Pecuarização na Amazônia e Consumo de Carne: o que está por trás?

Grassification of the Amazon Region and Meat Consumption: What is behind?

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Resumo

O artigo discute o avanço da fronteira agropecuária para dentro da floresta Amazônica, motivado, em grande parte, pelo aumento do consumo de carne bovina e por sua ineficiência na produção de proteínas. A metodologia constou de levantamento bibliográfico e de dados secundários e de campo no município de Xapuri, Acre, onde o fenômeno da pecuarização é bastante intenso, inclusive na Reserva Extrativista Chico Mendes. Em Xapuri, foram entrevistados diferentes atores sociais sobre a motivação para a introdução da pecuária no município e na reserva Chico Mendes. Resultados indicaram fatores históricos, de mercado econômico e de consumo como os principais propulsores. A redução do consumo de carne e seus derivados poderia diminuir a pressão sobre a floresta Amazônica, bem como políticas de incentivo às atividades extrativas.

Palavras-chave: Consumo de carne; Pecuarização; Desmatamento; Acre; Xapuri.

Abstract

The article discusses the increased grassification and deforestation of the Amazon Forest, related to cattle breeding and motivated by increased meat consumption and its inefficiency in protein production. Methods consisted of literature review, data collection and fieldwork in the municipality of Xapuri, State of Acre, where the grassification process is very intense, even at the Chico Mendes Extractivist Reserve. In Xapuri, different social actors were interviewed about their reasons to introduce cattle breeding in the municipality and inside the Chico Mendes Reserve. Results indicated historical, economic and consumer market factors as the main causes. The reduction in meat consumption and incentives for extractivist products might reduce pressure on the Amazon forest.

Keywords: Meat Consumption; Grassification; Deforestation; Acre; Xapuri.

Introduction

We live in a time, in human history, in which our actions have deep impact on the planet's health. In the 1980's, sustainable development became a new international paradigm. It has been pointed out by Agenda 21, the main document of United Nations Conference on Environment and Development, among other things, the "need of reducing and eliminating unsustainable patterns of production and consumption" (Lago, 2007, p. 83). Unsustainable consumption could be defined as the one that goes beyond basic needs and of the intrinsic functions of goods and services. According to the *Planning for Change* report (UNEP, 2008), sustainable consumption is formed by consumption habits that take into account the life cycle of the products, and incorporate more efficient use of natural resources, renewable or not.

Paradoxically, there are side by side two scenarios: on one side, consumerist exaggeration of today's society; on the other, misery and hunger still persists. In 2006, world's global grain production was around 2 billion tons. But, according to FAO (Food and Agriculture Organization of the United Nations), in the period 2001 – 2003, 854 million people were suffering from hunger in the world (FAO, 2006). Disparities like those lead to the questioning of the current productive process, in which billions of tons of grains, instead of being used to feed the part of the population that suffers from hunger, are used to feed animals for the production of meat, milk, leather and byproducts. On the other hand, there are environment and health negative impacts, caused by the excessive consumption of meat. However, the world meat consumption quadruplicated in the last 50 years. According to FAO, in 2006 there were 20 billion heads of cattle in the planet, three times the number of inhabitants (FAO, 2006). The Worldwatch Institute (2004) pointed that in United States of America the consumption of pork and beef tripled since 1970, whereas in Asia it doubled in the same period. The growth in beef consumption has remained significant, even in the light of new evidences of health hazards caused by this type of diet and the severe environmental impact caused by its production. Besides, there are increasing di-

fficulties to offer feeding and water supply to cattle herds in a world where hunger and scarcity of water are growing problems, yet unsolved.

A great deal of world's grain production is intended to feeding animals for slaughter. These grains, turned into ration, waste huge quantities of nutrients that would be better used if distributed directly to human populations. Furthermore, these grains derive increasingly from lands which used to house biomes such as the *cerrado* (inner lands bushy Brazilian vegetation) and forest. Cattle have also advanced in these biomes, being regarded as one of the leading factors of Amazon's deforestation in the last years (Smeraldi and May, 2008). It is estimated that 70% of deforestation in Legal Amazon is caused by the opening of pasture (Smeraldi and May, 2008).

The minimal individual daily caloric needs, according to FAO, vary from region to region; in Brazil, it is around 1,900 kcal/person/day, in average. The world's caloric need is estimated in 6 quadrillion kcal/year, and total caloric production in 2005 was of 7.5 quadrillion calories[1]. Therefore, there is a surplus in global production of approximately 1.5 quadrillion calories (FAO, 2002).

