato, jatropha and other labour-intensive harvests), on the other hand such characteristic of sunflower - of serving the several types of production - allows other gains to small producers. "They don't gain only from oil or grain; they can also use it for animal feed", underscored the EMBRAPA researcher. If he could risk a guess, Castro believes that sunflower will stabilize in an area about 500 thousand hectares. "It has its space because there is that late harvest, after soy".

Arnoldo Campos, MDA (Ministry of Agrarian Development) director for income generation of and its representative in the coordination of PNPB (National Programme for Production and Use of Biodiesel), adds oth-

er explanations for the existence of important sunflower areas in several regions of the country. For Campos, that is due to its qualities for rotation with other main crops, the soil's capacity for recovery, among other factors. He agrees with Castro in that sunflower "can be a late crop alternative, without competing with the main crop", both for its highly valued oil and for generating an animal feed that is not as qualified as soybean's but that can play a complementary role.

It should be noted that sunflower production does not have even a producer association today - a situation that is repeated with rapeseed.

CASE | Soybean farmers in Western Mato Grosso invest in sunflower and build seed crusher

Campo Novo do Parecis, in Western Mato Grosso, is Brazil's leader in sunflower production. According to the most recent municipal data on agricultural production by the Brazilian Institute of Geography and Statistics (IBGE), it had 5 thousand hectares planted with sunflower in 2007, for a total area of 73,233 hectares. In this harvest, the forecast by the National Supply Company (CONAB) is that sunflower will have occupied 36 thousand hectares in Campo Novo do Parecis and neighbouring Brasnorte. The fast increase is related to the creation of Parecis Alimentos - a collective enterprise by large local grain producers.

"This is the first year that several producers adopted sunflower for late harvest. Parecis Alimentos' 44 partners have their mandatory shares to be planted", explained the company's industrial director Vitorio Herklotz. "Our idea is to verticalise production, to sell products with a higher added value. Producers are usually the victims of the manufacturing industry's opportunism. When they acquire land that did not use to belong to them, they start to have authority over their property", Herklotz added.

Besides the seed crusher that started operating experimentally this year, an animal feed factory is under construction. According to Herklotz, partners' investment in the enterprise was about 8 million reais - all with their own resources. That was 2 million above the budget since part of machines bought for the crusher had to be replaced. "We chose oil extraction by pressing, while the domestic market is more often used for chemical extraction. We should not have relied on providers' promises and now we had to make adjustments", regretted the industrial director. Mechanic oil extraction, however, has advantages over chemical one: lower installation cost, modular character (mak-

ing it easier to enlarge units) and generation of an oilier product. "The flour left from pressing has more fat, so it is good to make animal feed. Our strategy integrates plantation and cattle, we want to get meat from the area and not only grains", Herklotz said.

The expectation of Parecis Alimentos' partners is to have their initial investment within five years at most. The idea is to meet the target of 250 tons of crushed seeds a day, but the current structure supports a much lower amount: 100 tons a day. "New instruments will come with higher demand. We are at the very beginning of the process and for most of us both planting and processing sunflower mean learning", said the industrial director. "What matters is that the same equipments that crush sunflower can work with soybean, which is already established in the region", he added.

► Biodiesel: thwarted expectation

Parecis Alimentos' goal is to extract higher-quality oil that meets the demands of the food industry. "Sunflower oil is sometimes used for biodiesel production, but that is an aberration. As long as soybean oil is traded in the food market, making biodiesel from sunflower is preposterous", vociferated Herklotz.

In spite of Herklotz's harsh tone, the one thousand tons of sunflower oil extracted so far by the company were sold to biodiesel processing plants in Mato Grosso. "This year, the price of soybean oil increased and we used a lot of sunflower oil", said Celso Lescano Jr, industrial manager of Biopar Parecis, located in Nova Marilândia, MT, one of the plants that purchased its raw material from Parecis Alimentos. "We work with biodiesel because our oil still does not meet quality requirements. We were at the industrial test stage and the characteristics of our oil varied a lot, so we could not place whatever product we had in the food market", justified Herklotz.

While the biodiesel market cannot be seen in projections by Parecis Alimentos in a near future, it was present at the company's birth: not only in the first sales of oil, but mainly as the initial motivation for the investment. According to Sérgio Stefanello - the largest sunflower producer in the region - their neighbours' interest in the crop emerged three years ago. "That was when the debate about sunflower and biodiesel started. Then came the idea of other producers investing in sunflower and of us building a crusher", he said.

