

The Political Tree:<sup>1</sup>

Castanha-do-Brasil

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Junior Paper

*I pledge my honor that I have not  
violated the University Honor Code.*

*Erin O Sills*

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<sup>1</sup>Emmanuel Wambergue, Director of the Centro Agrario do Tocantins, May, 1988: "A Castanheira é uma árvore política".

*Senhor Wambergue -  
Obrigada por  
a ajuda com  
este estado.  
- Erin Sills*

## Introduction

The economy of the Brazilian Amazon has, for most of its history, been based on the extraction of natural resources for exportation to other regions. These extractive products are often exploited in an unsustainable manner and commercialized in such a way as to concentrate the profits among only a few people. Regardless of the manner in which they are extracted and commercialized, however, virtually all of them have been subject to a boom and bust economic cycle. (Homma, 1988) International demand tends to focus on a limited number of resources at any one time, resulting in local socioeconomic systems which are specific to those products and which tend to lose their "utility when the extractive resource is depleted or demand shifts away from it." (Bunker, 1984, p.1059)

The Brazil Nut (*castanha* in Portuguese) is a typical Amazonian extractive resource. Its commercial exploitation began as the rubber boom ended, and it quickly became a major source of revenues for the state of Pará, where most of it was extracted, processed, and exported. (See map on following page.) As in other extractive economies, economic and political power became concentrated in the hands of a small dominant class which controlled production by means of the *aviamento*<sup>1</sup> system. Unlike many other extractive systems, however, the extraction of castanha does not degrade the resource base and is therefore ecologically sustainable over the long term. International demand for castanha has remained strong and, as of yet, no substitute for extractive production has been implemented.

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<sup>1</sup>Put simply, in an *aviamento* relationship, one person advances supplies to another and then accepts commercial products (agricultural or extractive) in repayment at a later date. The *aviamento* system will be explained more thoroughly in a later section.

## Preface

The sources used in this paper are listed in the text in abbreviated form and again in the bibliography. In the text, written material is listed by the last name of the author and the year published. (For example, Balée, 1987) Personal communication is listed by the last name of the person interviewed and the month/year in which the interview occurred. (For example, Bejerra, 5/89)

Certain Portuguese words are used throughout the text, without always being italicized in this draft. The following list defines these words:

castanha	Brazil nut
castanhal	forested property with Brazil nut trees
castanhais	plural of above
castanheira	Brazil nut tree
castanheiro	collector of Brazil nuts
aviamento	system of supplying worker at beginning of season and then subtracting earnings from this debt
aforamento	government lease of usufruct rights
ouriços	the fruit of the Brazil Nut tree

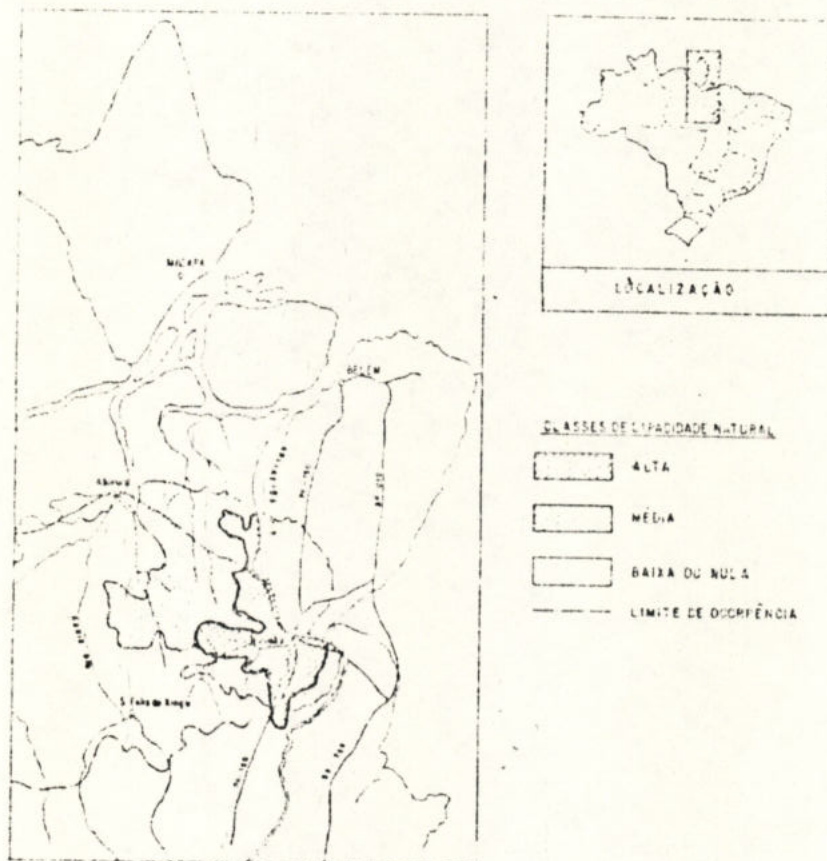
Program directors and advisors for the School of International Training's Amazon Semester Abroad were Nancy Uhl and Dr. William Overal.

Advisor at Princeton University: Prof. Ben Ross Schneider.

Castanha extraction is therefore still in the "boom" phase of the typical Amazonian economic cycle.

The castanha economy has been particularly important for the Marabá region of Pará, which was at one time the source of more than half of the castanha exported from Brazil. From approximately 1925 to 1965, the local social, economic, and political systems of Marabá were determined almost entirely by the commercialization process for castanha. Since the 1960's, however, and especially in the last ten years, Marabá's production of castanha has decreased dramatically. This is not due to a typical "bust" in an extractive economy, but rather to federal government programs and land politics in southern Pará.

Map I

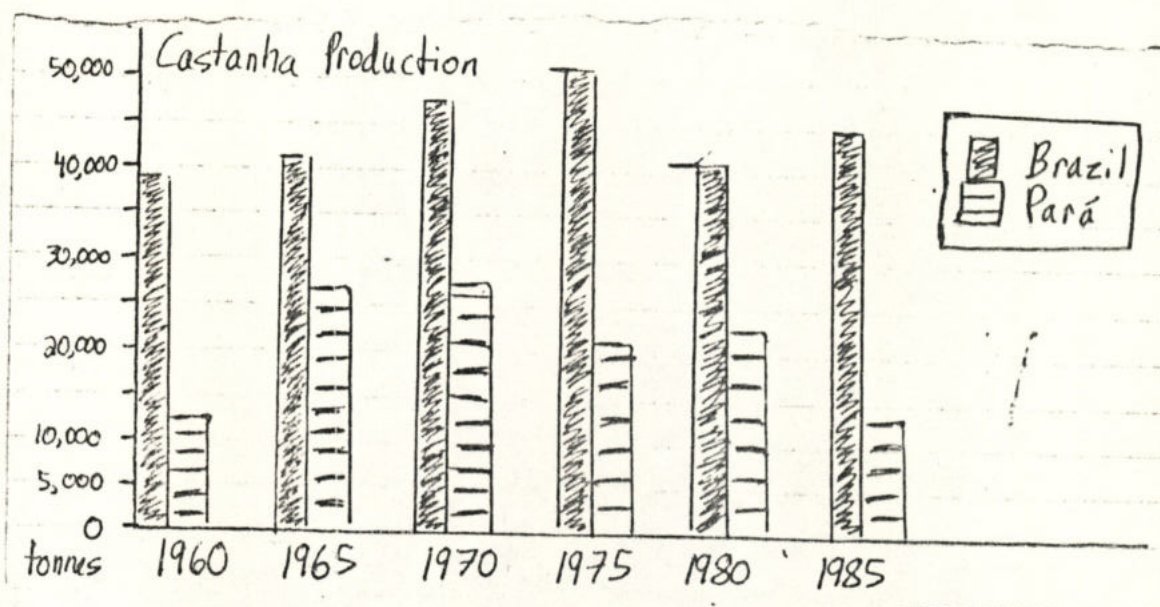


source: Kitamura, 1984



castanheiras, access by river or by road is necessary to ensure the economic viability of castanha collection in a given area. The vast majority of the areas which meet these conditions are found in Brazil, which consequently produces eighty to ninety percent of the world castanha harvest. (Banco do Brasil, 1984) See Diagram I for national production data.<sup>5</sup>

DIAGRAM I



source: IBGE

levels. (Ferraz, 4/89; Rafael, 6/89; Muller, 5/89)

<sup>5</sup>Production and export data for castanha is not known very accurately. Different sources (IBGE, IDESP, CACEX, Ministerio da Fazenda, Gill&Duffus Edible Nut Statistics) all report slightly different numbers, with up to twenty-five percent discrepancies. Usually, however, statistics from different sources vary less than ten percent. The inaccuracy of the data is probably due in large part to false reporting (or the simple absence of reporting) on the part of producers and exporters who wish to avoid taxes. Given these problems, the data will only be used to show general trends, and the specific amounts will not be emphasized.

Almost all (80 - 95 %) of Brazilian castanha which is commercialized is exported.<sup>6</sup> The United States and the United Kingdom absorb more than fifty percent of the total, with the remainder going to various European and Asian countries, as well as Canada. Although the foreign exchange (US\$36 million in 1983 [CACEX]) generated by this export business has never been significant in terms of total national exportation, it is an important part of the Amazonian economy.<sup>7</sup> Although Brazil has a virtual monopoly on the production of castanha, the Brazilian export sector cannot effectively control the world price because of an extremely elastic demand. The prices are "ditada principalmente pela competiçao de mercado com outros tipos de castanhas e pela preferênça seletiva do consumidor em relação aos diversos produtos da mesma categoria." (SEFA, 1986, p.64)

TABLE I

Price of Medium Brazil Nut Kernels

<u>YEAR</u>	<u>US cents per LB</u>
1975	59
1980	98
1985	82
1988	129

*source: Gill&Duffus, 1989*

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<sup>6</sup>It has not been estimated how much castanha is consumed in the Amazon region, because a large part never passes through organized markets.

<sup>7</sup>The value of castanha exports has never been more than 1.25 percent of the total value of Brazilian exports.(CACEX, in SUDAM, 1982) The income from castanha exports did, however, represent nearly 25 percent of the total value of exports from the Amazon region as recently as 1972. (Ministério, 1976) Because of the expansion of the Amazon economy over the past fifteen years, castanha exports today also represent only a small part of total exports from the Amazon. (For example, three percent in Pará in 1986 [CACEX]) Nevertheless, the castanha business is still very important for some micro-regions.

In spite of the inevitable fluctuations in the price of castanha, its value has followed a general upward trend, providing large profits for the exporters, and encouraging the commercial exploration of new areas and interest in plantation technology. (See Table I) Previously unknown or unaccessible areas are still being brought into production, especially in Acre and Pará, and several businesses have invested in castanheira plantations, notably in Amazonas.<sup>8</sup> In spite of the fact that new areas in the state are being explored, however, Pará's production has leveled off or slightly decreased during the 1980's. (See Table II) This is due to the dramatic decrease in production in the Marabá area, traditionally the most important castanha producing region in the world. The remainder of this paper will concentrate on Marabá and its local castanha economy.

TABLE II

State Production of Castanha in Tonnes

<u>YEAR</u>	<u>Pará</u>	<u>Acre<sup>9</sup></u>	<u>Amazonas</u>	<u>Amapá</u>
1980	22611	6624	8811	2516
1983	22947	13714	11132	900
1985	15417	14761	10754	2270

*source: IBGE*

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<sup>8</sup>The major plantation in Amazonas state is just beginning to produce castanha and has thus not yet affected production data.

<sup>9</sup>In the 1988-89 harvest, Acre surpassed Pará in castanha production for the first time. (Adamor, 6/89)



## History of the Marabá Region

The modern Micro-region of Marabá consists of the municipalities of Itupiranga, Marabá, Nova Jacundá, São João do Araguaia, and Tucuruí, and covers an area of approximately 73,000 square kilometers along the Tocantins River in southeastern Pará. The so-called "Polígono dos Castanhais," considered to be the most productive area in Brazil in terms of castanha, is comprised of portions of the municipalities of Marabá, Xinguara, Itupiranga, and São João do Araguaia, and it is approximately 1,750,00 hectares in size according to a 1986 IBDF map.<sup>10</sup> The city of Marabá was by far the largest population center in the area until the construction of the Tucuruí hydroelectric dam in the 1980's led to the rapid growth of the city of Tucuruí. Before the region was linked to the rest of the nation by a road network, the location of population centers and of economic activity was determined almost entirely by two factors: access to river transport and the location of extractive resources.