If one looks at meat production, it is estimated that 17 kcal of grains are necessary to feed bovine cattle for the production of 1 kcal of meat[2], which represents a waste of food resources. One hectare of land used for livestock produces 34 kg of meat, whereas one hectare used for grain crops produces 6,548 kg of corn, or 2,512 kg of soya, or 3,675 kg of rice or 3,816 kg of beans. In addition to that, grains offer more calories than beef: every kg of corn offers 3,610 kcal, of rice, 3,570 kcal, and of meat, 2,100 kcal. According to Webster (1994, p. 265), "no form of animal production reaches an efficiency of 20% on converting the food used to nourishing animals in human aliment when the costs of feeding the animals are taken into account". Less intensive meat production processes, such as cattle in pastures, are not only inefficient in converting animal food to human aliment, but also generate a high expenditure of fossil fuel in transportation (Webster, 1994, p. 266). This inefficiency in beef protein production increases the environmental impact of meat based diets, as well as causing a magnification in socioeconomic issues: because it needs larger land extensions for its production, cattle raising turns land more expensive and scarce, due to the fact that the largest portion of grains and cereals is sent to cattle raising. Add to this other environmental impacts caused by the production of animals for slaughter, such as deforestation, large water consumption and greenhouse effect gas emission. This paper intends to discuss cattle raising related factors which contribute to Amazon deforestation through the vision of varied social actors involved in the process.

Methods

A review of literature was made at *Web of Science* and *Medline*, using the following key words: deforestation, Amazon, hunger, meat consumption, sustainable consumption. Exploratory qualitative research method was used, considered adequate to the interdisciplinary nature of the theme, which is still little studied. To understand the dynamics of grassification, bibliography and documents reviews were conducted at the Marina Silva Library, in Rio Branco, Acre, in the Amazon. A field research with case study methodology was conducted at a region liable to the process of grassification. In order to do that, we chose a qualitative approach, conducting open, semi-structured interviews with nine key individuals at Xapuri, Acre, which is located inside the Chico Mendes Extractive Reserve (Resex), in February 2010. Xapuri was chosen because it is a place where resident families should make their living off natural products extracted from the forest; however, this is being replaced by livestock, which leads to deforestation. The interviews allowed us to understand the hardships faced by the Reserve inhabitants and the reasons why they changed to livestock. This research was approved by the Public Health Faculty's Ethics in Research Committee.

1 Available at: <http://www.fao.org/es/ess/faostat/foodsecurity/Files/Population_es.xls>. Accessed in: Jul 21st 2008.

2 According to *Portal do Agronegócio*. Available at: <www.portaldoagronegocio.com.br>. Accessed in July 23rd 2008.

Deforestation and livestock in Amazon

Legal Amazon occupies an area of more than 5 million square kilometers (Fearnside, 2007), most of which are covered by tropical rainforest, whose characteristics is a great biodiversity of ecosystems, species and genetics' diversity inside the same species, as well as a high degree of endemism. Is spite of high primary productivity, rainforests are fragile ecosystems, as their efficiency is related to their own biodiversity and structural complexity. Because of that, their change into pastures is troublesome and difficult to reverse.

In the Amazonian countries, cattle have always been related to territorial appropriation, as a mechanism of land occupation (Mast, 2006).

From the 1970's onwards, Amazon became the mobile frontier of economical and demographical expansion, being occupied according to the external demands of the forest's natural capital: either to the use of its area for the expansion of soya and cattle, or to the valuation of its natural products, of which the biggest example is the carbon market (Becker, 2005, p. 72-80). The Amazon frontier is also known as "arch of fire", since the occupation is made through deforestation (Becker, 2005, p. 81). According to Becker (2005, p. 82), there is "a gigantic conflict" between, on one side, soya agribusiness, cattle and timber industry, and, on the other side, the conservationist use of the forest, endorsed by family production, environmentalists and many scientists. According to the same author, this frontier does not follow a linear pattern, as it expands or diminishes according to the economical and political conjunctures of a given historical moment. Pastures implantation in the region is traditionally made through the sequence of clearing of the trees, burning of the biomass and planting grass.

In spite of presenting a high annual growth in the region, Amazon livestock has always been a poor productive activity, its productivity being always smaller than the nation average (Fearnside, 1979). After the decade of the 1980's, growth rates of cattle in the Amazon have increased, significantly contributing to deforestation. Since then, cattle growth in Brazil has happened inside the Amazon region, and it's been pointed as one of the major causes of deforestation in the region. According to a report by the nongovernmental organization *Amigos da Terra* called "The Kingdom of Cattle" (Smeraldi and May, 2008), 720,000 square kilometers was the estimated area cleared in the forest, which corresponds to 18% of the total. 74% of this is estimated to be used for pastures – 53 million hectares. Approximately 253 thousand square kilometers of the Amazon area were occupied by pastures between 1990 and 2006, and the Amazon livestock grew 180% in the same period.