► Sunflower far from family farming

Stefanello's involvement with sunflower took place in 1995. He lent three hectares for an experimental plantation conducted by the Mato Grosso Foundation for Farming Research Support. In the following



Bird feed is guaranteed, if restricted, market for sunflower



Vitorio Herklotz: major producers as victims of the industry

year, the area was already increased to 200 hectares, as part of a project by Caramuru Alimentos. "That program did not go ahead because it faced several difficulties, mainly logistic ones. Sunflower is very light, so trucks transport low weight, increasing freight price", explained the producer, who was mayor of Campo Novo dos Parecis in the last term, by the Partido da República (PR).

In spite of that, Stefanello found a strategic market for sunflower: birdfeed. By selling seeds already classified and packed, product's price and density increase (which reduces the freight's relative cost). "I started keeping 2 thousand hectares planted with sunflower during late harvest. This year, in order to meet Parecis Alimentos' share, I planted 1.5 thousand extra hectares. I expected to harvest 6 thousand tons of seeds, but in April it rained above the average and now the estimate fell to 4.5 thousand tons", he said. Stefanello makes only wholesales of his sunflower production at the so-called cereal zone in São Paulo's Brás neighbourhood (in); he also has regular buyers, such as Yoki Alimentos and Caramuru Alimentos.

Sunflower has European origins and has adjusted well to Cerrado. It now occupies a distinct planting window from corn - the crop that is most often used between soybean harvests in the region (the so-called late harvest). Corn should be planted by February 20, so that the plant can still get the semester's last rains. Sunflower, in turn, develops better in dry climates, and therefore it should be planted between February 20 and March 15.

Farmers work in sunflower harvest in Campo Novo dos Parecis



Sérgio Stefanello: biodiesel increased interest in planting sunflower

Sunflower production takes advantage of soybean's land and machines



Campo Novo do Parecis turned 21 last July 4, including a concert by renowned country singers Gian and Giovanni at the celebration. The city was born at the same period of other soybean leaders, such as Lucas do Rio Verde and Mutum. Sérgio Stefanello is one of the few migrants left from the first wave that came from the state of Rio Grande do Sul. He moved there in 1985, coming from Cruz Alta, RS. "Today there are at most a third of the first explorers left. Pioneering has a high human cost, a lot of people bankrupt. But those who stay grow and establish themselves", the farmer said. "President Lula does not always say he wants family farming? It is like that here, agriculture is in the hands of the Maggi family", joked Stefanello, referring to the family of state governor Blairo Maggi.

CASE | In the tobacco industry's backyard, 23 hectares of sunflower

Universal Leaf, Alliance One, Souza Cruz, Phillip Morris, Premiun, Kanenberg, Profigem, ATC... The scenario along the road that leads from Santa Cruz do Sul to Rio Pardo, in Rio do Grande do Sul, is impressive. Names, buildings, logos, billboards, workers... Everything is intimately connected to the world's tobacco giants. As a result, everything that happens in the region is evidently contradictory, controversial, and complex.

Amidst such scenario - a nightmare for sectors like public health and non-smokers and a paradise for smokers and private capital - a fledgling experience keeps the cigarette industry busy. The project of the Association of Brazilian Tobacco Farmers (AFUBRA) involves now 23 producers and has sunflower as its main raw material.



Tobacco farmer Alci Eisenhardt, from Santa Cruz do Sul: diversifying

Nataniel Sampaio, AFUBRA's agricultural technician, sustains that the association has always worked with the idea that farmers should diversify their production and their income sources beyond tobacco. In Rio Pardo, AFUBRA even has a business fair park where EXPOAGRO is held every year. In the same 92-hectare area, the association keeps a self-sustainable experimental station. Both spaces intend to contribute to the idea of diversification and strengthening of family farming.

Sampaio, however, recognises that the proposal of diversification, and even more in a region such as Santa Cruz do Sul, "is something complex, since it involves culture, knowledge, income...". According to him, federal and state governments had recently suggested the perspective of eradicating tobacco plantations because of problems with slave labour, pesticides, impacts of smoking on society as a whole, etc. But now the government would be seeing the matter in a different light, seeking to study and propose alternatives in order to gradually reduce the activity and small farmers' involvement.