The economy of southern Pará has always been dependent on the extraction of various natural resources (Morbach, 5/89), ranging from rubber and wood to iron and gold. Marabá is no exception to this pattern of economic development. The town of Marabá itself was created by the Rubber Boom, which brought the first wave of migration to the Amazonian interior. "Caucho," a species of tree which must be destroyed in order to extract its latex, was discovered west of the Tocantins river in the late

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<sup>10</sup>The "Polígono" does not exist in law, and thus its size is not officially defined. An early proposal by the Sindicato Rural de Marabá, representing the castanhal owners, included only 800,000 hectares. A map created by GETAT included 900,000 hectares. (Emmi, et.al, 1987) The IBDF map, however, has become the most widely used and accepted. The municipality of Xinguara was created in 1983, replacing part of Santana do Araguaia and of part of Conceição do Araguaia.

1800's and a trading post was established at the confluence of the Itaciúnas and Tocantins rivers. (Emmi, 1988; Laraia and Matta, 1967) Older residents of the city say that "Marabá no início da século ... constituia um grande acampamento de caucheiros em que todas as energias eram canalizadas para a extração do caucho." (Emmi, 1988, p.30) Driven by the high price of rubber, the town grew rapidly and enjoyed economic prosperity. As in the rest of the Amazon, a few people eventually gained control over the commercialization of rubber and established *aviamento* relationships with the extractive workers, thereby reaping great profits.

The Amazonian Rubber Boom came to an end by 1920 as a result of the fall in the world price of rubber and competition from British plantations in Asia which produced higher quality rubber. (Weinstein, 1983) This left the Amazon in economic disarray, and its economy has never again reached the same level of prosperity. Marabá suffered both from the fall in the price of rubber and the depletion of its rubber supply as a result of the predatory manner in which *caucho* was exploited. (Kitamura, 1984) Nevertheless, "Marabá was able to retain its importance as a regional center. The merchants who sustained the area's economy tried to hold onto the labor force by underwriting consumption needs until the economy could be shifted to the extraction of brazilnuts. It was this alternative that saved Marabá from the depression that swept most of the Amazon in the wake of the rubber boom." (Schmink and Wood, 1988)

The commercialization of castanha in the state of Pará actually began before 1800 (Kitamura, 1984; Ministério, 1976), but it remained a minor product until the 1920's. When the rubber boom ended, the extractivist workers of Marabá turned their attention to harvesting castanha. The depletion of *caucho* trees, the high price of castanha on the international market, and the

unusually high concentrations of productive castanheiras near Marabá all contributed to castanha's rapid rise in importance for the local economy. (Kitamura, 1984) The transportation and labor systems which had been developed during the rubber boom were easily adapted to the castanha business. Between 1915 and 1925, castanha production in Marabá grew by a factor of thirty, increasing its share of state production from four to fifty percent. (Mendonça, 1983, p.45)

Certain family and business groups, aided by state legislation, managed to turn their initial edge on capital and infrastructure into a virtual monopoly on the extraction of castanha from the region. In the early 1920s, a few people had control over credit and river transport, both essential to the extraction of castanha. (Emmi, 1988, p.78) They gained economic and political power and by the 1930's, were in a position to take advantage of the land legislation which strongly favored extractive activities. "The brazilnut barons were able to maintain their political hegemony and expand their power, originally based on control over exchange relations, by consolidating control over land as well." (Schmink and Wood, 1988, p.168) They divided the "Poligono" into great forested estates, called *castanhais*.<sup>11</sup>

State government policy tended to encourage the concentration of landholdings as well as the predominance of castanha production in the local economy. In 1933, Decree no. 1,044 limited agricultural lots to 25 hectares, an area insufficient for the long term subsistence of a single family practicing traditional agriculture. (Kitamura, 1984, p.15; Evangelista, 5/89) In contrast, in 1938, state law no. 3,143 set the maximum area for grants of usufruct rights for castanha

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<sup>11</sup>The singular form of *castanhais* is *castanhal*.

production at 4,356 hectares and allowed these grants to be renewed every three years. (Kitamura, 1984, p.14) Since production as low as 200 hectoliters is considered acceptable for a castanhal, and production per hectare per year in the Marabá region averages .25 hectoliters,<sup>12</sup> this area is clearly more than enough for castanha production. (Ministério da Agricultura, 1976) In 1954, state law no. 913 came into effect, increasing the maximum area for castanhais to 7,200 hectares, and promoting a standard of 3,600 hectares. Neither one of these laws excluded the possibility of one person or family owning the rights to use several castanhais at the same time. The 1954 law also extended the grant period to five years, with the right to renew in the form of "*aforamento perpétuo*," essentially giving the castanhal owners permanent and complete control over large tracts of land. (Kitamura, 1984, p.14)<sup>13</sup>

The Mutran family used the legal device of *aforamento perpétuo* to gain control over large tracts of land. They came into power in the 1950's, bringing to a close the thirty year period in which the local economy and government were largely dominated by Deodoro de Mendonça, a castanha merchant and secretary of the governor, who used his government position to obtain large castanhais for his relatives and friends. The Mutrans were involved in commerce and ranching as well as the castanha business, but the base of their power was the accumulation of land for castanha production. (Emmi, 1988, p.81) Although the individual members of this and other groups ran

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<sup>12</sup>See Table III of production data in the following section.

<sup>13</sup>Officials at INCRA, the federal agency currently responsible for land titling and reform in the region, say that the *aforamento* titles were actually granted for 90 years. Kitamura (1984) and Emmi (1988) both refer to them as "perpetual" grants, but this may be because they will almost certainly last for the original owner's lifetime.

independent enterprises, they worked together to maintain their political and economic hegemony. "Na realidade, eles estão unidos entre si por vários laços econômicos e sociais, dos quais podemos destacar como mais significativos os empréstimos e o parentesco. Os lucros são individualistas, e nem poderia deixar de ser assim num sistema capitalista, mas os modos de obter capitais e mercadorias e de se conseguir apoio político para os problemas de terras e mão-de-obra, ou para destruir um concorrente pernicioso, é uma empresa comun." (Laraia and Matta, 1967) Although they no longer have complete control over local politics, the Mutrans have maintained their political influence until today.<sup>14</sup>

During the 1940s and 1950s, some of the castanhal owners did begin limited investment in *agropecuária*. At the beginning of World War II, in 1942, an accord between Brazil and the allied nations prohibited the importation of castanha. Kitamura gives two reasons for this action: "para proteger o plano de extração da borracha dos seringais nativos da Amazônia e para evitar a utilização de navios cargueiros no seu transporte." (Kitamura, 1984, p.10) The economy in Marabá was temporarily devastated by the sharp drop in demand, and the local elite sought to adjust by expanding into ranching, mining, and farming. This expansion continued on a small scale throughout the following two decades as a means of diluting the risks of depending solely on the castanha harvest. (Fonseca do Vale, 1981) In the 1950's, ranching activity increased again as a result of the law which granted nearly perpetual leases of the castanhais, assuring the owners that they would receive the benefits from any "improvements" that they made. (Schmink and Wood, 1988) Both ranching and farming remained subsidiary activities, however, and clearing was limited

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<sup>14</sup>The current mayor of Marabá is a member of the Mutran family.

to areas of low castanha concentration. Castanha thus held forth as the primary determining factor of local socioeconomic and political organization.

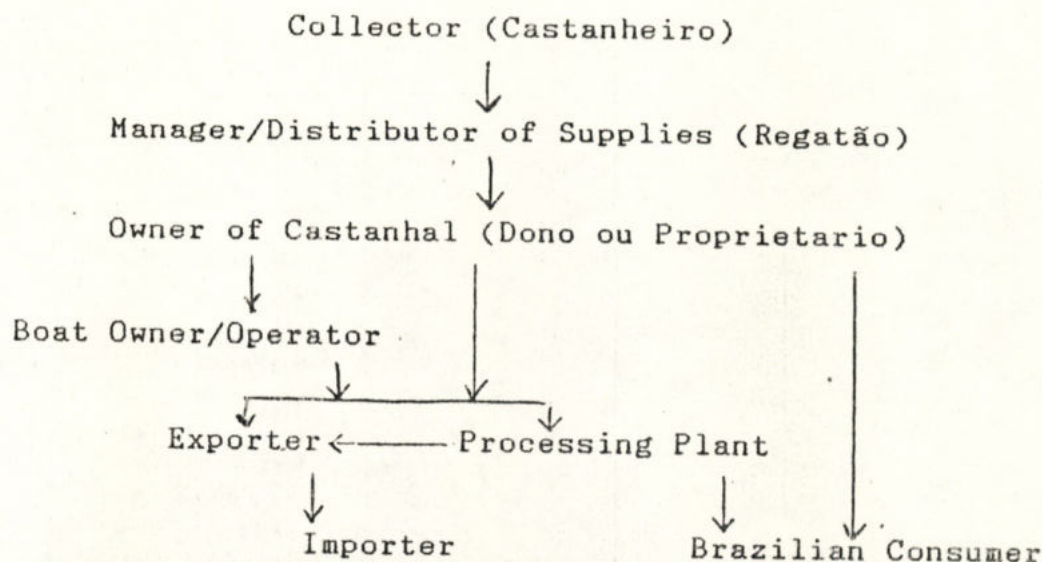
### Commercialization of Castanha: The *Aviamento* System

The castanha business in Marabá was and, for the most part still is, based on the *aviamento* system. A limited number of people and business groups either own or hold the usufruct rights to castanhais which vary in size from 500 to 10,000 hectares. (MIRAD, 1987) These owners then contract seasonal workers to collect, process, and transport the castanha, advancing them supplies and "paying" them according to the amount of castanha produced. The collectors and other workers often remain in debt to the owner at the end of the season, because the value of their earnings is less than the value of the supplies that were advanced to them. In some cases this means that the worker is required to stay on the castanhal over the summer, maintaining the infrastructure required for castanha extraction or clearing areas for cattle pasture. (Barros, 1987) In other cases, the worker simply begins the next castanha harvest already indebted. The *aviamento* relationship exists on all levels of the commercial process. Tupiassú and Oliveira (1967, p.16) refer to the two most common cases: "a firma exportadora 'avia' o empresário interiorano; este 'avia' o 'castanheiro' - ocorrendo depois o 'acerto de contas' que determina os ônus e lucros de cada um."

The commercialization of castanha is characterized by a large number of intermediaries as well as by the *aviamento* relationships between these intermediaries. Diagram II provides a flow chart of the basic steps which castanha passes through on its way to market. Many more intermediaries may be involved in the process, with the profits usually higher for each step closer

to consumption. The profits taken by the "middlemen" are often cited as one of the major barriers to more efficient and competitive production. (Amazônia, 1978; CEPA/Acre, 1980)

DIAGRAM II



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The actual production process is much more complicated than indicated by this flow chart of people who buy and sell the castanha. The castanhal must be prepared, the ouriços gathered and cut open, and the castanhas transported by mule to the collection centers. The castanhas are then washed, sorted, dried, and sorted again. All of the people involved in these production phases must be outfitted with equipment and supplies. Transportation costs are the most important expense in the commercialization of castanha. (SUDAM, 1976) The castanhas are carried by motorized canoes to Marabá, where they may be unloaded and stored. (Ministerio de Agricultura, 1976) Before the Tucuruí Hydroelectric Dam was built in the 1980's, most of the castanha was transported by small boat to Tucuruí, where it was transferred to larger boats for the passage to Belém. Now that

the dam obstructs river passage<sup>15</sup>, all of the castanha is taken to Belém by truck, or occasionally to southern Brazil. (Von Atzinger, 5/89) In Belém, the castanha is stored and processed, either by dehydrating it, leaving the shell on, or by removing the shell and then drying it.<sup>16</sup> In either case, it must once again be sorted and then packaged for exportation.

