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Amazon Rainforest Current Threats: The Soybean Boom

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Introduction

Amazon Rainforest is endowed with a wide range of natural resources. Ancestral communities depended on the forest for their livelihoods and displayed a good repertoire of imaginative forms of resource management, adapted to climate extremes in temperature and rainfall. From the midst of the twentieth century, however, the rainforest became a labour safety valve, perceived as a gigantic reserve of soil for the landless and unemployed Brazilian households. A network of roads has been devised in the 1950s and 60s and opened through the forest during the 1970s, alongside which Public Integrated Colonisation Projects (PIC's) have permitted to settle destitute farmers from North-Eastern Brazil, over 100 ha plots (BECKER, 1998). During the 1980s, a shift in policy favoured large-scale agro-industrial programmes, major public and private efforts to develop Brazilian northern frontier, seen as good opportunities for socioeconomic advancement in the whole country, such as the Great Carajás (Pará state) targeting iron ore exploitation. The mineral poles created within the rainforest further required fresh produce and meat, stimulating extensive cattle farming over the Belém-Brasília road, the first terrestrial connection established within Amazon rainforest (1959). Following the trend, in 1998 Pará state exported its first shipment of soybeans, a crop introduced with success alongside the Araguaia-Tocantins watercourse that quickly pulled out most of former farming projects. Currently soybean cultivation has been expanding via Cerrado (savannah) over the Cuiabá-Santarém road (BR-163), which connects the interior champion state of grain production, Mato Grosso, to an Amazon River fluvial port city, shortening the 3,000 km previously covered by commodities to the port of Santos (S. Paulo) to scarcer 700 kilometres.

Methods

The study followed the procedural sequence listed: (i) Literature survey, comprising historical documentation available on the lower Amazon forest environments using Portuguese and Brazilian archives and institutional library manual as printed sources; (ii) Fieldwork, including fifty in-depth interviews to four categories of informants in the municipality of Santarém (Pará state, part of the Amazon), extracted during 2006 and 2007, plus ten additional ones recorded at Brasilia in 2008, within the Federal District and Goiás state (Central-West Region). The first informants were national, regional and local authorities, a quest to get a picture of current policy approaches to development. The second group was judges and lawmakers, technicians and university scholars, in particular agrarian sciences experts, whose insight contribution was decisive to understand the environmental status of the geographical spaces under scrutiny. The third group involved artisans, traders and service providers from the urban realm, an insight over urban livelihoods and an examination of their perception of the rural realm.

Last but not least thirty-seven household surveys were conducted in the Amazon and Central-West Regions: a) the floodplains of Nova, Maicá and Ituqui Islands, and along the Igarapé-Açu, a

water channel located in the mouth of Tapajós where it meets the Amazon River, in the municipality of Santarém; b) at Alto Paraíso (Goiás) and Federal District farms where flower, fruit and horticulture producers plus soybeans farmers and seed growers added their insight. Interviewing paid an important role though, making sampling measurement techniques possible in the case studies. Furthermore we've used photographic and video graphic techniques in order to register and build a database. The archival, documental and recent scientific literature analysis has been fundamental to fully develop the ongoing ethno-geographic research (MADALENO, 2008).

Results

Research has focused two types of farming systems: A) Subsistence livelihoods from Caboclo settlements existent alongside the Amazon River; B) Recent agribusinesses settled all along the BR-163. Regarding the first system, households were examined during the dry season (from July through September), over two subsequent years (2006-2007), called on the shack used during the cropping period, for during the rainy season they displace their belongings to safe upland, *terra firme* (located above 10 meters high). Lower Amazon Nova, Maicá and Ituqui fluvial islands as Igarapé-Açu ("Great Channel" in *Tupi* language) are located in the municipality of Santarém, Pará, and mixed Indian and white farmers that occupy the islands whenever the water level falls (about 7 meters) harvest melons, water melons, corn, cassava and horticulture species in order to sell them on the nearby city markets. With two exceptions of male farmers living on high ground year-round and travelling to the floodplains everyday, during the cropping period, the remainder thirty interviewed households (on a co-operative manner) spent about 7 months on the fluvial islands and Igarapé-Açu margins, cleaning-up the soil, sowing, planting and tending both subsistence and commercial crops (see Table 1). Nova has the only community with no tropical forest species on hand for the island has emerged from the Amazon River less than a decade ago.