Forests have a more fertile soil than the *cerrado*, and data show that Brazilian cattle are being displaced from the south-east and west-central regions towards the Amazon. From 2003 to 2006, Brazilian livestock outside Amazon remained practically stable; 96% of its growth was due to the growth of forests' livestock, which reached 74 million

animals, an average of 3.3 cattle per inhabitant (Smeraldi and May, 2008). In 2007, 41% of Brazilian's cattle were in legal Amazon, compared to 34% in 2004. On the other hand, Brazilian's beef production jumped from 4.1 million tons in 1990 to 9 million tons in 2007, and beef export had a growth of 126% between 2002 and 2006. Breeders moved towards Amazon, where the land is sold by such a low price that its impact in costs of production is almost negligible. According to IMAZON, a nongovernmental organization, the majority of beef produced in deforestation lands in Amazon is consumed in the south-east, and only 5% is exported. From the 95% consumed within the internal market, 70% go to the south-east and 12% feed population located in legal Amazon. Brazil is the second biggest beef producer in the world, and the biggest exporter. In 2007, more than 33% of Brazilian exported beef came from legal Amazon (Smeraldi and May, 2008). Most of the beef is sold *in natura* (82%), with small production added value and few jobs created.

In view of the exposed, it becomes clear that deforestation in Amazon is strongly related to the expansion of cattle in the region. Alencar et al (2004, p. 25) report that the three major causes of deforestation are: the grassification, the clearing for family farming and for grain production by the agribusiness. Of the three, creation of pastures is predominant. Wood extraction historically repre-

sents an important source of capital for breeders, as it offers the infrastructure needed for establishing livestock (Ribeiro, 2008).

41% of all cattle slaughter in Brazil in 2007 was made in Amazon, compared to 34% in 2004. This is due to the increasing number of slaughterhouses and the arrival of the 5 biggest Brazilian groups of beef exports (Ribeiro, 2008, p. 17). The total area occupied by pastures also had an increase, from 61 million hectares in 1996 to 70 million hectares in 2006 (IBGE, 2006). Besides, cattle have acquired a growing participation in family production in settlement projects and in extraction communities (Ribeiro, 2008). Even the Extractive Reserves (Resex) are giving in to the pressure of cattle for slaughter, and in some of them there is an equal or superior number of cattle when compared to people[3], particularly in Acre and in Rondonia.

This is the reason why we opted to focus this study on Acre, located east of the Amazon and having frontiers with Amazon, Peru and Bolivia.

The Acre case: its characteristics and the process of grassification

In the Amazon region, Acre is one of the states that presents one of the greatest biodiversity, and the smallest rate of deforestation – 88% of its forests are preserved (Acre. ZEE-Acre, Fase II, 2006[4]). However, there are many agricultural and livestock development projects, as well as rural settlements or colonization plans created by INCRA (*Instituto Nacional de Colonização e Reforma Agrária* – National Institute for Colonization and Land Reform) since the 1970's, installed in areas of high risk of erosion (Acre. ZEE-Acre, Fase II, 2006, p. 282). In the last decades, exodus of settled families was seen, due to their "poor living conditions, the reduced soil aptitudes and the lack of socioeconomic infrastructure" (Acre. ZEE-Acre, Fase II, 2006, p. 282-283). This fact contributes to land concentration and cattle expansion.

Up to 2004, pastures occupied an area of 13,352.2 square kilometers, or 81.2% of total deforested area. The period between 1989 and 2004 registered the biggest growth rate of pastures among all the activities of the state – 8,981.53 km2 – showing the expansion of livestock. Big farms had beef cattle, and settlement projects had beef and dairy cattle.

The beginning of the deforestation process in Acre was related to geopolitical strategies of the federal government in frontier areas during the 1970's, and had a strong relationship with big agricultural and livestock investments in the 1980's. Since then, deforestation dynamics is changing. According to the Economical Ecologic Zoning (Acre, 2006, p. 84), in the last years it is happening mostly in the settlement areas along BR 364 and BR 317 highways, in order to install agriculture and cattle, and for wood extraction. Another indicator shows that deforestation in Acre happens, in 60% of the cases, in areas of up to 10 hectares; 35% in areas of 10 to 60 hectares; 5% in areas bigger than 60 hectares (idem, p. 87). In the period of 1998 and 2004, cattle grew from 900 thousand heads to 2.4 million. At the same time, financial investment in form of credits to agriculture and cattle also grew: 22 million *reais* were given by the *Fundo Constitucional do Norte* (Constitutional Fund for the North, FNO) from 1988 to 1998; after 1999, the amount was of 200 million *reais* (ibidem, p. 87). However, even with the increase in the number of cattle and of FNO investments, deforestation rates remained at the same levels over the last 10 years.