This production process for castanha supported the whole local economy in Marabá until other economic sectors became active in the 1960's. The price and demand for castanha fluctuated, but except for a few years during WWII, they remained high enough to support the local economy. Much of the employment generated by the castanha industry and the majority of the value added to the final product occur in the final processing stage, when the castanha is treated and packed for export.<sup>17</sup> The processing factories have always been located in Belém or other cities, depriving Marabá of a potentially important source of employment. The castanha business did create other forms of employment in Marabá itself. When asked about castanha, local

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<sup>15</sup> Construction of locks for the dam has begun, but according to a Tucuruí company official, they are not likely to be finished in the near future, if ever.

<sup>16</sup> Before 1970, approximately 70 percent was exported with shell. (Ministério da Agricultura, 1976, p.38) Now, on average only 40 percent is exported with shell. Castanha is occasionally exported in 'natural form,' neither dehydrated or dried. This, however, is not a popular option because it is difficult to store unprocessed castanha, especially in the dark, moist holds of ships where it tends to rot.

<sup>17</sup> In the processing factories in Belém, approximately 60 workers are required to produce each tonne of dried, shelled nuts daily. (Benzecry, 6/89; Adamor, 6/89) During the first half of 1989, the factories were buying castanha for an average 40 cruzados, around US\$15, per hectoliter. This HL is then transformed into about 17 kilograms of dried, shelled nuts, which were sold on the export market for approximately US\$30 during the same period. (Adamor, 6/89)



residents often recall that it supported (and presumably still supports on a lower level) a wide range of subsidiary industries that produced the items required on the castanhais and for river transport. The main economic activity in the region, however, was centered on the castanhais themselves, where the castanha was extracted and initially processed. In spite of the radical changes that have occurred in the region over the past twenty years, the socioeconomic organization on most of the castanhais has changed very little.

The castanhais of the Marabá region vary significantly from one another in terms of labor organization and production levels. Different owners have established different traditions, according to their preferences and economic capabilities. They also control different sized properties. As noted before, the standard size for castanhais, which were leased from the state government to private owners on a long term basis, was originally 4,356 hectares and was then changed 3,600 hectares.<sup>18</sup> In the ten years between 1955 and 1965, the state government granted 165 *aforamento* properties in the municipality of Marabá alone. The vast majority of these properties were titled for 3,600 hectares. (ITERPA, 1983) Few of the properties have actually been demarcated, however, and those that are do not correspond to their titles.

When handing out usufruct rights to the castanhais, the state government was not concerned with defining property lines and thus gave *aforamento* titles to a specified amount of land but not to a strictly defined area. The castanhal owners have therefore expanded the area from which they extract castanha production, absorbing the "sobras" of state land which should

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<sup>18</sup>The government is not currently granting new *aforamento* titles to state land. (Enjenia, 6/89)

**Table III**

The numbers listed in the right hand column are averages that apply to the areas of high productivity in Marabá. (see map, p.2)

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One(1)Hectoliter of Unprocessed Castanha (nuts with shells)  
is approximately equivalent to:  
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47 -100 kilograms of unprocessed castanha	60 KG/HL
40 kilograms of dehydrated castanha with shell	40 KG/HL
17 -36 kilograms of castanha without shell	22 KG/HL
14 -29 kilograms of dried castanha without shell	17 KG/HL

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\*\* 5,500 castanhas/HL

sources: Balick, 1985; CEPA/Acre, 1980; Ministério da  
Agricultura, 1976; Yoshioka, 1986; Adamor, 6/89;  
Ferreira, 6/89; Benezcry, 6/89.

\*\* based on 325 dried, shelled nuts per KG for medium size  
castanhas which are typical of Marabá region

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One(1)Hectare of land in a Castanhal has:  
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10-20 castanheiras in a "good" area  
1 castanheira at a minimum

sources: Morão, 5/89; Tupiassú, 1967.

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One(1)Hectare of land in a Castanhal produces on average:  
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.16 -.55 hectoliters of unprocessed castanha .25 HL/HA

sources: Kitamura, 1984; Ministerio da Agricultura, 1976;  
Raul, 5/89; Sindicato Rural de Marabá, 1980, Muller (1981),  
Ferreira, 6/89. -

Most of the workers required for the collection and processing of castanha are hired on a seasonal basis and are paid at a low rate according to the amount of castanha processed rather than the number of hours worked. The castanha collectors are hired for a period extending from November or December to April. (J.Rosa, 5/89; Emmi, 1988) They are advanced supplies when hired and paid for the amount of castanha collected at the end of the season. According to government documents, the castanhal owners hire approximately one collector for every 100 hectoliters of expected castanha production. (SEFA, 1988, p.66; CEPA/Acre, 1980, p.23; Ministerio da Agricultura, 1976, p.44) The Sindicato Rural de Marabá, on the other hand, indicated that on average, one collector is hired for every 240 hectoliters of castanha, or every 850 hectares. (Sindicato Rural, 1980, p.7)

The Sindicato and government sources also differ on the total number of additional workers necessary for a castanhal, with the government documents listing 23 workers to carry out the basic functions of a castanhal (average size of 3600 HA), and the Sindicato listing only 10 for a castanhal of 3000 hectares. (same sources) This may be a result of the fact that the Sindicato is referring to the absolute minimum possible, while the government agencies are referring to optimum efficiency. In both cases, however, at least half of these "additional workers" are actually only employed for the period between harvests, and thus may be hired again as castanha collectors during the season. Almost all of the workers are male: "A etapa de coleta das castanhas é feita, basicamente, com trabalho masculino. Na 'quebra' do ouriço, pode se detectar, em alguns casos, o trabalho feminino ..." (CEPA/Acre, 1980, p.53) See Table IV for an employment chart developed by the Agriculture Ministry.

Table IV

NECESSIDADES BÁSICAS DE UM CASTANHAL

	ÉPOCA DE TRABALHO	PESSOAL
a) Administração:		
- Administrador	jun. - maio	1
- Escrivão	jun. - maio	1
b) Preparo de uma quadra de milho e roçado (4,84 ha)		
- Broca e derrubada	jun.	4
- Derrubada	jul.	
- Queima e coivara	ago.	
- Coivara e limpeza	set.	
- Conservação de estradas de trabalho	out.	
c) Manutenção Geral:		
- Conservação do Barracão, do alojamento e de outras instalações	jun. - out.	2
- Conservação de estradas de trabalho e obras auxiliares (pontes, cercas, etc.)	jun. - out.	2
d) Reparilhamento da troca de carga	out.	1
e) Contratação de Castanheiros à base de 100 hl/Homem.	nov.	
f) escoamento da Produção		
- Equipagem média a três barcos	jan. - maio	12
	PESSOAL BÁSICO	23
	TOTAL	homens

source: Ministerio da Agricultura, 1976, p.45.

Emmi lists five classes of workers in addition to the castanha collectors: (1) the *lavador* who cleans and sorts castanha and is paid by the hectoliter (2) the *tropeiro* who transports castanha by mule and is paid by the hectoliter or

number of trips made; (3) the *barqueiro* who transports castanha by boat and receives a monthly salary; (4) the *cantineiro* who keeps records of the castanha processed and receives a monthly salary; and (5) the *encarregado*, or general manager, who hires workers and is paid by the number of hectoliters produced on the castanhal. (Emmi, 1988, p.72) Each castanhal will vary in the precise composition of its work force. All of them must, however, hire some workers to maintain their infrastructure. These workers are the primary exception to the pattern of non-wage, seasonal employment. Their job consists of the "aterro de alagadiços, limpeza e conservação de estradas e 'varadouros', tratamento de pastagem (para as tropas de burros) e roçados de subsistência, assim como conservação ou construção de armazens e depósitos." (CEPA/Acre, 1980, p.59)

Even though all of these workers make their living from the commercialization of castanha for at least part of the year, in general, only the owners of the castanhais and the exporters profit from the business. This is widely blamed on the *aviamento* system which keeps workers in debt, and on the high unemployment rates which allow employers to pay low rates. (J.Rosa, 5/89; Morbach, 5/89; Emmi, 5/89; Beltrão, 1981) Under the *aviamento* system, "é o dono de castanhal quem estima, estipula o preço do hectolitro que será trocada não por dinheiro, mas por mercadorias do barracão que são vendidas por preços muito superiores aos seus custos". (Emmi, 1988, p.74)<sup>21</sup> Laraia and Matta estimate that the amount of castanha sold by the collector for one cruzado will be transported at the cost of one half cruzado and sold in Marabá

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<sup>21</sup> According to various authors, the castanhal owners and their representatives often use improperly adjusted weighing devices so that the collectors and other employees are paid for less than they actually produce. (Laraia and Matta, 1967; Emmi, 1988)

for five.<sup>22</sup> (Laraia and Matta, 1967, p.137) The former director of the Catholic Church's land commission condemns the aviamento system used for castanha as "quasi escravidão", and estimates that the collectors only receive ten percent of the value of the final product. (Wambergue, 5/89) The workers are able to survive under this system in part because during the harvest season they eat mostly wild game, castanha, and other forest fruits and nuts. Thus, although they may be in constant debt, the castanha collectors and other workers lived above the subsistence level.

In spite of poor working conditions and low pay, the workers did not organize in an attempt to improve their situation (at least until the 1970s, when they joined in the land invasions). Laraia and Matta explain this by the fact that "entre os trabalhadores da castanha, não existe nada que os uma, exceto a miséria que exibem nas matas, nas zonas suburbanas de Marabá e o desejo de fazer algum dinheiro após as safras. O fato de não terem nada mais para defender do que a sua força de trabalho, faz com que sejam assim: afastados uns dos outros e indiferentes à sua condição de mão-de-obra indispensável à economia regional". (Laraia and Matta, 1967, p.133) The few "rebellions" on the part of the workers were only isolated and individual events, which involved stealing castanha for sale in town, direct confrontation with the owner's representatives, and fleeing after having received the season's aviamento supplies. (Emmi, 1988, p.75) The owner always had the option of "firing" a troublesome worker, but usually maintained control over them through debt.

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<sup>22</sup>The actual prices paid at different stages of the commercialization process and their evolution over the years are difficult to determine, because of the castanhal owners' reluctance to release the information, the deliberately inaccurate records which are reported for tax purposes, and the extremely unstable nature of the Brazilian currency.

Until the 1970s, one option which did exist for those not hired by a private castanhal was to collect castanha in the municipality's castanhais. These public lands are frequently referred to as "castanhais do povo" by the residents of Marabá, who remember them as an important economic alternative for the poor families of the city. (J.Rosa,5/89; Morbach,5/89;da Silva Brandão,3/89) Nevertheless, local businessmen usually controlled the castanha collectors in these areas through the same system of aviamento found on private castanhais, and they have since all been absorbed either by private landholders or by the expanding city of Marabá. Since the extinction of the public castanhais, however, employment options in the region have expanded tremendously.

## Change Comes to Marabá

Until the 1960's, the federal government of Brazil had viewed the Amazon as a region of limited development potential. In the eyes of the federal policy makers, it was a sparsely populated wilderness area that could best support its cities by commerce and trade in extractive products. The Marabá region had always fit this model well. The military government that came into power in the 1964 coup, however, envisioned a very different future for the Amazon.<sup>23</sup> The new policy makers in Brasilia launched a campaign to integrate the North of Brazil with the rest of the country, populate it with migrants, and develop it in a manner that would increase Brazil's export earnings.

This new philosophy of Amazonian development represented a severe challenge to traditional extractive economies and their accompanying socio-political orders. The new focus on the value of the land itself and of the subsoil resources changed the perception that the Amazon's primary value lay in its renewable forest resources. Agriculture and mining received the support of direct government incentives and of a growing transportation infrastructure. Southern Pará was one of the first areas to feel the impact of the federal government's policy, and the Marabá region has been radically changed since the early 1960's when the castanhal owners were still in firm control of the economy and society.