In this context, in 2006, within the National Programme for Diversification of Tobacco Areas (Programa Nacional de Diversificação em Áreas de Tabaco), AFUBRA presented to the Ministry of Agrarian Development (MDA) a project to studying the feasibility of sunflower for income generation in small properties, with emphasis in production of biofuels and food (meal, meat, and milk). Sampaio explains that the Project had already covered three harvests, the first one linked to AFUBRA and the others, to the MDA project - with AFUBRA's counterpart contribution - and that the fourth harvest (2009/10) will use only AFUBRA's resources.

► The project

The initiative includes now 23 producers and is developed in a partnership with UNISC (the University of Santa Cruz do Sul), a local private higher education institution. At first, each farmer provided 1 hectare of land for sunflower plantations, as well as labour, while the project's coordinators gave money, seeds, technical support, etc. After the harvest, sunflower seeds are taken to the experimental station to be crushed in the extruder. After that, the farmer receives three products: sunflower biodiesel (ready to be used in the property's vehicles), the cake to be used to feed the farmer's livestock and glycerol, which can be transformed into soap. Sampaio explains that the protein-rich sunflower cake has its ideal fraction in bovine feed at 25% of the total.

Besides the extruder to take the oil from the seeds by crushing them, the experimental stations includes an oil filter and a small biodiesel processing unit, which does transesterification of the oil in order to withdraw glycerine and refining the fuel. Sampaio explains that the whole equipment cost about 200 thousand reais and serves the demand of 100-150 producers. "It is an interesting equipment for associations and communities", he says, adding that the proposal also depends on the market - diesel prices on gas stations and inputs for production - and incentives. "In 2006, the litre of biodiesel had a production cost of 1.10 real. In 2009, it reached 1.70 real", he says.

UNISC provided five tractors to study the performance when using 100% of biodiesel from sunflower (B100). The vehicles underwent cleaning before receiving the fuel and after 300 hours of work, they come back to maintenance inspection and analysis of components. When this report was finished, reports on that research were being written.

► Studies and plans

Heitor Álvaro Petry, AFUBRA's vice-president, sustains that the project is under study and in search of a model, and that the association's proposal is not only "producing raw material for the processing companies, but also adding value, creating alternatives for family farming". He does not want to sell false illusions and hopes - he is aware that sunflower will not replace tobacco, but rather complement what is being done. "There is nothing ideological about it", he says, "it's the search for something practical, to see if there is space for producers, for family farmers".

In spite of the criticism towards large companies implied above, Petry says that AFUBRA does not intend to compete or challenge major enterprises. "We believe there is room for both". Nataniel Sampaio's words, in turn, are more direct. "Differently from the BSBios model, where producers provide seeds, we consider our model more interesting, because it adds more value for them".

AFUBRA is now studying the possibility to extend the project towards fostering the advancement of the activity, which can place the association as a service-provider in that field. Sampaio explains. "Initially, we thought about stimulating current producers involved to plant a little more. And also include new producers". For him, differently from the first producers who were partners to the project, "with the new ones, we think about charging a fee, which has not been defined yet, to provide the service". Sampaio's mathematical thinking proceeds: "up to 50 km from our processing plant, it seems interesting. Beyond that, the city should do something to foster advancement". And how would AFUBRA follow those more distant initiatives? "We could be a reference to these other towns".

No wonder why his reasoning envisages so many stages for the project. AFUBRA Works precisely in the medium and long run. It will be 55 years old in 2010 and has 20 branches in the three states of Brazil's southern region. Its commercial headquarters are located in Santa Cruz do Sul. And it has about 150 thousand members - a figure that varies each year. Besides representing producers, the association is in charge of making the production's mutual insurance.

► Profits and birds

Alci Eisenhardt, from Santa Cruz do Sul, is one of AFUBRA's 150 thousand members and one of the 23 participants of the biodiesel project. However, his main activity is obviously not that. Eisenhardt plants 80 thousand tobacco trees in his property in an area of 4 to 5 hectares. In the last harvest, he produced 1.100 arrobas of tobacco. Sold at 101 reais each, they generated a gross income of over 100 thousand reais for the Eisenhardt family. After costs, it was a total of 60 thousand reais. Sampaio explains that such income, price of the arroba, and productivity are not typical. "That is one of the best categories for payment by the companies, and there are quite different situations among producers".