Case study: Xapuri, Acre

The small town of Xapuri was founded in 1883, at the confluence of Xapuri and Acre rivers. It has become one of the main Acrean trading posts in the Rubber Cycle, in the XXth century's first years – it was nicknamed "Acre's little princess", for all the wealth generated there by nut and rubber extraction. After the end of this cycle, the city was forgotten. Only in the 1980's it has drawn attentions again, by staging the resistance movement of rubber tappers against grassification, and in defense of native rubber trees of the region. The main leader of this movement, which ended with the creation of extractive reserves by the

3 According to news published by *Valor Econômico* newspaper in the 9th of July 2008.

4 Acre. (Estado). Zoneamento Ecológico-Econômico. Available at: < http://www.bibliotecadafloresta.ac.gov.br/index.php?option=com_content&view=article&id=159&Itemid=58>. Accessed in: Dec 20th 2009.

government, was Xapuri's unionist Chico Mendes. In the town area there are many settlements, such as: the Tupá Settlement Project; the PAE – *Projetos de Assentamento Agroextrativista* (Agricultural and Extraction Settlement Projects) Chico Mendes and Equador; and the Xapuri I and II Agriculture and forest poles. At the Chico Mendes PAE (formerly known as Seringal Cachoeira) live more than 70 families, spread by the *colocações.* Each *colocação* is formed by an area of 300 to 500 ha. According to the Extraction Settlement Projects rules, resident families of *colocações* should make their living off mainly nut and rubber extraction, which would be complemented by subsistence agriculture and cattle, hunting, fishing and small livestock breeding. Together with the settlement projects, two industries were installed in the region: Natex Male Condoms and Xapuri's Floor Factory, both with the objective of generating jobs and revenue and introducing a sustainable use of local natural resources, particularly the rubber tree (INCRA, 1987).

Chico Mendes Extractive Reserve

Chico Mendes Extractive Reserve, located inside the perimeter of Xapuri, was created in 1990. It has an area of 970,570 ha and a population of 9,000 inhabitants – which makes a population density of 0,9 people/km². It is the biggest Extractive Reserve in Brazil, with families distributed among 48 seringals[5] that comprehend approximately 1,100 *colocações*[6] of 672 ha average size (Alechandre et al, 1999, apud Costa, 2000, p. 26). Nowadays, approximately 1,800 families live at Resex Chico Mendes[7]. In this model of extractive reserve, land belongs to federal government, and is given to usufruct of those who work or live there. All reserve dwellers are coresponsible by the execution of its Deployment Plan and its sole beneficiaries. Each rubber tapper plays a role of controller of its own *colocação* and others', and sees that every one meet the standards set through the Deployment Plan. IBAMA – the acronym for Brazilian Institute of Environment and Renewable Natural Resources – is responsible for supervising the compliance to the conditions established by it. If one fails to do so, for instance by provoking damage to the ecosystem, one may be punished by loss of the rights of use. Each family is entitled to only one *colocação*; it has to ensure good conditions of the roads to rubber and nuts trees, which cannot be felled. Deployment Plan allows dwellers to have complementary activities, such as agriculture and small livestock, fishing, cattle and agroforestry, occupying up to 10% of their area. Cattle are allowed to occupy 50% of the complementary activities area, which means 5% of total area. Sustainable extraction of natural resources of the forest must be the way dwellers make their living. According to IBAMA[8], before 1996 only 0.65% of the reserve's area had been deforested; in 2000, anthropic action was noticeable in 1% of the area, and in 16.73% of its outskirts (Costa, 2000). Nowadays, 6.3% of the reserve's forest has been felled. According to *Instituto Chico Mendes*, there are 10,000 heads of cattle in it[9]. IBAMA and Federal Police investigated the reserve in 2008, and found 4,000 heads of cattle and 3,000 hectares deforested[10]. Another source, the IDAF (Instituto de Defesa Agropecuária e Florestal do Acre – Acrean Institut of Agriculture, Cattle and Forest Defense), indicates that there are 8,431 heads of cattle inside the reserve[11], and that the management plan allows the clearance of 15 hectares of forest per *colocação.* This area would be enough for 15 to 30 cattle heads, but there are *colocações* with up to 648 heads; 15% of them would be raising more cattle than the number allowed, risking eviction[12].

5 Ancient production area of native rubber trees in Amazon that reunited the *colocações.*

6 Productive and family unit of a SERINGAL. Each *colocação* has an estimated number of 257 nut trees and of 400 to 500 rubber trees (CNS).

7 TEIXEIRA, Viviane. Levantamento na Reserva Chico Mendes irá traçar perfil da população. Notícias do Acre, Rio Branco, 31st Jan. 2009. Available at: <http://www.agencia.ac.gov.br/index.php?option=com_content&task=view&id=6991&Itemid=26>. Acesso em: 01 fev. 2009

8 Deployment Plan of Chico Mendes reserve. Available at: <http://www.ibama.gov.br/resex/cmendes/hist.htm>. Access em: 03.13.2009.

9 *Folha de São Paulo,* article published in 12.22.2008, p. A9.