By 1970, Marabá's economy had diversified and was no longer completely dependent on the castanha harvest. Previously, ranching activities had been limited, because "os altos

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<sup>23</sup>Interest in developing the Amazon actually began in the late 1950's, and the democratic administrations immediately preceding the military coup initiated some new projects in the region. Rapid change, however, came with the military government and its National Integration (PIN) and Pol-Amazon programs.



investimentos necessários à formação das pastagens e o interesse maior na castanha limitam o tamanho do rebanho de cada proprietário, sendo muito pouco freqüentes fazendas com mais de 1000 cabeças." (Fonseca do Vale, 1981, p.5) This situation changed completely in the late 1960's with generous government incentives for cattle production and an expanding road network. Cattle ranchers were optimistic about the area's potential for pastures in part because of the successful example of the small pastures which were already maintained in the castanhais. These pastures were, however, quite small, stocked at low rates, and for mules, not cattle. by the example of the small pastures which had been created in the castanhais to support the mules used to transport castanha. (Enjênia, 6/89) Even after the short life-time and low productivity of regional cattle pastures had become apparent, ranchers continued to clear areas, encouraged by fiscal incentives from SUDAM and easy credit from Proterra. In twenty years (1960-1980), the farming area in Marabá increased from 16,400 to 52,500 hectares, and the number of head of cattle increased from 64,000 to 367,000. (Kitamura, 1984, p.8) The traditional landowners from the area cleared pastures along with the new business enterprises and ranchers from the South.

Sawmills, mines, and construction companies also provided new employment opportunities. Especially during the 1980's, the number of sawmills throughout southern Pará has increased dramatically. The mineral wealth of the region is enormous. "Desde 1968-69, a Meridional-encarregada da prospeção na Serra do Carajás, tinha seu escritório em Marabá, por onde passaram os dois ou três mil operários ocupados na mina. Com a implantação da Rodovia Transamazônica aparecem as construtores com seus acampamentos inaugurando novas relações de produção, expandindo na região o assalariamento e provocando o surgimento de um mercado regional capitalista da força de trabalho." (Emmi, 1988, p.117)

The construction of roads through southern Pará, in addition to providing a new source of employment, brought innumerable changes to the region. They provided an alternative for shipping castanha to Belém (although it was seldom used before the Tucuruí Dam was built because of the high price of gasoline and the poor state of the roads during the rainy season) and access to castanhais that had not previously been exploited due to their isolation from the river transport system.<sup>24</sup> (Schmink and Wood, 1988; Ministerio da Agricultura, 1976) At a 1967 conference, the castanhal owners had stated that new roads were essential to the modernization of the castanha industry. (Primera Conferência, 1967) They found, however, that the roads caused many more problems than they solved. For one, they broke the castanhal owners' "control over the collectors, who could flee with their advance money or who were now in a position to complain to the army commander about working conditions." (Schmink and Wood, 1988)

More importantly, the roads brought cattle ranchers, large business enterprises, and migrants looking for land. The Belém-Brasília highway, which had already reached southern Pará by 1960, opened up the region to migration and agriculture. The Transamazon highway, which reached Marabá in 1971, brought an even larger wave of migrants. The population of the Marabá micro-region grew 93 percent between 1960 and 1970 and another 258 percent by 1980. (Kitamura, 1984, p.8) The expansion of the city of Marabá brought an end to the last "castanhais do povo," turning them into sprawling slums and subsistence agriculture plots. (da Silva Bentes, 1988) Many private castanhais were also occupied by small farmers, initially in the "sobras" of the properties which technically still belonged to the government.

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<sup>24</sup>The roads also allow castanha to be exported from ports other than Belém, such as São Paulo and Rio de Janeiro.

In the late seventies, land invasions of entire castanhais began. The Catholic church and the rural workers' unions who supported the small farmers were aware of the many irregularities in the titles to the castanhais, and therefore encouraged migrants to settle in the areas which might legally still belong to the state or federal governments. (Enjênia, 6/89) The castanhais were also easier to invade and settle than unexplored forest, because there were already paths and clear waterways established by the castanha collectors. (Paraguassú, 6/89)

Marabá's local political and power structures have changed dramatically within the last twenty-five years. The federal government has replaced the local elites as the most powerful political actor in the region. Brasília expanded its influence in the region by implementing national development plans, expanding the power of federal land reform agencies, fighting the guerilla war of Araguaia in the early 1970's, and giving GETAT - an organ run by the national military - complete control over local land issues for the five years from 1980 to 1985. Marabá is also now part of the Greater Carajás program and is within the sphere of influence of both the Carajás mine and the Tucuruí dam. National and international companies, such as the Bamerindus Bank, have expanded their activities in the Marabá region and are politically important both because of their economic power and because of their ties to the national government. On the other end of the political spectrum, the rural workers' unions, supported by the Catholic Church, have increased their political activity and influence in local affairs.

Economic factors have changed the structure of the traditional landowning elite as well. Many of the castanhal owners suffered economic difficulties when the price of castanha on the international market fell in the late 1960's and then fluctuated radically for several years, until a minimum price

policy was established in 1974. Combined with an increasing cost of living, the fall in the price of castanha spelled economic doom for many of the smaller castanhal owners. "Após repetidas operações procrastinadores de solução a seus débitos com o aviador, o produtor chega à insolvabilidade. E neste ponto é compelido a entregar a sua propriedade como pagamento da dívida. Por este processo a propriedade dos castanhais vem sendo absorvida pelos exportadores." (Ministério da Agricultura, 1976, p.14) Thus, during the 1980's, the Sindicato Rural de Marabá, which represents the majority of the castanhal owners, has been overshadowed by the Castanha Exporters' Association, which is dominated by the Mutran family.

The Mutrans and the various companies in which they are involved have increased their landholdings and their share of the export market<sup>25</sup>, adapting to the new political situation in Marabá by using their connections with the federal government. Many of the other castanhal owners include the political maneuvering of the Mutrans as one of the reasons for decreased castanha production. (Ferreira, 6/89; Benezcry, 6/89) Although this accusation is in part a result of bitterness towards a successful competitor, it also indicates how drastically the local economy and society of Marabá have changed. The preservation of the castanhais and increased production of castanha are no longer necessarily desirable, even for the traditional local elite.

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<sup>25</sup>The three processing and export firms owned by the Mutrans and operating in Belém export approximately half of the national castanha production.

## The Decline of Castanha

Although many of the federal government's new plans for southern Pará were initiated in the 1960s and early 1970s, castanha production did not begin to decline noticeably until the mid seventies. The most dramatic decrease has occurred in the "Poligono dos Castanhais" during the 1980's. Between 1980 and 1984, production in the Poligono fell by 71 percent, moving from forty to ten percent of Brazil's total production. (IDESP, 1979-1985) See Table Four for a complete record of this fall in production.<sup>26</sup> According to various sources, the 1988-1989 harvest in Marabá was the worst since the late 1940's. (de Proenca, 5/89; Von Atzinger, 5/89; Mutran, 3/89) Diagram III charts production in Pará, and Table V lists production in 1978 and 1984 in the three most productive micro-regions in Pará.

TABLE IV

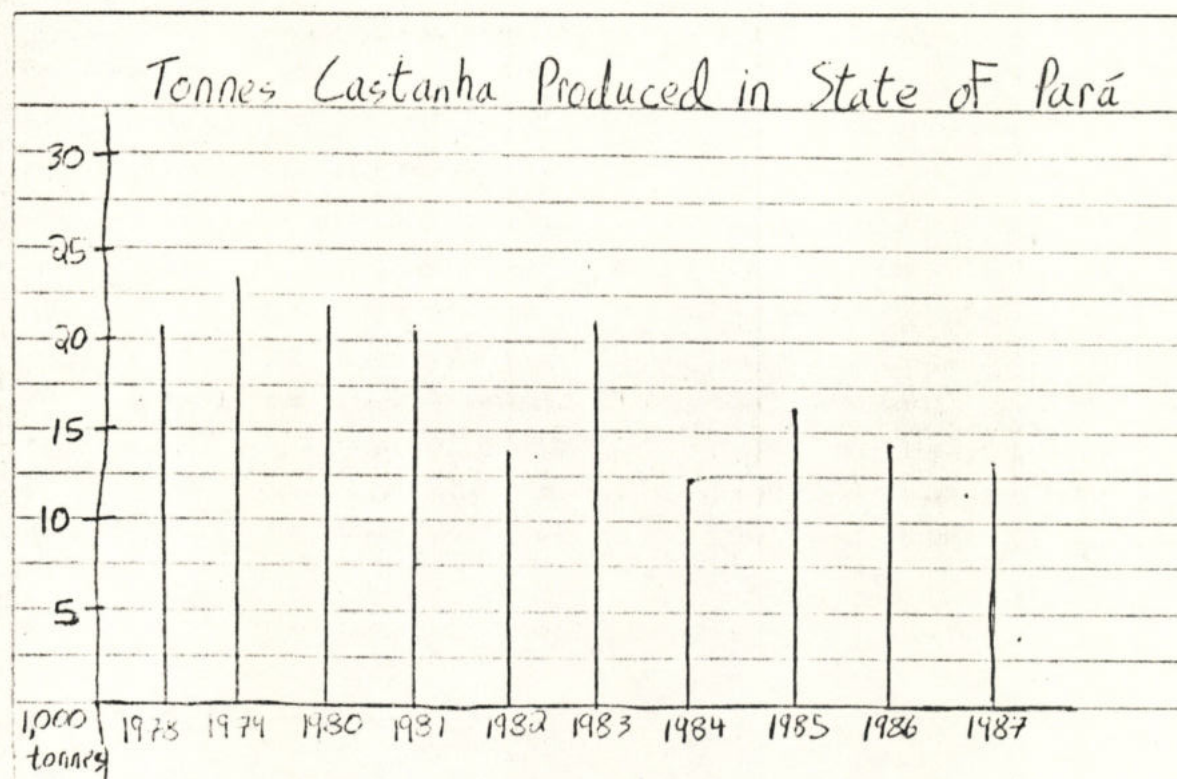
Year	Tonnes of Castanha Produced in Marabá, São João de Araguaia, and Itupiranga <sup>27</sup>
1978	13,736
1979	15,730
1980	16,050
1981	10,900
1982	8,125
1983	5,478
1984	4,590

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<sup>26</sup> 1984 is the last year for which IDESP has published data.

<sup>27</sup> These are the three municipalities included in the Poligono for which IDESP lists production data. Note again that this data is probably not completely accurate.

DIAGRAM III



source: years 1978-1983: IDESP, *Anuário Estatístico 1979-1985*; years 1984-1987: CACEX, Banco do Brasil.

TABLE V

Tonnes of Castanha Produced & Percentage of State Production

YEAR	Marabá <sup>28</sup>	Medio Amazonas	Tome-Acu
1978	15,338 (70%)	4,506 (21%)	673 (3%)
1984	4,980 (42%)	4,245 (35%)	1,408 (12%)

source: IDESP, *Anuário Estatístico 1985*

<sup>28</sup>The micro-region of Marabá includes Tukurui, which is not included in Polígono dos Castanhais. Between 1978 and 1984, production in Tukurui dropped from 1000 to 200 tonnes (IDESP), probably mostly as a result of the flooding of the Tukurui reservoir.

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This decline in production must be due to (1) a decline in the productivity per hectare, and/or (2) a decline in the number of hectares from which castanha is extracted. Kitamura does report a decline in productivity between 1978 and 1983 in the castanhais which he surveyed. (approximately one fourth of the total land area devoted to castanha production in Marabá) He states that this drop in productivity from .47 to .23 hectoliters per hectare was the main cause of the 55 percent decrease in production on those castanhais. (Kitamura, 1984, p.6) On the other hand, there has been a considerable decrease in the area utilized for castanha production due to its conversion to other uses. Thus, between 1975 and 1980, the total area used for vegetative extraction in the Marabá region decreased from 751,925 to 420,548 hectares. (IBGE, Censo Agropecuário, 1975 and 1980) Although figures are not available for 1985 or for castanha production in particular, various sources indicated that this reduction in area has continued and that the castanhais have been particularly severely affected. Due to the lack of recent data (many "annual" government documents have not been published recently) and the difficulty of establishing productivity levels for the castanhais (explained in an earlier section), it was not possible to determine how much of the decrease in production is accounted for by productivity and how much by land area for this study.