At the property, four hectares are used for corn and five, to plant reforestation trees. The family also has a half-hectare orchard. According to Eisenhardt, the corn planted gives a return of 2.5 thousand reais, "which pays for the costs and can be used to feed livestock". He does not doubt to say the obvious: "The real income comes from tobacco". But he says that sunflower has contributed with the diesel used in tractors and meal for animal feed.

The feed for beef cattle that the family raises for their own consumption includes corn (40%), rice meal (34%) and mineral salt (1%), and has incorporated the 25% of sunflower cake recommended by AFUBRA.

A problem emerged in the last harvest: birds attacked heir sunflower - an issue that concerns even EMBRAPA. That is a phenomenon seen in other countries, but that is really serious in Southern Brazil. In some cities, the presence of birds makes it virtually impossible to plant sunflower - the birds eat up everything and there is no reasonable suggestion to control the situation.

AFUBRA says that the average productivity of the Project is 1.5 thousand kg of sunflower per hectare involved. Such production per hectare yields about 600 litres of oil and 900 kg of cake. For Sampaio, a good plantation would be about two thousand kg per hectare. In the case of the Eisenhardt family, productivity was about 1.3 thousand kg in the first years and in the following years, it was around 1 thousand kg. "The problems with birds have certainly contributed for that fall", he adds.

CHAPTER 2 THE RAPESEED CHAIN IN BRAZIL

"We still don't have much information about rapeseed. Only now the crop raised more interest, because its benefits for human health have been identified, above all its oil." The statement by CONAB analyst Manuel Carvalho reveals, in part, the current stage of rapeseed production in Brazil. "We have more data at international level than in Brazil itself", he adds.

However, the lack of some official data, as a result of the relatively small size of rapeseed compared to the giants of Brazil's agriculture - such as soybean, corn, and sugarcane - hides a much richer and established reality of the crop in Brazil.

That is what Gilberto Omar Tomm explains. He is a researcher with EMBRAPA Wheat, based in Passo Fundo, RS, and one of Brazil's institutions with more achievement in rapeseed research. "In Brazil, work on that crop started in 1974, while EMBRAPA started studying the crop in the early 1980s. The crop is widespread, especially in Europe and the United States", he adds.

In terms of planted area, Tomm underscores that rapeseed reached 30 thousand hectares in 2008. The state of Rio Grande do Sul is by far the leader in national production: in that harvest, it accounted for 24.5 thousand hectares, followed by Paraná (3.7 thousand hectares), Mato Grosso do Sul (700 hectares), Minas Gerais (500 hectares), and Goiás (150 hectares).

In the current harvest, he says that Brazil was heading towards something around 45 thousand hectares, but the crop faced a drought period right in the beginning of sowing, reaching virtually all producers states. With that, the planted area in the current har-

vest should be around 35 thousand hectares. According to Tomm, in Mato Grosso do Sul, for instance, estimates pointed to an increase in production of nearly six times, but the expectation was thwarted by the drought that hit the region. The problem also damaged activities of Rio Grande do Sul producers in the ideal period for sowing rapeseed. Since they would have to plant late, many of them gave it up.

Besides the problems, the researcher is excited about the fact that the crops are behaving "very positively" in the current harvest. Furthermore, the states of Rio Grande do Sul, Santa Catarina, Paraná, Mato Grosso do Sul, and Goiás have already defined the rapeseed zoning. "That allows producers to access loans in order to plant under insurance - even large-scale producers", he underscores.

Because of the increase of rapeseed in Brazil, CONAB is now considering to include it in its periodic surveys of grain production and other federal agencies also advocate the species as an interesting alternative in Brazil's biodiesel programmes.

"Rapeseed is certainly an interesting winter crop and may be an excellent alternative for producers, and more intensely in the Southern region and a little bit more in the Southeast and Midwest", says Arnaldo Campos, who represents the Ministry of Agrarian Development in the PNPB coordination. Besides difficulties with the price of wheat, rapeseed becomes interesting for producers because it contributes to soil recovery, it has high-quality oil and meal that can be used for animal feed.