10 Idem.

11 *Folha de São Paulo,* article published in 9.21.2008.

12 Idem.

Many times, raising animals in the reserve, particularly cattle, plays a role of savings for emergency needs. Dwellers of the reserve are forced to pay high prices for consumer goods, which are three times more expensive in nearby towns than in bigger metropolitan areas. Besides, latex extraction has limited capacity of increasing their revenues, firstly because prices for rubber are low, secondly because the one extracted at Chico Mendes reserve compete with rubber successfully produced in different locations throughout Brazil. Another important product of the reserve, Brazilian nut, also fails in increasing revenues due to a tight competition for international markets with different, more popular types of nuts.

The interviews allowed us to understand much of the grassification process, as it can be seen below.

Results

We present now the description of some aspects of lives and thoughts of Xapuri's dwellers – of different social extracts –, as expressed in their interviews, which give an account of the complexity and diversity of the situations that they face.

F.N., 36 years old, rubber tapper, was born and has always lived at a *colocação* of 300 hectares at the New Catete Seringal, 10 km away from Xapuri. This Seringal has 15 *colocaçõeS*, being located at the green belt of Chico Mendes Resex. According to him, 8 seringals are located at the green belt. Eight families (circa 30 people) live in his *colocação*, all of them relatives of his father, who has the tenure of the land since he came from the north-east during the year of 1942. All the families live from extracting rubber and nuts, from subsistence farming and cattle (approximately 70). Calves are sold for R$ 350.00 each, to middlemen who resell them to medium and large breeders. After a period of fattening, the latter sell them to Xapuri's or Rio Branco's slaughterhouses.

According to F.N., his family, as well as other families that live at the seringal, do not manage to fatten their calves because they cannot afford it (feed, vaccines and drugs, for instance, are expensive) and because there isn't enough space – burning down the forest to open new pastures has been heavily fined by IBAMA and IMAC[13] (from R$ 60,000 to R$ 120,000[14], in his words) over the last years. Nevertheless, he and his family have been clearing their area since the 1940's, using fire without removing timber before or after burning. "The wood that does not burn is left to rotten". Cleared areas are used for food crops (rice, beans, corn, cassava) for a year – after this period, it either "turns into pastures or is left so that the forest may grow in it". According to F.N., "what is worth more here is cattle", for several reasons. The first one is the price paid by each product. In the past, his family lived only by collecting rubber and nuts, but the prices dropped significantly and led both to the bankruptcy of the Xapuri collectors cooperative and the shutdown of the town's nuts processing plant. Today, the price of pure latex (the "rubber tree milk") is R$ 4.10/kg, which is sold to the preservatives factory (Natex), or R$ 0.90/kg for rubber sold for other ends, such as tires' manufacture. But, according to F.N., there is almost no demand for rubber; besides, to prepare the latex for selling to Natex it's necessary the use of chemicals and technical knowledge which the government is offering to other latex collectors, but have not yet reached the *Seringal Novo Catete.* The price of the nut has also drastically decreased in the last decades. Nowadays, a can of nuts (around 20 liters) is worth R$ 5.00 to R$ 10.00, but it used to be worth R$ 20.00. The second reason to the choice of cattle is the difficulty in transporting the production of rubber and nuts. The rubber tree plantation is around 10 kilometers far from Xapuri; the only road is not paved and crosses the jungle, being impassable during the winter, the rainy season in the region, from September to May. But, according to F.N., in the last years, "winter" only lasts from December to April, due to deforestation and landscape alterations.

Besides, the cost of freight from the city to the rubber tree plantation is R$ 150.00 average, value which in many cases exceeds the sale value of nuts or rubber; this is also the reason why they don't sell

13 IMAC – Instituto de Meio Ambiente do Acre (Acre's Environment Agency).

14 I US$ = 1.7RS$ (real)

timber from deforested areas. On the other hand, calves' freight is paid for by the buyer, which makes this activity even more profitable than the others.

To F.N., people living in the outskirts of the reserve, the so-called "white area", are forgotten by the government and this makes their lives difficult. "We live in the white area; we have no rights, not for the land tenure, nor for financing, nor for housing allowances. We don't have machines, we work a lot, very hard, and sell everything very cheap.[...] There is no way out".

J. R. A., 60, director of the Xapuri Rural Workers Union, says that back in 1987 he already worked with Chico Mendes "to protect the men of the field and forest". Born in Acre, son of northeast-born parents, he has been living for 40 years in an INCRA settlement, the Aquiri, which is located 12 km from Xapuri. J. R. A. says he's one of the last occupants left in the settlement, since "farmers bought almost everything and it became a desert". His land occupies an area of 52 ha; there he raises fish and cultivates rice, beans, cassava and corn; he owns 70 heads of cattle. "However, there is a lot of forest in my *colocação*, even nut trees". J. R. A. has also bought a *colocação* for his children at the Seringal Equador, near Chico Mendes Resex, and there he collects nuts for selling in Xapuri. About the use of fire to control weeds in the pastures, J. R. A. reports that he used to "set fire every year", but stopped four years ago (before 2010, period when the interviews were conducted); for him, "it's better this way, grass grows greener".