Several possible reasons for a decrease in productivity in Marabá may be eliminated. Although several sources attributed the decrease in productivity to a natural "cycle" in the life of the castanheiras, natural ecological change (that is, change not caused by man) is almost certainly not the source of the problem. The idea that Marabá's castanheiras have come to the end of a natural cycle and are therefore all dying (da Silva Brandão, 3/89; Rodrigues, 5/89) is rather nonsensical from a scientific point of



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view, because all of the castanheiras in the region are not of the same age. (Von Atzinger, 5/89; Overall, 5/89) The other possible ecological cause frequently mentioned is drought, or at least severe dry seasons. (J. and A. Rosa, 5/89, for example) This may very well be the cause of yearly fluctuations in production and may even be the primary reason for the low level of the last harvest, but the downward trend shown in Table IV cannot be attributed simply to natural variations in the climate.<sup>29</sup> Other residents of Marabá argue, however, that deforestation in the region has led to a drier climate. (Bamerindus workers, 5/89; Morbach, 5/89) Although many scientists believe that continued deforestation will modify the local climate, there is as of yet no confirmed long term downward trend in yearly rainfall.

The most common explanation for decreased productivity on the castanhais is that smoke from the fires set for deforestation or pasture maintenance interferes with pollinization. Several species of large bees pollinate the castanheira's flowers during the months of October, November, and December. (Moritz, 1984) Nearly every person interviewed mentioned the detrimental effect of the smoke on these bees, noting that the trees still flower,

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<sup>29</sup> Many people in the castanha business were alarmed by the scarcity of last year's harvest. One resident of Marabá reported, for example, that his 400 hectare castanhal had not produced anything during 1988-1989, and he believed that this indicated an end to the castanha business. (Morbach, 5/89) The forested section of the Bamerindus ranch produced 4,000 hectoliters in 1987-88 and only 150 in 1988-89. The manager of the ranch, however, attributed this to rainfall patterns. During Sept., Oct., and Nov. of 1986 (when the castanha flowers bloom), there had been 425.4 mm of rain on the ranch. During the same period in 1987, only 178.6 mm had fallen. (de Proenca, 5/89) The area of forest did not change, and the number of fires for pasture maintenance probably decreased. Thus, the poor harvest was probably at least a partial result of climatic factors combined with natural variations in the production level.

but no longer produce as many fruits. (for example, Muller, 5/89) Nevertheless, there is no scientific evidence for the theory that the numerous fires set every summer have led to decreased pollinization rates. One unpublished study found no difference in the number of pollinators present in two castanhais, one of which was close to large scale forest burning and the other of which was located in a fairly undisturbed area. (Overal, 5/89) This study did not, however, include the actual pollination process, and more information is clearly needed before any conclusions can be reached.

A final reason for lower castanha productivity is a change in the regional labor market. Until the late 1960's there had always been an excess of labor and a fairly constant labor pool in the region, allowing the castanhal owners to choose their workers and depend on them to return year after year. This changed with the arrival of the roads and the discovery of mineral deposits nearby. "As mudanças sócio-econômicas ocorridas na região, significaram a desestruturação da força de trabalho empregada na unidade productiva do castanhal." (da Silva Bentes, et.al., 1988, p.19) The former castanha collectors now have a wide range of employment options, many of which pay better than work on the castanhais. (Von Atzinger, 5/89) The labor force in the area is larger but also more mobile, and the castanhal owners cannot depend on having the same workers every year. (da Silva Bentes, 1988) They still, however, follow the aviamento system, making them some of the less desirable employers in the region. Thus, they have suffered from a high worker turnover and from the lower productivity of inexperienced workers.

Several economic factors which could potentially result in fewer castanhais being explored have, in reality, probably not affected production over the past decade. One of these factors is the price of castanha on the international market. As seen in

Table II, the price of castanha has actually risen slightly, thereby encouraging the expansion and not the restriction of the area dedicated to castanha extraction.<sup>30</sup> Another possible explanation could be increased costs of transportation due to the construction of the Tucuruí Dam and the disruption of river transport. A study carried out by SUDAM in 1975, however, concluded that transporting castanha from Marabá to Belém by road was less expensive than by river, assuming that the roads were passable. (SUDAM, 1976) The state highway from Marabá to Belém has since been paved and is open the entire year. A former castanhal owner and the owner of processing factory in Belém both indicated that it is preferable to transport castanha by truck than by boat because it is faster and more secure. (Ferreira, 6/89; Benezcry, 6/89) Thus, the price at which castanha is sold on the international market and the cost of shipping it to Belém are not the causes of decreased production.

At least some castanhais have probably been removed from production due to land conflicts or recent changes in land tenure. Many of the enterprises which have bought land in the Marabá region do not have any previous experience with extractivism. Thus, they are not likely to immediately, if ever, begin organized extraction of castanha from their newly acquired properties. (Homma, 6/89) Economic activity is also curtailed on castanhais which have been invaded and are the subject of violent land conflicts, and on castanhais which are disputed as part of debt settlements between exporters and producers. The fifty-six castanhais expropriated in October of 1988 by the land reform

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<sup>30</sup>Taxes on the sale of castanha are also not likely to have affected production. The rate and collection efficiency are both quite low. The use of the official exchange rate for castanha exports in fact exerts a far greater tax on the exporters, but this is not a recent phenomenon, and many firms are able to partially avoid the requirement. (Benezcry, 6/89)

agency of the federal government are yet another example of forested areas which have been removed from commercial production due to the confusion of land politics. This situation is, however, almost always temporary, as the castanhais are either returned to extractivist production or converted to other land uses.

The deforestation of the castanhais is the critical factor in the reduction of castanha production levels. As noted above, many people believe that the burning associated with deforestation is the reason for decreased productivity in the remaining castanhais. While this remains to be proven, it is undeniable that deforestation inevitably destroys the extractivist potential of the deforested area. Because it is illegal to fell castanheiras in Brazil, they are often left standing when an area is cleared. When isolated in pastures, however, castanheiras either die due to fire damage, are blown over by the wind, or at least stop producing because they are isolated from the habitat of their pollinators. The SUDAM mapping department has attempted to calculate the total deforestation in the region of the Poligono, but its results have not yet been published.<sup>31</sup> No other studies have attempted to estimate the rate or total of deforestation of the castanhais, but all sources consulted indicated that it is significant and rapidly increasing.

This deforestation is a direct result of the federal governments' development plans for southern Pará. Development policies of the seventies and eighties have been implemented with the express purpose of replacing traditional extractive activities with more productive uses of the land. Castanha production is not a high priority for the policy makers because,

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<sup>31</sup>A preliminary map prepared by SUDAM appears to show between ten and fifty percent of the Poligono as deforested. (45%!)  
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in comparison to their goals for the region, it can only support a low population density and provide low profits per hectare per year. The development policies of the 1970's and 1980's, as local residents note, have been designed in the South of Brazil by southerners who are not familiar with the North. (for example, Morbach, 5/89) The local population, including the political elite of castanhal owners, was not consulted in the formation of new programs and policies. (Emmi, 1988) Thus, castanha extraction was not included as a priority or even as an activity to be maintained at current levels. "A nível federal os incentivos fiscais, os financiamentos e outras facilidades, visando o incremento de atividades agropecuárias e industriais na Amazônia, foram efetivados sem ações concretas de proteção às áreas de floresta castanheira." (da Silva Bentes, 1988, p.21)

The effect of the federal government's policy in the Marabá region is most obvious where the large development projects have been implemented. New roads, railroads, and powerlines built by federal agencies cut directly through the castanhais. The Tucuruí Dam flooded a large area of forest, and its high voltage power lines required that wide paths be cleared, many of them passing through castanhais which belonged to indigenous peoples.<sup>32</sup> (Filho, 1979; da Silva Bentes, 1988) The railroad built for the Carajás mine passes through another area of castanheiras. The direct effects of these projects on the

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<sup>32</sup> In 1988, total production of castanha in the indigenous areas of southeastern Pará was less than 2,500 hectoliters. (Campos, 3/89) The numerous relocations of these peoples and incursions on their land, as well as their acculturation under FUNAI policy, have resulted in decreased production by them.

castanhais are minor, however, when compared to the indirect effects of the access and infrastructure they have provided.<sup>33</sup>

As noted in the previous section, the construction of these roads made cattle ranching possible in the Marabá region. Over the last ten years, the chief threat to castanha production has been the creation of cattle pasture. Between 1978 and 1984, the number of head of cattle in the Marabá region increased 350 percent (from 123,974 to 554,400). (IDESP, 1985) Deforestation for pasture development is listed by researchers, journalists, academics, local residents, government officials, and the ranchers themselves as one of the primary reasons, if not the most important one, for the decline in castanha production.

Although the roads were an essential precondition, few people would have invested in cattle ranching without the additional incentive of fiscal support from the federal government. Many researchers have demonstrated that cattle ranching would not be profitable, even in the short term when yields are highest, without government incentives and land speculation. Da Silva Bentes writes that "essa prática [of conversion to pasture] não resulta em atividades produtivas que compensem tamanha destruição, significa, essencialmente, maiores lucros individuais e maior concentração da terra." (da Silva Bentes, 1988, p. 19)

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<sup>33</sup> Another government program, however, does have quite significant direct effects on the environment. Several pig iron plants have been established in the Marabá area and more are planned under the government's Greater Carajas development program. These plants operate with wood charcoal produced in large part from native forest. (Oren, 3/89) Although charcoal production is probably not yet a major cause of the decrease in the castanha harvest, its potential for damage is enormous. A civil suit has been filed against the federal government and the pig iron program, but it is unlikely that the plants already in operation will be shut down.

A mathematical simulation of the economics of cattle ranching in the Amazon designed by Hecht,etal essentially confirms this argument. They found that the internal rate of return to a corporation's own resources is much higher than the rate of return for all resources invested in a ranching operation. (Hecht,etal,1988,p.238) According to the simulation, "cattle ranching is profitable to the corporation because of the fiscal incentives, low interest loans, tax benefits, inflationary hedges and land speculation."(ibid,p.239) According to Susan Hecht,

"The environmental degradation associated with pasture development in eastern Amazonia is best understood as a consequence of the role of land in inflationary economies, the traditional function of livestock as a means of acquiring large areas (and the institutional rents associated with them), the stimulating effect of the physical opening of the agricultural frontiers on certain industrial sectors of the economy, and the role of large government subsidies in the creation of land markets and speculation." (Hecht,1985,p.680)

All of these sources emphasize the importance of land speculation and the rapid increase in the value of land as determining factors in the profitability of cattle ranching. Hecht, etal conclude that deforestation for cattle ranching will continue even without government incentives and credits for as long as the high rates of increase in land value continue.<sup>34</sup>

According to this analysis, government intervention was necessary to start the process of clearing for pastures but will not be necessary for it to continue. With annual increases in

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<sup>34</sup>Government incentives for cattle ranching have been temporarily suspended under the Nossa Natureza program, so their future is unclear.



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All of these sources emphasize the importance of land speculation and the rapid increase in the value of land as determining factors in the profitability of cattle ranching. Hecht, etal conclude that deforestation for cattle ranching will continue even without government incentives and credits for as long as the high rates of increase in land value continue.<sup>34</sup>

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<sup>34</sup> Under current government policy, SUDAM may not grant any new fiscal incentives for cattle in areas which are, or once were, forested. This does not prevent the disbursement of funds already approved. Even before this policy formally went into effect, however, SUDAM had stopped making new grants and was having difficulty paying old ones due to lack of funds.