By and large, rapeseed is now eliminating the obstacles for its expansion. Insured loans, which used to be a core issue, have been overcome. Sowing techniques and times, a second issue that producers are mastering. And a third bottleneck was harvesting, which, according to Tomm, "is also being worked out, by making plant maturation uniform, and less moisture, grains that come out clean, plants that do not end up green". Finally, he says, "we are also minimizing risks for storms and rains. That is, the risks of harvest losses are also being reduced".

As for diseases, the problem with black rapeseed is being overcome by the development of resistant varieties, or by using those that do not demand the use of fungicides. For Tomm, such advances are highly important, on the one hand, in reducing the costs for farmers, and on the other hand, when providing a crop with less impact on the environment in terms of pesticides, for instance, compared to soybean and wheat, that demand fungicides.

In terms of climate, rapeseed has proved to be resistant to extremely low temperatures in the South while EMBRAPA celebrates its success in tests in the Cerrado and

even in the state of Paraíba. For Tomm, such results show that Brazil can become a major producer and even an exporter of the grain and its potential products. That will depend on support by the public sector, including the PNPB, which may encourage the emergence of new potential buyers for the product. EMBRAPA data point to an oleaginous plant with about 38% of oil, while its meal reaches a price that is around 70% of soybean's.

Since the beginning of research on rapeseed in Brazil, the crop had been expanding without any strong public support to research or a more decisive support to production. Therefore, the PNPB, even though it is not a pioneer and isolated influence on its increase, made zoning possible, which, in turn, made insured loans. "Now research is advancing in several fronts, very distinct ones, such as pollination of plantations together with bee farming", Tomm says, excited. And public investments have also been increasing.

Tomm sees that although there are biofuel companies interested in rapeseed oil, "the trend is that soybean oil will gain more and more space and rapeseed's will be used for human consumption, which is quite understandable, because it is more noble and healthier than soybean's".

The fact that rapeseed can be a complement to soybean in terms of plantations and oil extraction is yet another argument in favour of the former. Firstly, because it optimizes and develops the infrastructure for storage, transportation, and production of the oil, helping the industry not to be idle during part of the year, and second, for creating opportunities for producers; finally, by generating wealth for the economy and offering options to consumers.

Given BSBios investment in producing up to 50% of its biodiesel from rapeseed, Tomm prefers to make a more general analysis. "Historically, rapeseed oil has a value that is 30% higher than soybean's. And if it for domestic consumption in Brazil, it doesn't matter whether biodiesel is made from soy, sunflower or rapeseed. So, what's the point in using a raw material that is 30% more expensive?"

Right now, it should be noted that such view has lost momentum - that it does not matter which raw material is used for the oil, whether as fuel or for human consumption. Rights to information, to a healthy environment, or even consumers' rights, and the obvious advancement of the movements that claim for those rights are out there to challenge that hypothesis. On the other hand, it becomes even more important to point out that the companies that currently invest on biodiesel made of rapeseed are ultimately looking to foreign markets. European specifications, for instance, are based on

rapeseed oil while soybean biodiesel does not meet "Old World" specifications.

That is to say that the turn of some companies towards rapeseed oil, with all positive elements that it might bear, incurs in some bad habits of our economy, like treating the foreign buyer more carefully than the Brazilian one, and direct production towards exports rather than also investing in the domestic market.

Tomm sustains that private enterprises are highly interested in rapeseed's potential. "You don't need to give anything up. It's the same machines' the same people, the same silos. It optimizes every investment that has been done". For him, however, private enterprises will not sustain the entire industry's expansion. He says that some activities are typically government ones, where costs end up being difficult to cover. Examples of such activities are research and extension, especially for small farmers and when plantation starts.

Since it is the world's third largest oleaginous species in terms of production, rapeseed now receives high technology investments, including some advancements over soybean - a decades-long process that makes Tomm recommend cautious with other crops such as jatropha. "Investments so far in those other crops are much lower, so it will be years before they achieve technology similar to rapeseed's and soybean's", he says. For him, "risks for those who invest in those crops are much higher".

He also points out that the institution's webpage provides the rapeseed plantation manual, agro-climate zoning, and that in case of diseases, EMBRAPA seeks to help immediately... "In those other crops, in turn, there is often no technology in Brazil and often, nowhere". Tomm is concerned about the magnitude of the investment that might be needed in permanent crops. "Ultimately, they demand much more labour, and you have to think where you'll find those people, and what the cost will be" - risks, duties, etc.