According to J.R.A., the only feasible option as economic activity in the region is cattle. "Farming receives no incentive from the government, and producing is more expensive than selling". Moreover, he says that Mato Grosso (Brazil's west-central region state) is a big producer, and supplies Acre with cheap agriculture goods. "Government tried to introduce soya here, but it didn't work out." Sugar cane "works out fine", he says, and 25 years ago a mill was built in the region; a big area was deforested, but the owner went bankrupt and the mill was abandoned. Some years ago, another group took over the mills' management, but environmental license problems have embargoed its operation. J.R.A. is pessimistic about forest handling. He says that last year he sold 36 cubic meters of timber from his children's area, which was extracted according to a management plan, and it was worth only R$ 900.00.

F.A.S., approximately 60 years old, is a Elementary School teacher; he was born in Amazonas and moved to Xapuri when he was seven, as his father bought land in a *seringal.* He left when he was 15 to study in town, and stayed there. F.A.S. still owns a *colocação* at the *seringal,* together with his three brothers. They look after the property as F.A.S. works as a teacher. He and his brothers raise cattle (approximately 50), cultivate rice, beans, cassava, and "extract rubber and nuts". He thinks it is important to preserve the forest, and that nowadays the region inhabitants are "a lot more aware of it". When asked about forest preservation, F.A.S. says that the condom factory was a good initiative of the government, as it has created 180 jobs to Xapuri's dwellers, and because it encourages preservation of the forest, because it pays a good price for rubber. As regarding the floor factory, he is pessimistic, saying that "forest handling is not sustainable; they say it is, but one day they'll see that they have put an end to the forest".

About livestock in the region, his opinion is that "everybody has cattle", due to the public policies in the 1970's, which stimulated cattle and discouraged extraction. Also, says F.A.S., "I saw on TV today that Acre's meat is in the list of the allowed ones for export to Europe". "Nowadays, most of it is exported to China", he explains.

J.C., 64 years old, agriculture and cattle agent of the IDAF – Acrean Institut of Agriculture, Cattle and Forest Defense – was born in Presidente Prudente, São Paulo. He was transferred to Rio Branco in the 1970's, and moved to Xapuri, where he has worked for 35 years in the same position. His duties are related to animal health control in the region, which includes checking cattle vaccination. According to him, there are 1,360 cattle breeders registered, and approximately 200,000 heads of cattle. The majority of it is located in farms situated along BR-317 highway, which connects Rio Branco to Xapuri and Brasileia. According to J.C., most of the states' area still has its native forest preserved, the deforestation is localized only on the road's surroundings. He also reported that the slaughterhouse of Xapuri supplies only the domestic market of the city; most of the

cattle in the region are sent to be slaughtered in Rio Branco, and from there they are sent to "Brazil and the world".

L., 30 years old, veterinarian of the IDAF in Xapuri, is from Paraná but moved to Rio Branco six years ago. In the past five years, he has worked there as a veterinarian; he is responsible for health control of animals in the region. According to L., small farmers are the majority. Most of them are rubber tappers who chose cattle because of the decrease in rubber prices over the last decades. In his opinion, each rubber tapper owns 20 to 30 cattle heads. The few big farmers in the region own 5,000 to 6,000 heads. He says that the rubber tappers sell the calves whilst very young, seven to eight months old, to middlemen who resell them for fattening to bigger breeders in the region. This is due, in his opinion, to the fact that rubber tappers cannot afford freight costs to the slaughterhouses – middlemen go to them to buy their calves. After fattening cattle are sent to be slaughtered at Rio Branco, in slaughterhouses which work under federal supervision, and are finally sent to export.

For L., deforestation in the region hasn't increased over the last years thanks to IBAMA's tighter control, which includes surveillance over the area with airplanes and satellites, the establishment of limits to the size of livestock in the *seringals* ("30 cattle per landowner, in the reserve area"). L. also reports that many small farmers have sold all their cattle recently, because they were afraid of being fined by IBAMA. No limit was put upon big breeders, since they are not located inside the reserve.

He says that pastures in the region lack in minerals, and the resulting deficiencies require mineral supplements. When asked about deforestation in the region, L. says that "livestock has no future in Acre if farmers are allowed to deforest only 20% of their area".