According to this analysis, government intervention was necessary to start the process of clearing for pastures but will not be necessary for it to continue. With annual increases in the value of land at 140 percent or higher (calculated for the mid 1980's by Hecht, et al), castanha production cannot compete with land speculation as a source of profits. The two are not compatible enterprises, because the land market deals in "improved" (i.e. deforested) land, and because government policies and agricultural reform have increased the pressure to deforest landholdings.<sup>35</sup>

The government's land reform policies in southern Pará have led to the deforestation of productive castanhais in several ways: by encouraging small farmers to invade castanhais and clear agricultural plots in hopes of receiving title to a piece of property; by expropriating castanhais and then leaving them without any organized settlement plan; and by encouraging castanhal owners to sell to larger, better protected corporations in order to avoid expropriation. In the 1960's, migration and agricultural reform were important goals of the federal government's development plans for the Amazon. By the 1980's, they could better be classified as one of the government's most troublesome problems in Amazonian development.

Southern Pará has been particularly prone to violent land conflict and has been under the administration of several different land reform agencies. INCRA (Instituto Nacional da Colonização e Reforma Agraria) was created in 1970 to distribute federal lands to colonists and mediate in land disputes. By the late 1970's, however, the number of land conflicts in the Marabá

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<sup>35</sup>Christopher Uhl notes that one such government policy allows ranching to be used "as a justification for laying claim to land when the real motive is to gain control of mineral rights." (Uhl, unpublished, p.6)

region had increased sharply, with thirteen large conflicts occurring during 1979 and 1980 alone. As a result, "na tentativa de suprir essa inoperancia do INCRA- mas, ao mesmo tempo, dando continuidade à prática de priorizar a regularização fundiária, sem alterar o regime de posse e uso da terra - foi criado, através do Decreto-lei 1.167 de 01 de fev de 1980, o GETAT. Diretamente vinculado ao Conselho de Segurança Nacional, teria como finalidade 'coordenar, promover e executar as medidas necessárias à regularização fundiário no sudeste do Pará, norte de Goiás e oeste do Maranhão." (Emmi et al, 1987, p.16) During the five years of its existence, GETAT handed out titles at a much faster rate than INCRA ever had or MIRAD ever would. (Leite, 5/89) Late in its term, however, the agency became increasingly ineffective and unpopular and its mandate was not expanded beyond five years. Thus in 1985, the land conflict problem was handed over to the Minister of Agriculture, and GETAT became MIRAD (Ministério da Reforma e do Desenvolvimento Agrário). MIRAD has recently become INCRA once again.

The fact that the Marabá region has been governed by so many different land reform agencies has in itself increased the rate of deforestation by adding to the confusion over land tenure and the necessity of laying claim to land by clearing it. Property titles and boundaries are often conflicting. INCRA records show that properties rarely have the same number of hectares titled and demarcated, reflecting the frequency with which property owners expand their boundaries. The Sindicato Rural de Marabá, which represented most of the castanhal owners, explained another problem in a letter to GETAT in 1980: "na região de Marabá, quase toda a área de castanhais não são titulados, principalmente porque a titulação dos castanhais foi interrompida com a transferência, para o domínio da União, das terras devolutas na faixa de dez quilômetros dos rodovias federais." (Sindicato Rural,

1980, p.4) This again reflects the problems caused by the federal government's sudden interest in the area during the late 1960's and 1970's when roads were built and the lands along them taken by the federal government for the purpose of colonization.

The rapid population increase has also been a factor in the numerous land conflicts and expropriations during the last ten years. The population of the Marabá region in 1984 was four times what it had been in 1978, and by 1987, it had increased seven times over that of 1978. This increase was due in large part to the immigration of families looking for land. The number of properties in the region has also increased, and properties smaller than 100 hectares have taken an increasing share of the land area. On the other hand, the number of extremely large properties also increased, and land distribution remains very unequal. (See Table Six.)

TABLE VI

Land Distribution in Marabá

#= number of properties; area is in hectares

Year	≤ 100 HA		100 to 1000 HA		1000 + HA	
	#	area	#	area	#	area
1975	4398	113,522	2901	463,702	437	1,560,351
	57%	5%	38%	22%	6%	73%
1980	2767	154,060	347	661,457	402	1,615,029
	79%	6%	10%	27%	11%	66%
1985	10,529	435,633	4124	728,887	307	1,137,787
	70%	19%	28%	32%	2%	49%

source: IBGE, Censo Agrario, 1976, 1981, 1986.

The possibility of invasion and occupation of land has led many castanhal owners to either deforest on their own or sell out to large corporations who will eventually deforest. According to the former director of the Catholic Land Commission, colonists only invade forested land, primarily because the soil is more fertile and secondly because of the value of the timber. (Wambergue, 5/89) This clearly increases the desirability of deforestation for anyone who wishes to avoid having their land invaded, especially since the government has never developed a coherent settlement plan for Pará. Da Silva Bentes notes that in the last ten years, many castanhal owners have given this reason for converting their castanhais into ranches: "intencional é a decisão de substituir as castanheiras por capim, de queimá-las e de 'limpar' a área para livre circulação de gado ... justificam serem obrigados a fazê-la para evitar as 'invasões'". (da Silva Bentes, 1988, p.19) Many INCRA officials, however, believe that this "fear" is little more than an excuse to create pastures with which fiscal incentives may be captured.

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The various land reform agencies' policies towards expropriation has probably only had a limited effect on deforestation. The Sindicato Rural noted that "a política fundiária até então adotada pelo INCRA estimularia o desmatamento feito pelos posseiros ou ocupantes, porque este órgão só reconhece como benfeitoria a cultura permanente (praticamente inexistente na região) o a pastagem. E como a infraestrutura voltada para o extrativismo não é considerada como forma de ocupação, ocorre o desmatamento indiscriminado para a formação de pastagens que possam garantir a posse da terra." (Sindicato Rural, 1980, p.3) Until 1986, however, none of the castanhais with an aforamento title in the Marabá region had been expropriated by the federal government. (Enjenia, 6/89). This was in large part because the land still officially belongs to the

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state government, with the landowners only holding usufruct rights. The land reform agencies had preferred to avoid a potentially troublesome legal problem and therefore did not expropriate the properly titled castanhais. (Paraguassú, 6/89)

In 1986, one castanhal was expropriated and paid for by the federal government at a price well above market value as an emergency measure. This castanhal, "Araras," was used to settle a group of small farmers who had to move from an indian reservation.<sup>36</sup> In all documents related to this expropriation, MIRAD noted that its "exceptional nature." Nevertheless, in 1988, MIRAD again paid a high price to expropriate fifty-six castanhais. This time, however, the owners of the castanhais themselves (mostly members of the Mutran family) had asked that their land be expropriated, knowing that only the federal government would pay them so well.<sup>37</sup> Thus, the fear of expropriation is much less of a factor in deforestation than the threat of land invasion. Once the land has been expropriated, however, government policies once again encourage deforestation.

When land is expropriated by INCRA (or formerly by GETAT or MIRAD), it is always divided into lots that are too small for a family to live from extractivism and is frequently divided into lots that are too small for a family to live from subsistence agriculture over an extended time period. The average lot size given to colonists is fifty hectares, which is not large enough to allow a family to maintain a small forest reserve for

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<sup>36</sup> The indians, in order to attract attention to the fact that the farmers had been settled within an indigenous reservation, blocked the Carajás railroad. The Carajás mining company then pressured MIRAD to take immediate action.

<sup>37</sup> MIRAD paid for the castanhais with "tda's," or títulos da dívida agrícola, which are adjusted for inflation, may be sold to other parties, and may be redeemed two to twenty years after they are issued.

extractive products. The entire lot, including any castanheiras, is usually deforested.<sup>36</sup> If an area is densely occupied, the colonists will receive smaller lots. (de Pontes,5/89) In either case, without any infrastructure or supporting services, the colonists are likely to have a hard time maintaining acceptable levels of production and/or getting their products to market. The end result is that many colonists sell their land back to the original landowner or to someone else with sufficient capital when the soil fertility is too low for agriculture but still suitable for pasture. (Leite,5/89;Evangelista,5/89;Von Atzinger,5/89) This tendency to sell out is of great concern to rural unions and has led to widespread disillusionment with land reform programs.(Evangelista,5/89)

The castanhais expropriated in 1988 have suffered more from a lack of government action than from any definite government policy. Although MIRAD/INCRA's project proposals for settling the castanhais include the continuation of castanha extraction through larger lots and appropriate infrastructure, no concrete steps have been taken to rationally settle the areas. They are thus being invaded by loggers and small farmers who burn the castanheiras for charcoal. This is largely a result of the fact that INCRA is currently very poorly funded, like most federal agencies.

The complexity of the land issue in Marabá has meant that there is no clear "guilty party" to be blamed for the deforestation of the castanhais. Every actor tries to fix the blame on someone else. Thus, each land reform agency blames its successor for keeping bad records and complicating rather than improving the land tenure situation.. INCRA officials also tend

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<sup>36</sup> Colonists are especially likely to completely deforest the land when they come from another region and are accustomed to a different type of agriculture.

to blame the colonists who sell out and invade new areas, and the "grileiros," or people who deal in land, for driving the cycle of land speculation and for producing illegal land titles. (Leite, 5/89) Both the colonists and the large landowners, on the other hand, blame the government agencies for not providing sufficient support for the colonization projects and for failing to prevent violent land conflicts. (Gomez, 5/89; Mutran, 1987)

The fundamental debate, however, is between the castanhal owners, the new business enterprises from the South, and the migrant colonists. The castanhal owners usually blame the colonists for deforestation and for the decrease in castanha production. (Emmi, 4/89) See Table Seven, adapted from Kitamura (1984), for the other causes named by the castanhal owners. Most researchers, however, blame the owners themselves:

"O extrativismo da castanha não alterou suas formas de produção e de organização do trabalho, de maneira a responder aos desafios e às exigências da fase atual da economia. Ao contrário, buscando sua reprodução, enquanto fração de classe dominante, os 'donos de castanhais' transformaram os castanhais em fazendas. ... Ao mesmo tempo, para justificar a perda de hegemonia e a mudança de atividade econômica, elaboraram uma explicação a nível do discurso, onde o bode expiatório são seus opositores imediatos: os 'invasores' dos seus domínios." (da Silva Bentes, 1988, p.20)

Local union representatives and church supporters argue that land invasions could not possibly be the cause of the deforestation because there are simply not enough of them to account for the huge area that has been deforested. (Evangelista, 5/89; Wambergue, 5/89) Both the colonists and the castanhal owners blame the large corporations from the South who have invested in the region. The manager of the Bamerindus ranch denies these



charges, however, pointing out that his ranch is going to maintain 30,000 hectares of continuous castanheira forest in compliance with the federal law which requires that fifty percent of every property be left with forest cover. (de Proença, 5/89)<sup>39</sup> The large landowners are certainly responsible for most of the deforestation, but it is government policy which has made it profitable and rational for them to deforest.

TABLE VII

TABELA 4 — Principais causas da depreciação dos castanhais na região de Marabá — novembro de 1985.