Table 1: Gender labour division in case-studied Amazon River Floodplains

Tasks	Nova Island		Igarapé-Açu		Maicá Island		Ituqui Island	
	M	F	M	F	M	F	M	F
I. Subsistence								
1.Fishing	X		X		X	X	X	X
2.Food crops	X	X	X	X	X	X	X	X
3.Commercial crops	X		X	X	X	X	X	X
4.Animal husbandry	X		X		X	X	X	X
5.Extractivism			X	X	X	X	X	X
6.Hunting	X	X	X	X	X	X	X	X
II. Artefacts								
7.Fishing nets	X		X		X	X	X	X
8.Feather and seed earrings		X		X		X		X
9.Buffalo cheese		X		X		X		X
10.Canoo builders			X		X	X		
III. Trade	X	X	X	X	X	X	X	X

Source: 2006-2007 household surveys

M = Males

F = Females

Caboclos are also small scaled chicken, duck, and goat, pork, buffalo and cattle raisers. They tend to be cowboys during the rainy season, service providers for landlords, less because of the income but mostly in order to secure their families on a wild and remote Brazilian territory, ravaged by landownership conflicts. Caboclo women produce fine cheese they sell on the streets of Santarém using buffalo milk together with appreciated feather and seed earrings. Communities present linear layout along the Amazon River and its numerous channels, the plots averaging two

hectares. Riverside communities see nature in an integrative fashion because rivers, forests, fish and wildlife constitute food sources and income. A changing pattern is evident at Ituqui Island, though, the widest fluvial setting researched (20,000 ha), in favour of commercial fishing, traditionally practised to feed households and supplement income in times of hardship.

B) Built-up under military engineers expertise (BECs) the BR-163 has been inaugurated in 1976 during a dictatorial regime (1964-1984) and soon became the best colonization path for innovative Centre and Southern Brazilian entrepreneurs, responsible not only for the new agribusinesses but also for the birth of new Mato Grosso cities such as Sinop, Alta Floresta and Sorriso, the “Soybeans Capital”. Scarce environmental control, public incentives to soy production and raising commodity prices have favoured the Amazon Rainforest trend towards the port-city of Santarém. As the 2008 Centre-West interviews have added, deforestation paces are shrinking in time and labour: In 1970 six men with axes would need a week to slash 1 ha of rainforest; then they would wait for about a month in order to set fire to the pretended farming area. These days airplane thrown chemicals can destroy 100 ha of tropical forest on half a day!

Discussion

Introduced in 1908 by Japanese immigrants, soybeans have expanded northwards from Rio Grande do Sul (the Southernmost Brazilian state) across Santa Catarina and Paraná, a process enhanced after the 1929 crash and the Great Depression, due to the pressing need of cooking oil and fodder. Following the Second World War the soybeans further reached the Central-West Brazilian states, setting up in interior Brazil together with the new capital city – Brasilia. As far as soy is concerned the integration of formerly low densely populated areas in Brazil has registered enormous success in Mato Grosso state, located North-West of Brasilia, which is part of the so-called Legal Amazon; That’s because new heat resistant seed varieties have been developed both by private and public research during the 1980s and 1990s permitting the crop to shift from temperate to tropical areas.

From interior Brazilian states soybeans conquered the dry tropical North-Eastern Region where nowadays they are cropped in huge farms at Bahia, Piauí and Maranhão. Currently about 60% of the fields are seeded with genetically modified seeds (GMS), comprising 30 varieties that contain the Roundup Ready of Monsanto, further adapted by EMBRAPA SOY (the Brazilian public soy transgenic seeds research pole) to three different tropical climate environments: 1. Dry North-East; 2. Dry Central-West highlands; 3. Humid and hot Amazon areas, which adopted the “Tracajá” variety, now the most planted in Northern Brazil (about 90% of the soy fields). The heat-resistant varieties have been tested from the late 1980s to the dawn of the 21st century, when the “wonder soybeans” definitely penetrated the final frontier – the Amazon Rainforest: Roraima state (1988), Tocantins (1989), Pará (1998) and Rondônia (2001) are now the main drivers of grain production in the country. Pioneers from Southern Brazil possess 800 to 10,000 hectare farms and they are currently attracted by low-cost or no one’s primary forest land, bringing together machinery, fertilisers and chemical industries (see table 2). They usually sell their produce to *Cooperativa Grão Norte* or to the *Maggi Group*, which owner is the richest single Brazilian soy producer and is now Governor of Mato Grosso state (GAZETA, 2007).