C.Z., around 50 years-old, medium-sized breeder, owns a shop of agricultural and animal products and used to be a city councilman. He lives in Xapuri, and owns 500 cattle heads in an area of 350 ha; his shop is the biggest in town. He came from São Paulo, in the 1970's, following government incentives. C.Z. told us that in those days, government used to pay for people to migrate into Acre, clear the forest and raise cattle. "If one did not deforest, one had to pay very high taxes". According to him, this was a mistake, since "Acre hasn't got a vocation for livestock, Acre's got a vocation for extraction of rubber and nuts. However, Acre's government didn't bother to do the economical-environmental zoning of the region". In his opinion, this is what Chico Mendes use to fight for – the zoning of Acre. "Nowadays", though, "cattle breeders are treated as outlaws by the government". Government agencies make life difficult for breeders, one cannot get a loan; they even took milk out of children's school meals, in order not to stimulate production in the region. Therefore, pastures in Acre are less productive than in others states and less money is paid for its meat, leaving the cattle breeders in the region "with no way out".

C.Z. tells that, according to IBAMA, every property of the region that deforested more than the actual legislation permits will have to reforest part of its lands with governmental funding and that he himself will have to reforest 50% of his property. He will achieve this by planting rubber tree in order to sell latex to the preservative factory in Xapuri. According to him, "the best thing they did was this preservative factory", since it's the largest stimulus for keeping forest areas. "Now everyone will want to plant rubber trees". Regarding the floor factory, C.Z. is not so optimistic, because the forest management is not done properly, and so is not sustainable.

C.Z. denies the use of fire for clearing the area, because IBAMA forbids it. To do that, he clears manually with the sickle or uses herbicides. He also states that the meat produced in Xapuri is consumed internally in Brazil as it's been vetoed by the European Union. The meat is taken to Rio Branco and, from there, to Porto Velho, from where it's transported to Manaus through waterways or to other states by truck.

M.A.M., 50, medium-sized cattle raiser, is from Paraná and came to Acre to raise cattle in 1975, with government incentives. Today, he owns a 350 ha property and 500 heads of cattle. Like C.Z., M.A.M. is pessimistic with the cattle breeding in Acre. He says that the Acrean meat is Brazil's finest, as cattle are raised in a flat area, making the meat soft and tender. However, it's the cheapest meat in Brazil, worth around R$ 4.00/kg. According to him, this is

the result of a state policy which doesn't offer support to local cattle. M.A.M. share C.Z.'s view and says he is treated as a criminal by Acre public organs. He also says that in 35 years he's never fertilized his land and its productivity is declining, but the government doesn't offer financing or technical support to help breeders. "Embrapa – Empresa Brasileira de Pesquisa Agropecuária – never sends its technicians over here". M.A.M. will also have to reforest 50% of his land by 2020 and doesn't use fire for weed control, because "fire in Acre is not allowed anymore, IBAMA is watching".

M.B., 54 years-old, who owns an inn in Xapuri, is Italian, but came 14 years ago, "to see the city where Chico Mendes used to live". His inn is one of the biggest in town. In his opinion, Xapuri is growing a lot over the years. When he moved in, there were no cars or TV sets. However, this growth is largely due to the welfare income offered by the government, as there are no options for income generation "unless one works for the government or has some cattle". Not even tourism generates income in this region. "Tourists over here I've never seen, my clients are always public servants that come for official festivities in the city. That's what the mayor does most, festivities".

Regarding environmental preservation in the region, M.B. says that the situation improved a lot thanks to the action of environmental agencies, like IBAMA. Up to 2005, according to him, every September was marked by the fires in the region. "Everybody set their pastures on fire, and from them rose a copper-colored cloud to the sky. One couldn't even see the sun at noon, because of the smoke". However, in 2005 fire spread and burnt a large part of the reserve, causing a lot of respiratory problems in the population. M.B. says that he knew at least nine children that died of respiratory problems by that time. Since then, government has been a lot more restrictive regarding the use of fire, and smoke clouds are not seen any more in September.

E., 36 years-old, rubber tapper and employee at the inn *Pousada Ecológica do Seringal Cachoeira*, located at Chico Mendes Resex, was born inside the Resex, where he's been living with his family since. He says that in this seringal there are 80 families, each living in a *colocação* of 300 ha, full of rubber and nuts trees. E. says: "we do live off extraction, now that we're aware". At his *colocação*, they grow rice, corn and beans for their own consumption, and extract nuts and rubber which is sold to the condoms factory.

E. told us that the families that live at the seringal receive technical support from Acre's government in order to collect raw rubber for condom production, and this is generating a good income. But the most profitable activity is forest handling that's being done in the region over the last 8 years. E. Says that the wood extracted is certified; all the management is done under supervision of the FSC[15], and the wood sent to Xapuri floor factory.