Causa	Frequência absoluta	Frequência relativa (%)
• a legislação sobre sua proteção não é aplicada	14	77,77
• é necessário desmatar para evitar a entrada de invasores	14	77,77
• o governo não consegue fiscalizar a derrubada	13	72,22
• quem derruba são os invasores	13	72,22
• necessidade de cultivar a terra (pecuária)	10	55,55
• a multa pela derrubada das castanheiras não é aplicada	7	38,88
• o preço pago pela madeira pela tora de castanheira é muito bom	6	33,33
• necessidade de explorar a madeira da área	4	22,22
• para qualificar ao benefício da política de incentivos fiscais	4	22,22
• o rendimento de castanha por ha é muito baixo	4	22,22
• necessidade de desmatar para requerer título	4	22,22
• o preço pago pela castanha não é compensador	3	16,66
• não existe uma legislação específica sobre sua proteção	1	5,55
• no desmatamento derrubase tudo	1	5,55
• o governo não tem interesse na preservação das castanheiras	1	5,55

source: Kitamura, 1984

Despite the fact that it is illegal, many lumber companies in the Marabá region harvest castanheiras, primarily because the agency responsible for protecting the trees does not have sufficient resources to carry out its duties. Laws no. 4,771 and no.449-P of the Federal Forestry Code of Brazil prohibit "o abate

<sup>39</sup>This ranch may very well selectively log its forests, however. In addition to directly damaging the forest left standing through the use of heavy equipment and the felling of some trees, selective logging makes forest fires possible, further reducing the likelihood that this area will remain a productive castanhal. (Ulh & Bushbacher, 1985)

e a comercialização da castanheira (*Bertholettia excelsa*) e da seringueira (*Hevea brasiliensis* sp), bem como os desmatamentos em área de ocorrência natural de maciços das espécies." (da Silva Bentes, 1988, p.21) These laws are not completely without effect, as amply demonstrated by the numerous castanha trees left standing in the cattle pastures along all the roads in the Marabá region (the so-called *cemitérios de castanha*). They are, however, currently ignored by most sawmills. In 1988, "somente em Marabá existem cerca de 200 serrarias. Segundo informações (entrevistas), apenas 6 não serram castanheiras." (da Silva Bentes, 1988, p.20) Castanheiras provide large amounts of quality wood and are therefore in demand by the sawmills. Each castanheira provides an average of ten to twelve cubic meters of sawn wood, and they generally do not have any defects which would cause problems with sawing. (Overal, 5/89; Filho, 1979) The wood is excellent for heavy construction work, and is sold on the internal market under various other names. (Casa da Cultura, 1987) Logging activity has increased since the construction of the Tucuruí Dam, because loggers can now obtain permits to extract castanheiras from the reservoir but use these permits for wood from other areas. (VonAtzinger, 5/89; Neves de Souza, 5/89) There are unfortunately no good estimates of the amount of illegal logging in Marabá, precisely because it is illegal.

The agency responsible for enforcing the forestry code - the IBDF of the IBMARNR<sup>40</sup> - does levy fines against loggers and sawmills but has had little effect on the industry. The director of the local IBDF office says that it suffers from a multitude of problems: only four officials with one jeep responsible for four million hectares; officials are underpaid (approximately US\$250

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<sup>40</sup>The Brazilian Institute for Forestry Development has become part of the Brazilian Institute for the Environment and Renewable Natural Resources.

per month), making it easy to accept bribes; the guards are not trained; and the money from fines goes to Brasilia and does not return to help finance the local office. Once again, deforestation in the castanhais can be traced directly to federal government policy, in this case, the lack of funding and support for environmental agencies. Although logging activity is a popular scapegoat among residents of Marabá seeking a convenient explanation for the decrease in castanha production, it generally only occurs in conjunction with the creation of cattle pasture. The two cannot be separated, and together they are bringing an end to the Poligono of the Castanhais.

## Proposals to Preserve Castanha Extraction

While the cumulative effect of government policies and individual reactions to them in the Marabá region has been to encourage deforestation and the destruction of the castanhais, politicians<sup>41</sup> and government reports have consistently called for just the opposite: the preservation of the castanhais and the extractive system. The need to address the problems plaguing the commercialization of castanha have been a constant theme in both political rhetoric and the press ever since other sectors of the economy first challenged castanha's privileged position in the 1960's. Except for the representatives of these new economic sectors, very few people in Pará have openly disputed the economic importance of castanha or the benefits of continuing the current extractive system. Most press reports and academic literature on the subject also accept the premise the castanhais must be "saved." A typical article in Q Liberal, a Belém newspaper, reported that government land reform policies needed themselves to be reformed because they were resulting in the deforestation of the castanhais, thus undermining the resource base for a product which "já esteve em primeiro lugar e permanece em quarto lugar na pauta das exportações paraenses." (Q Liberal, 9/28/86, p.20) The local museum in Marabá has also contributed to public awareness of the problem, promoting a "week of the castanha" every year, holding seminars, and circulating petitions. (Von Atzinger, 5/89) The castanhal owners, however, have been the most influential in ensuring that the fate of castanha extraction remains a political issue.

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1 In the federal legislature, for example, delegates have denounced the deforestation of castanhais in Marabá, one calling for a "*policia florestal*" to protect them.

Since the late 1970's, the castanhal owners, represented by the Sindicato Rural de Marabá<sup>42</sup> and the Castanha Exporters' Association, have been sending letters and proposals to various government agencies with the goal of protecting the castanhais. In 1979, a letter went to the Minister of Justice protesting the land invasions along PA150 and INCRA's policies in the area, which the landowners thought favored the invaders. (Sindicato Rural, 1979) When GETAT was created in 1980, the Sindicato promptly sent a letter outlining its proposal for regularizing land titles in the area in a manner which would ensure the continued viability of castanha extraction. This proposal was the first to include the demarcation of a priority area for the preservation of castanheiras and to ask that titles be granted only to those who already owned productive castanhais (and had therefore demonstrated that they could manage them). In its letters and lobbying efforts, the Sindicato was essentially calling for the enforcement of Pará's original land legislation which had only allowed the state to "lease" areas rich in castanheiras for the sole purpose of castanha extraction. In every new proposal, however, there were additions and modifications. In 1980, for example, the Sindicato wrote that "considerando que a produtividade média de um castanhal nativo é relativamente baixa (em torno de .25 HL/HA, podendo atingir .55 HL/HA), e que a produção oscila muito de um ano para o outro, conclui-se de imediato que para ser econômico um castanhal nativo deve ter uma área grande, ou seja, em torno de 3000 HA." (Sindicato Rural, 1980,p.4)

Although GETAT never acted on the 1980 proposal, the Sindicato continued to promote the idea of a priority area for castanha, calling it the "Poligono dos Castanhais," and loosely

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<sup>42</sup>The Sindicato is distinctly different from any workers' union. Marabá also has a Sindicato dos Trabalhadores Rurais.

defining it as the area south of Marabá richest in castanheiras, covering somewhat less than a million hectares. In 1983, the Sindicato approved a six part plan: (1) designate the area, but allow landowners to exclude their property if they wish; (2) demarcate the area following natural boundaries where possible, but include properties outside of the area if the landowners wish; (3) post the area; (4) limit activity in the area to the extraction of castanha unless the landowner obtains a license (to create pasture, for example); (5) strengthen the judiciary and police systems within the area; and (6) promote further discussion. (Sindicato Rural, 1983) The president of the Sindicato Rural at that time had already been lobbying for the implementation of a similar proposal. (Ferreira, 5/89) He says that although his idea was received favorably by officials at all levels of the state and national government (including the country's president), official policy in regards to the castanhais never changed. Legislation based on the 1983 proposal was even introduced in the national congress, but it never became law. (da Silva, 4/89) Despite these failures, the "Polígono dos Castanhais" has been accepted as the basis for the political debate over the future of castanha. All sources interviewed referred to the Polígono as the area of greatest concern, and many government maps and documents treat it as a legal entity.

The castanhal owners gained this widespread approval of their proposals to preserve the current extractivist economy in Marabá by supporting their position with arguments based on social welfare and environmental preservation. The 1980 letter to GETAT emphasized the economic importance of castanha for the society:

"O memorial desenvolve toda uma argumentação que enaltece a economia extrativa da castanha: ela é fonte de divisas para o país; é grande absovedora de mão de obra; oferece grandes

possibilidades de expansão e, principalmente, tem mercado assegurado. O valor dessa produção extrativa supera a produção pecuária; se incentivada, a castanha pode continuar como principal produto da região de Marabá." (Emmi, et al., 1987, p.16)

In other documents, the Sindicato emphasized the nutritional value of the castanha, lauding it as a potentially important protein source for the national population. (SUDAM, 1982) The owners attempted, and for the most part succeeded, to equate support for an important economic sector, preservation of a societal resource, and the maintenance of a socioeconomic system highly favorable to themselves.

As originally proposed, if enforced, the Polígono would protect the large landholders who extract castanha against newcomers to the area, both colonists and ranchers. Emmi notes that "supõe e quer impor uma territorialidade para o poder econômico e político, hoje contestado, de segmentos ou grupos dominantes na economia da castanha." (Emmi, et al., 1987, p.12) All sources interviewed, except for those connected to the castanhal owners, explained the Polígono proposal as an attempt by the landowners to maintain their power. A group of Brazilian researchers concluded that:

"O preservacionismo embutido na proposta de criação do Polígono Castanheiro do Tocantins, oculta outros interesses: o monopólio da coleta e do comércio dos frutos e, o mais forte, a manutenção dos seus domínios sobre grandes extensões de terras."

(Da Silva Bentes, et al., 1988, p.22)

Thus, for example, the 1980 proposal that properties be granted with the minimum size of 3,000 hectares was designed to exclude small farmers and maintain the large landowners' control. Control over land in southern Pará is important as a means of

establishing rights to any sub-soil resources, as a means of capturing fiscal incentives for "improvements" on that land, and as a means of cashing in on the rapid rise in land prices due to land speculation. Although most of the castanhal owners did intend to continue extracting castanha if their properties could be guaranteed by the government, many of them were probably even more interested in these side benefits of land ownership.

The castanhal owners' limited interest in increasing the production of castanha in the state is clearly demonstrated by their reaction to the newly available techniques for "*cultivo racional*" of castanha. As noted earlier, except in the empty words of policy statements, the government has not been very supportive of castanheira plantations. The castanhal owners in Pará have, however, been even less supportive. In the 1982 National Symposium on the Castanha, the Castanha Exporters' Association was firmly against the implementation of castanha plantations in the state. (SUDAM, 1982) They justified this by saying that plantations would result in over-production and a fall in the price of castanha. This, however, would not have been the case if they had also followed through on their plans to expand the internal market. To date, none of the traditional castanhal owners have invested in planting castanheiras. (See Appendix I.) Although this can be explained in large part by the insecurity of land tenure in southern Pará, it also demonstrates the owners' unwillingness to invest their own resources in castanha production. This again indicates that their interest in retaining the castanhais has more to do with land politics than productive economics.



## Conclusion

The decline in the production of castanha in the Marabá region has been one of the results of the federal government's ambitious development policies for the Amazon, first implemented under the military government of the 1960's. From approximately 1925 to 1965, the socioeconomic and political organization of Marabá was determined by the commercialization process for castanha and characterized by the dominance of a small local elite of landholders. In the 1960's, their monopoly on political and economic power was broken by new enterprises which were supported by the federal government. The castanha harvest, however, did not suffer notably until the mid-1970's. During the 1980's, castanha production has decreased dramatically.

The most vehement protests against government policy have come from the owners of the castanhais. They clearly also have had the most to lose. The traditional production system for castanha concentrated profits in their hands and in the hands of the exporters. Before the 1960s, the castanha economy had contributed to the general welfare in that it had provided employment in a region where there were few economic options and in that it had been one of the most important export products for the Amazon region, generating significant foreign exchange. By the 1980's, however, Marabá had developed a highly diversified economy and exports from the Amazon region had grown tremendously, especially in terms of mineral wealth, making castanha of relatively minor importance in the overall trade balance. The castanhal owners themselves have in many cases been able to adapt and profit from this new situation, clearing their castanhais for cattle pasture, thereby capturing fiscal incentives, or selling them to the federal government for excellent prices under land reform policies.

Although many individuals have benefited from the government policies which have led to the deforestation of the castanhais, the long-term effect is to destroy an important societal resource base and therefore to decrease the social welfare. The alternative land uses which have been implemented yield short-term profits but leave behind degraded, useless land. If left standing, the castanhais would continue to produce castanha forever and would at the same time would provide numerous other products such as fruits, nuts, and resins. In addition, they would protect the watershed of the Tocantins, provide habitat for game, and continue to play their essential role in the regional hydrologic cycle. Castanha production will continue to decline and the castanhais will continue to be deforested unless the Brazilian government develops new policies which recognize the important environmental benefits of the castanhais and the long term economic value of castanha.