Although he is clearly enthusiastic about rapeseed, Tomm insists in reminding small-scale producers of a golden rule for agriculture: do not use your whole area for one only crop, diversify, and use proper techniques for soil management. In case producers choose to start planting rapeseed, the best option, according to Tomm, is that they divide their area in three and plant rapeseed in one of them, rotating each year with other crops such as wheat, green peas, barley, oat, and triticale". He says that the ideal situation is not to plant rapeseed for two years in each of the three areas, but if that is not possible, producers should attempt to rotate at least one year the crop in each part of their property. "By planting three different crops, they obviously would run fewer risks of bad weather, diseases, price decreases...", he concludes.

CASE | In Rio Grande do Sul, BSBios chooses rapeseed

One of Brazil's ten largest biodiesel companies BSBios, based in Passo Fundo, RS, strongly believes in rapeseed to guarantee its growth and its access to new markets - especially European ones.

With production capacity authorised by the ANP (National Agency for Petroleum, Natural Gas, and Biofuels) of 160 million m³ a year, BSBios believes that within a few years, rapeseed might account for up to half its raw material.

The companies' partnerships with local producers have increased at a fast pace. While it excites farmers that are looking for alternatives to wheat and income that may complement that generated by soybean, it creates risks. A processing company with a 160-million-litre capacity may face problems with its raw material and review its plans. Farmers who choose to plant all the area with one crop that they do not know and then face difficulties are in a completely different situation.

In 2007, BSBios' partnerships with local producers to plant rapeseed reached about 3 thousand hectares. In 2008, that figure more than doubled, reaching about 6,200 hectares. And in 2009, the expectation was to keep the rhythm of growth and get to 15 thousand hectares, but because of strong drought, the area remained about 9.5 thousand hectares.

Founded in 2005, BSBios has shown a major appetite for new opportunities. In 2009, the company purchased a unit to produce biodiesel in Marialva, PR, originally belonging to the Agrenco business group, which started the construction but faced difficulties and sold the plant. The unit will be called BSBios Marialva and should have the same capacity of 159 million m³.

In the Passo Fundo unit, in July 2009, the construction site was busy, with works on an extraction unit to crush raw materials near the processing plant. That unit, which can crush up to 3 thousand tons a day, will help the company to reduce its costs and increase profits. Nowadays, BSBios buys raw oil to make biodiesel or buys soybean and other grains, and then outsources crushing. Before that, the company used to buy about 2/3 of raw material in oil, which increased costs. In 2009, it chose to lease a crushing unit in Estrela, RS, from Granóleo, with capacity to crush 1.5 tons a day, and then started to buy virtually 100% of what it uses in grain.

"In terms of raw materials, what drives us is soybean", explains Fabio Benin, agronomist who works for BSBios' advancement area. Translating that as numbers, what drives the company is about 9-10 million sacks of soybean a year, that is, 600 tons. It uses 300-350 thousand litres of raw oil or 1.5 tons of soybean a day, or 25 sacks of soybean.

BSBios' soybean supplies come from a radius of about 100 km from the company, covering a total of about 50 towns, whose centres are Passo Fundo, Carazinho, Não-me-toque, Soledade, Tapejara, Erechim, Lagoa Vermelha, and Cruz Alta.

Rapeseed used in the unit, in turn, comes from a broader radius. It is a use model for a time of structuring the company. Among

the crops that it could use to complement soybean (such as rapeseed, sunflower, castor bean, and hantsley), priority was given to rapeseed for some reasons. For instance, there is more knowledge about that crop and its cultivation possibilities. According to Benin, sunflower could cause damages to soybean by delaying the plantation. Castor bean, in turn, has been dismissed because it is planted at the same time of year as soybean, its storage facilities are very different, etc.

► Foreign and familiar

Nevertheless, one of the core factors that led BSBios to use rapeseed - maybe the main one - is the European oil standard, the colza oil, to which Brazil's rapeseed oil is much closer, thus allowing it to enter an important market. "We are in a stage of structuring, studying technologies, etc." explains Benin. "Now is the time to grow, see the gains, the difficulties, and other aspects", he goes on, adding that "in the medium run, we can think 50-50". That is, there is a perspective for choosing their raw material that points out to exports of a large part of the company's output.