Acrean government is also financing reforestation of the *colocações* that have more than 20% of their areas deforested. When asked who was responsible for clearing the forest in Seringal Cachoeira, E. declares that "it's been cleared since the time of the comperes". Comperes were the farmers of the region that bought land in the *seringals*, deforested it in order to install pastures, and enslaved, killed or cast out people that lived there beforehand. E. says that it was Chico Mendes who organized the rubber tappers to stop new comperes invading the forest where they lived, in the famous "shocks" in the 1980's. He remembers having taken part in the shocks with his family whilst still a child, and says that, after Chico Mendes' death, the reserve was created, including the Seringal Cachoeira, where he lives. "The compere was expelled" and the land leased to the rubber tappers that lived there, including his family.

At his *colocação* they also have cattle, about 30 animals. As in the other *colocações*, his calves are sold to middlemen, but E. considers that cattle are not a good investment there, since it is expensive to look after it (vaccines, drugs, feed, etc.) and profit is small. "To breed cattle here is a worthless job". He stopped using fire to weed control about five years

15 FSC Brazil – Brazilian Council for Forest Handling – is an independent,non governmental and non-profitable organization that represents the Forest Stewardship Council (FSC) in the country. Its mission is to facilitate and propagate good handling practices of Brazilian forests, reconciling environmental preservation, social benefits and economical viability. For further information, visit www.fsc.org.br .

ago, due to the tight control of environmental agencies like IBAMA and IMAC. This one allows clearance and burning of the forest to open a slash, an area to be used for cultivating for their consumption, in the *colocações* that have not reached the 20% deforestation limit; and more, this is done in the places and dates established by IMAC's technicians. E. says that another factor that's contributed to control deforestation in his region is an incentive given by the government, that pays a monthly allowance in the program "Pro-environment" so that families do not clear their woods; "however, very few people get it".

E., besides being a rubber tapper, also works at the inn *Pousada Ecológica Seringal Cachoeira*, built by Acre's government inside the forest, in the style of a rubber tapper house. The inn, managed by the estate of Acre and staffed by seringal's inhabitants, receives many foreign tourists. Staff was trained by the government over a period of three months, to work as cooks, cleaners, tourist guides, etc. E. says that the profits are split in three parts – one third to the government, one third to the inhabitants and one third for maintenance costs.

Final considerations and Conclusions

As consumers understand the consequences of their habits, they can adopt an ecologic behavior – environmental and socially friendly, considering the effects of their choices on environment, society and economy. There is nowadays an increase in ecological awareness of consumers, but, paradoxically, beef consumption is becoming less and less sustainable both in relation to world's population nutritional needs and to the preservation of natural resources of the planet.

In the case of Acre, discussed here, cattle are fed on pastures, not grains, which results in a great increase in grassification of its land. However, meat consumption cannot be regarded as the sole significant determinant of the Amazon deforestation, as there has been a complex system of incentive to deforestation in the region due to economic and geopolitical reasons. The increase in Amazon's grassification in the last decades can be related to many factors; amongst them, the increase of beef's value as a commodity induces cattle raising for its guaranteed financial return. The state of Acre follows the trend of increasing bovine herd spotted in other Amazon states, and shows an expressive increase of cattle. And, as in the rest of Amazon, Acre has low productivity rates – cattle represent only 6% of the Acrean Added Value (Valor Adicionado Acreano. Acre. ZEE-Acre, phase II, 2006, p. 121), with also a reduced share on the income of local families. Nevertheless, this research showed that grassification is in progress inside the Extractive Reserve Chico Mendes. We asked ourselves which factors would lead resident families in extractive reserves and settlement projects to fell forest in order to raise cattle. We came to the conclusion that it occurs for lack of better opportunities. According to the interviews, cattle are not seen as promising or profitable business, and the inhabitants of the reserves did not use to breed cattle. Its existence now is due to the harsh living conditions, the lack of market for extraction goods and the lack of governmental policies that encourage the trade of these goods. As this study pointed out, one of the main problems at Extractive Reserve Chico Mendes is that extractive economy did not stood a chance against cattle. "It's very easy to the worker to join this production chain, because it works smoothly. He doesn't even have to worry with the transport of the cattle, as the slaughterhouse picks it up at his land". The extractive economic activities have plans able to make goods more valuable and therefore more attractive as a source of revenue, but they are still insufficients.

We reckon that in order to reduce deforestation in Amazon, it is necessary a set of suitable and integrated public policies, developed in accordance with sustainability principles and adequate to the vocation of each region. Without them it will not be possible to reach satisfactory levels of social and economic development. However, it depends also from consumers taking their share of responsibility over Earth's natural resources and practicing sustainable consumption. If consumers take an ecologic and socially responsible position and voluntarily reduce their beef consumption, they would contribute to the decrease of the consumer market,

consequently reducing the appeal to cattle raisers and slaughterhouses in beef production, and, as a result, the pressure for deforestation. As a byproduct they might improve their health with lower meat consumption.

Photo 1: Xapuri: cattle, deforestation and erosion.

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