Table 2: Deforestation trends in hectares – Pará State and Amazonia

Spatial Units	1978	1988	1990	1995	2000	1988-00
Para state	56,400	131,500	144,200	169,007	200,118	1,984,621
Amazonia	152,200	377,500	415,200	497,055	587,727	5,776,652

Source: Homma 2003

Whenever and wherever there is road soy follows suit. Brazil produced 58 millions and Amazon Region alone harvested 1,079 thousand tons of soybeans in 2007(GAZETA, 2007). The yield is the highest in the country – 3,070 kg per hectare. Table 3 presents official data of farmed areas in 2007 (IBGE, 2007). The last two years (2006/07 and 2007/08) the sought after new farming areas

has dramatically increased for soybeans diseases have obliged the government to impose a 4 to 6 months sanitary void after each crop. Additional deforestation gives path to new farming spaces, incorporated because they constitute uncontaminated soils. Besides soy, deforested areas also produce corn, sugar cane and rice, as well as pasture for cattle, the latest business having for long been introduced in Lower Amazon River Marajó Island and persevering along the Belém-Brasília road (MADALENO, 1998). Brazil is the first world exporter of the highly valuable commodity under study and its expansionism has stirred a revolution, causing rural populations to move to cities and towns for soybean farms are extensive and capital intensive businesses that expel subsistence smallholders, oust family farming and force out impoverished illegal plot farmers and small cattle raisers, mostly alongside the BR-163 – connecting Cuiabá (Mato Grosso state capital city) to Santarém (Pará state, as said), known as “The Soy Road” (CARNEIRO, 2005). Interviews extracted from Central-West and Amazon residents have revealed the rainy season is shrinking to about 3-4 months a year, the humidity during the driest season being so low (less than 20%) that high 30° temperatures make breathing difficult. Rivers are falling short of water in interior Brazilian states, where Araguaia-Tocantins Basin and most Amazon River tributaries feed. Soil conversion is augmenting alongside BR-230 (Trans-Amazon), BR-010 (Belém-Brasília) and BR-163 (Cuiabá-Santarém) with extensive deforestation, savannization and increasing degradation of formerly primary forest covered soils.

Table 3: Soybeans per farmed area and region in 2007

Spatial Units <i>Regions</i>	Brazil	North (Amazon Region)	Northeast	Southeast	South	Central-West
Hectares of soybeans	20, 518, 535	414, 006	1, 451, 325	1, 401, 395	8, 211, 050	9, 040, 759
Hectares of grain and oilseeds	36, 335, 844	1, 429, 437	6, 470, 178	4, 000, 016	13, 356, 983	11, 079, 230
% soybeans	56.5	29	22.4	35	61.5	81.6

Source: IBGE 2007

Conclusions and Future Prospects

The next challenge will be to connect Atlantic Itaqui port (Maranhão state) to Anapolis (Goiás), using the pre-existing mineral Carajás railway, (in operation from the 1980s), to export soybeans to Europe and USA either, which is part of a terrestrial gigantic transport infrastructure under completion (North-South Railway) that will solve logistics problems posed by the 1970s unpaved roads within Amazon rainforest as well as anticipating the planned fluvial pathways that have been designed to link up neighbouring Amazon countries and Brazil to the Atlantic Ocean. Sometimes rotating with corn, soybeans are chained to poultry and pig industries, more recently also to oil and bio-fuel production, justifying a national strategy towards subsidised farming and weighty international trading support (Cargill and Monsanto), fuelled by high commodity prices, illustrated through the option for this crop all over the biggest South American country (56.5% of all grains and oilseeds farmed in 2007), in detriment of nature conservation and forgetfulness of former ecological commitments. Economically doomed, Amazon rainforest follows short Cerrado’s fate and is politically considered a collateral damage of progress.

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