At the domestic level, the search for foreign markets comes together with establishing a strong relationship with family farmers, basically through large co-operatives. That can guarantee the company the tax incentives and other benefits provided by the PNPB's Social Seal. In Brazil's Southern region, the programme's rules establish a minimum 30% of raw material used by companies coming from family farming.

In 2007, the company received 42% of its raw materials from family farming. In 2008, that share fell to 13.14%. And in 2009, indicators collected by August pointed to a strong recovery in the area, with purchase of 37% from family farmers up to that month.

According to Benin, between 2007 and 2009, "The relationship with farmers has evolved considerably". He points out that in Southern Brazil, co-operatives play a very important role in terms of integrating production and providing assistance to producers. According to his estimates, only the six largest co-operatives with which BSBios work gather 30 thousand producers.

"We buy a lot of soy from family farmers' co-operatives, such as CAMILA (from Lagoa Vermelha), COTAPEL (Tapejara), COTREJAL (Não-me-toque), COOAGRISOL (Soledade), and COOTREL (Erechim)", he lists. Besides, in its oil purchases, BSBios is supplied by others like COOPERALFA (from Chapecó) and COOCEAGRO (Cruz Alta). The destination of the company's production in ANP auctions has been basically Petrobras refineries in the Southern region.

► Producers are enthusiastic

Alceu Martinelli, a family farmer from the town of Colorado, about 80 km from Passo Fundo, is one of BSBios' partners in production of rapeseed for biodiesel. He gets excited with the perspectives brought by the new crop. "Rapeseed is a rustic, strong, resistant, plant, it only has problems with caterpillars". For him, the crop also offers the option of rotation with soybean and others that are typical of the region, thus allowing an extra income for producers.

In the 2009/2010 harvest, Martinelli had 25 hectares planted with rapeseed, 24 hectares with wheat and 16 with linseed. "In the

next harvest, I intend to plant almost the whole area with rapeseed, which has a fixed price guaranteed by BSBios", he explains, showing that his options come not only from rapeseed's advantages, but also from the difficulties faced by wheat farmers. The expectation of dedicating about 60 hectares to rapeseed next year, reducing or at least keeping the linseed and wheat areas is explained by Martinelli in a very objective way. "Prices of wheat sold to co-operatives are not good", he says, adding that he is looking for alternatives. "You don't harvest oat, you don't take advantage of it. Rapeseed, in turn, you use and as soon as it goes, you plant soybean".

Besides having the minimum price guaranteed by BSBios, local producers have technical support provided by the company itself and the co-operatives, such as COTREJAL. Martinelli points out that "the price of the [60 kg] rapeseed sack sells for about the same as soybean. And with 12-13 sacks per hectare you can already pay for the costs". According to him, "you need 30 to 35 sacks to pay the costs. In today's scenario, the profits provided by rapeseed to Martinelli "virtually double compared to wheat", and the average output in his area has been 30 sacks per hectare.

According to Matheus Sartori, from BSBios' advancement department, producers who have planted rapeseed for a longer time are dedicating 1/3 of their area to it, "or even more, because they are aware of its direct and indirect benefits". However, since many of them started planting in 2009, Sartori believes that the average area dedicated to the crop is between 10 and 15% of the total planted area.

As can be seen, rapeseed achieves new status within a perspective of growth in absolute terms and also in relative terms in the properties of each small farmer who is a partner to BSBios. It remains to be seen how that expansion by rapeseed will take place, firstly to see if there will be producers investing all of their resources and areas in one only crop, and secondly, for rapeseed not to be implemented in the South with the same model used - and questioned - for soybean. Given the risks of consolidating a new monoculture in the region, it is crucial to monitor the possible impacts on the climate and the balance of the Pampa biome, which has been hit so hardly by human action¹⁵.

Finally, it seems to be highly relevant to follow the warning by Gilberto Omar Tomm, a researcher with EMBRAPA Wheat, on how producers should be careful to reduce their risks and achieve better results. Basically, Tomm recommends that farmers do not put all their land to a single crop, rather choosing diversification and better techniques for soil management - perspectives that tobacco producers from the area of Santa Cruz do Sul, RS, also start considering.

CHAPTER_3 RECOMMENDATIONS

Integration of small farmers to sunflower's and rapeseed's production chains should serve the interests of both the industry and farmers. For that, it is crucial that producers have access to the necessary information and technology about their respective crops.

The expansion of those two crops should take place according to new models that do not repeat the troubling impacts -especially social, labour and environmental - impacts of soybean and sugarcane's growth, among others.

Given the destruction suffered by Pampa, it is recommendable that rapeseed's expansion be closely monitored in order to guarantee that the crop's advancement does not lead to even more devastation. The same should be sought for sunflower, both in Pampa and in Cerrado.

BSBios' unit in Passo Fundo, RS chooses rapeseed



- 1 Marina Silva: Riscos e oportunidades do dendê, Terra Magazine, 26.04.2009 - <http://terramagazine.terra.com.br/interna/0,,OI3135441-EI11691,00-Riscos+e+oportunidades+do+dende.html>
- 2 Governo expandirá dendê na Amazônia - Folha Online, 06.04.2009 - <http://www1.folha.uol.com.br/folha/ambiente/ult10007u546684.shtml>
- 3 Scot Consultoria, *A Hora da Conta* report, **Amigos da Terra Amazônia Brasileira**, abril 2009
- 4 Abiove (Associação das Indústrias de Óleos Vegetais)
- 5 In January 2008, EMBRAPA started planting 75 thousand seedlings of oil palm in areas of family farming in the Alto Solimões, as part of project "Validation of technologies to produce palm oil for biodiesel by family farmers in the state of Amazonas", which includes establishing 500 hectares with oil palm along federal road BR 307, which connects the towns of Atalaia do Norte and Benjamin Constant, initially benefiting 100 families.
- 6 *O Brasil dos Agrocombustíveis: Os Impactos das Lavouras sobre a Terra, o Meio e a Sociedade Volume 2 - Palmáceas, Algodão, Milho e Pinhão-Manso 2008 - Estudo de caso: Braspalma, no Amazonas - Pequenos agricultores podem perder suas lavouras* - http://www.reporterbrasil.org.br/documentos/o_brasil_dos_agrocombustiveis_v2.pdf
- 7 One of the government's most successful social projects, the rural electrification Luz para Todos (Light for all) connected about 2 million homes between 2004, when it was launched and June 2009, according to data from the Ministério das Minas e Energia
- 8 **Cenbio:** *Uso de óleo de palma "in natura" como combustível em comunidades isoladas da Amazônia - novembro de 2005* - http://cenbio.iee.usp.br/download/projetos/provegam_bj.pdf
- 9 **Victor Hugo da Silva Rosa:** *Energia elétrica renovável em pequenas comunidades no Brasil: em busca de um modelo sustentável - abril/2007* - http://bdtd.bce.unb.br/tesesimplificado/tde_busca/arquivo.php?codArquivo=2106
- 10 **ABPPM: Programa Acelerado de Cultivo do Pinhão-manso-PAC do Pinhão-manso** (*Jatropha curcas* L.), 15.12.2008 - http://www.abppm.com.br/carta_lula/carta_lula.htm
- 11 *Trabalho degradante é flagrado no cultivo de pinhão-manso*, 09.03.2009 - <http://www.reporterbrasil.org.br/exibe.php?id=1523>
- 12 *Superintendência liberta 280 de fazenda de pinhão-manso*, 20.03.2009 - <http://www.reporterbrasil.org.br/exibe.php?id=1532>
- 13 *Saudibras: quem somos*, setembro de 2008 - <http://www.bioenergy-world.com/americas/2008/IMG/pdf/Orbeid-Binzagr-Saudibras.pdf>
- 14 A tools by which cities with effective environmental actions (such as increasing basic sanitation and maintenance of conservation units) receive from the state a larger share of the state sales tax, ICMS. Originally created by the state of Paraná in 1991, the Ecological ICMS has been approved also by São Paulo, Minas Gerais, Rio de Janeiro, Pernambuco, Mato Grosso, Mato Grosso do Sul, Amapá, Rio Grande do Sul, Tocantins, Acre, Ceará, and Rondônia

15 Data from the Ministry of the Environment point that, until 2002, Cerrado had already lost 39% of its original cover. Pampa, a biome highly threatened by the expansion of soybean, had lost nearly half of its original extension while Caatinga, threatened to a lesser degree by the monoculture, had lost 36%. The Atlantic Forest is the biome with the most devastated native vegetation, having lost 73% of its original vegetal cover. And Pantanal is the most preserved extra-Amazon biome, with 87% of its native cover intact.