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## Appendix I

### New Production Systems: *Cultivo Racional*

Researchers have been working on plantation techniques for castanha since the 1960's, and several plantations had been established by the late 1970's. The early plantation system involved growing full-sized castanha trees, which usually take almost fifteen years to even begin production. They were planted in cleared areas, and the recommended spacing was thirty by thirty meters. (EMBRAPA, 19 ,p.179) There has never been a high level of investment in this type of plantation, however, probably due both to the delay before production and to the low levels of productivity that have been obtained on the plantations that have been established.<sup>32</sup> Anderson, a researcher at the Museo Goeldi, points out that although castanheiras are not prone to disease, they do not produce well in plantations, perhaps due to pollination problems. (Anderson, 3/89) Nelson, a researcher at INPA, however, studied perhaps the largest castanha plantation in existence and concluded that pollination was not a problem:

"Secondary growth near the Aleixo plantation supports a bee guild which appeared to effectively pollinate almost every flower on the Brazil Nut trees studied." (Nelson, 1985, p.225)

Nelson attributes the low productivity to poor soils. In either case, there are severe drawbacks to traditional plantation systems for castanheiras. The extensive spacing, the long delay before production, and the care required by the seedlings have all acted as deterrents to potential investors.

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<sup>32</sup> There is not any reliable data on production available from EMBRAPA due to the lack of security at their research sites. Much of the castanha produced in EMBRAPA fields is harvested by trespassers before it is ever recorded by researchers. (Ferreira, 2/89; Muller, 5/89) Thus, the only information available is from the few commercial plantations.

During the seventies and eighties, plantation techniques for castanheiras have been refined. The problems of difficult germination, long maturation, and a low ratio of fruits to flowers have all been addressed by researchers. EMBRAPA now recommends a technique for removing the shell before seeds are germinated, thus reducing germination time from eighteen months to three weeks.<sup>33</sup> The number of years before production begins has been reduced to seven by grafting techniques. The grafting method also allows more trees to be planted per hectare, with the spacing reduced to ten by ten meters. By selecting natural material known to be highly productive, the ratio of fruits to flowers has been improved. (EMBRAPA, 19; Ferraz, 4/89) Various books produced by EMBRAPA explain this technology and the fairly intensive care required by young castanheiras. There are, however, very few experts in castanha cultivation, (Ferreira, 2/89) and many factors, such as fertilization, have not yet been researched.

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Thus far, plantation technology has been developed primarily for large landholders. Hans Müller, the foremost researcher in the field, has promoted castanha plantations as sustainable, productive alternatives to traditional agriculture. He believes that castanha could be planted in almost any area of Amazonia, not just where it occurs naturally in high densities, such as in Marabá. The system he has developed is of special importance to areas where there is a pronounced dry season, because the castanha trees, when planted in pasture, help maintain the productivity of the pasture by protecting it from the sun. Thus, rather than promoting an alternative to the creation of cattle pasture, he has developed a means of reviving pasture and increasing its productivity by combining cattle and

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<sup>33</sup>With this technique, germination time actually varies between three weeks and six months. (Rodrigues, 5/89)

castanha production. (Muller, 5/89) Muller believes that large landowners are the most likely to invest in planting castanheiras, precisely because of the large investment required.

In addition to the degraded pasture system, however, there are other alternatives for planting castanha, some of which could be used by colonists if the necessary infrastructure and training were provided. Castanha seedling would be planted along with annual crops in a slash and burn system of agriculture. Once the old fields were allowed to return to forest they would not be burned again in order to protect the castanheiras. Although people are interested in this system, it has not been worked out as well as the one for combining pasture and castanha. (Q Liberal, 4/1/89; da Silva Bentes, 4/89) Castanha plantations could also be combined with more traditional perennial crops. A government document suggests, for example, that plants which require shade, such as cacau, cupuaçu, and guaraná, <sup>cole</sup> be planted among castanheiras. (CEPA/Acre, 1980) Once again, however, little research has been done on this possibility.

Only a few enterprises have invested in planting castanheiras, either grafted or natural. Perhaps the most successful one so far has been the "Agropecuária Aruanã" ranch, located near Manaus. Using the grafting techniques developed by Hans Muller, this enterprise claims to have recuperated 3,700 hectares of degraded pasture by planting castanheiras. (Q Liberal, 4/1/89) Although the castanheiras have started producing, the ranch has yet to make a profit from the castanha harvest. (Ferraz, 4/89) They did, however, receive a large government subsidy which covered many of their start-up costs. In Mato Grosso, the Alta Floresta private colonization project included a program for planting castanha. Seedlings and training were provided for the small farmers in the colony. (Muller, 5/89) In Pará, none of the traditional castanhal owners have invested

in plantations, (Muller, 5/89) nor have the vast majority of the colonists. In fact, only two projects for planting castanheiras on a large scale have been initiated in southern Pará, the traditional castanha region.

One of these projects is the Ararás colony, located to the east of the city of Marabá. The colony was created when a group of small farmers had to be moved from an area that had been designated as an indigenous reserve. These settlers, represented by their union, chose the Ararás castanhal from the three options that GETAT gave them as the site of the new colony. (Wambergue, 5/89) These colonists refused to move onto the site until roads were built in late 1987. Thus, today all of the plots have access to a road, although the roads are not maintained and were closed through much of the rainy season in 1989. (Gomez, 5/89) Ninety-two families received plots of fifty hectares each. These families, however, are not all members of the union or even of the original group of settlers that was moved from the indigenous reservation. The extension agent who works with them estimates that about fifteen percent of the families were already living on the castanhal when it was expropriated and colonized, and about ten percent are from totally different areas, but were chosen by GETAT to receive land in Ararás. (Bejarra, 5/89)

Because the colony was established on an expropriated castanhal, the colonists' land is rich in castanheiras. Fifty hectares per family, however, is clearly not enough land for the families to live by the extraction of forest products alone, especially considering that many of them are immigrants and not familiar with the resources to be found in Amazonian forests. The colonists have proceeded with slash and burn agriculture, not cutting the castanheiras but usually killing them through their use of fire. (Bejarra, 5/89) Thus, without any additional outside influences, the colonists in this region would probably

have rather quickly deforested their land, leaving behind unproductive secondary forest and exhausted soils only viable for pasture.

Three months after the colonists settled in Ararás, however, an extension agent was assigned to the area by EMATER, and he began a new program for combining the traditional agriculture with silviculture. As a result, one year later, 7,000 castanheira seedlings have been planted in the small farmers' first fields. The program created by this extension agent would provide various types of seedlings to the colonists, teach them how to care for them, and hopefully leave a productive forest behind in each three to four hectare lot that the colonists clear. The local union has actively promoted this program, and further support has been received from the independent "Centro Agrario do Tocantins," run by the former director of the Catholic Land Commission. (Bejarra, 5/89)

There are numerous problems to overcome if this program is to be successful in the future. The extension agent who began the program is being transferred to another area by EMATER, and thus will not be able to continue organizing the distribution of seedlings and agricultural training for the colonists. He did not know if his successor in the position would continue his project. (Bejarra, 5/89) He believes that he is probably being transferred because he pressured FUNAI and CVRD to hard to build the community infrastructure, such as a meeting house and a plant nursery, that they promised the colony. The lack of the infrastructure increases the difficulties of continuing with the program. There are also conflicts among the colonists, principally among the three groups mentioned above, leaving the union in a weak position to continue the project on its own. Furthermore, some of the colonists have never received official "licenses of occupation" for their land, and as long as they are

uncertain about their future in the area, they will be unlikely to invest much time and effort in such a long term project as planting castanha. (Gomez, 5/89) Thus, although this project has been initially successful, it seems unlikely to last long.

The other case in which castanha has been planted in Pará also faces an uncertain future, although for different reasons. The Marabá Agro-Pastoril ranch, owned by the Bamerindus bank, covers approximately 60,000 hectares of former castanhais south of Marabá, near the PA150 highway. The bank bought the land in 1978, but it was not clearly demarcated until 1982, when some of the surrounding areas were also established as colonization projects by GETAT. The ranch has cleared 25,000 hectares for cattle pasture and plans to clear the remaining 5,000 hectares allowed under the law which requires fifty percent of any property remain forested. (de Proenca, 5/89) The manager of the ranch says the remaining 30,000 hectares of castanha forest will not be sold, but will be utilized for the extraction of castanha. He indicated that it was also possible that this land would be selectively logged, which could damage a large percentage of the castanheiras.

Since 1978, the ranch has been carrying out various projects involving castanha plantations. In 1978, 18,000 castanheira seedling were planted on 720 hectares as part of a program partially funded by IBDF. In 1983, another 780 hectares were planted with castanheira seedlings under a SUDAM program. In both cases, the castanheiras were planted underneath the canopy of natural forest in areas where the undergrowth had been cleared away. Grafted castanheiras, which require full sunlight, were therefore not used. The idea behind these programs was to create a more productive natural forest, where castanha production would be concentrated. The ranch manager says, however, that planting and maintaining the castanha has proven to be more expensive than

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expected, and the ranch is therefore not currently planting any new areas with castanheiras, but simply maintaining the 1,500 hectares already planted.<sup>34</sup> The trees have grown very slowly, and over fifty percent of them have had to be replaced. (Rodrigues, 5/89) The ranch is also no longer receiving financial aid from any government agency to plant the castanheiras, further reducing the incentives to continue investing in this project.

The circumstances surrounding both of these attempts to plant castanheiras in the Marabá region are exceptional. It is highly unlikely that either project would have been undertaken without government assistance, assistance that is not generally available. Few extension agents are able or interested in beginning such ambitious programs as the one at Ararás. The Bamerindus bank, on the other hand, as a privileged national corporation, was in a good position to receive government incentives. Landowners without connections to the government would probably find it difficult to arrange large aid packages for themselves. Also due to its privileged position, the Bamerindus bank has greater security in terms of land tenure than many other property owners in the region. The bank's land is highly unlikely to be expropriated, and thus it can afford to invest in a project which will not give returns for many years.

There are many obstacles to the general development of a production system for castanha based on "rational cultivation." The high initial investment with delayed returns is probably the most important obstacle. The facts that a fairly extensive infrastructure and technical knowledge about germination and grafting techniques are necessary also act as deterrents.

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<sup>34</sup> The director of silviculture on the ranch estimated that it costs approximately US\$350 (1989 price) to raise the seedlings for, plant, and maintain for one year a hectare of their castanha plantation. The expenses then continue every year, for replacement of seedlings and cleaning of the area.

Government incentives are not widely available for castanheira plantations as they are for cattle ranches. The price of castanha on the international market cannot be assumed to always remain steady or rise, especially because castanha is a luxury product. (SEFA,1986) If many people did invest in castanha plantations, and production greatly increased, the question of whether or not there is a large enough market for all of the castanha produced would then arise. Thus, although the experimental results are appealing, in reality, investing in castanha plantations may not be an economically rational step.

For much the same reasons that the original castanhais are being destroyed, it is unlikely that castanha plantations will be developed on a large scale in southern Pará in the near future. The uncertain land tenure in the region only increases the economic uncertainty of investing in castanheira plantations. As long as the prices for deforested land are rapidly rising, the profits to be had from deforesting and selling an area will make it extremely difficult to invest in any long term project which maintains forest cover.

## Bibliography

- A Provincia do Pará. Various articles, Belém, Pará.
- Alberto de Andrade, Fredrico. Cojuntura da Castanha do Pará: Relatório Preliminar. Belém, Pará: SUDAM, 1968.
- Allegretti, Mary H. Reservas Extrativistas. Curitiba, Brazil: Instituto de Estudos Amazônicos, Jan. 1987.
- Amazônia. 1978. Vol.III, No.35, Fev. 1978.
- Anderson, Anthony B. and E.M. Loris. "The Logic of Extraction," Conference on Traditional Resource Use in Neotropical Forests, Univ. of Florida, 1989. (unpublished)
- Andrade, Deputado Sebastião. 1980. Speech to the Camara dos Deputados. Brasilia, 8/21/89.
- Associação Marabaense de Proteção à Natureza. 1981. Petition to IBDF. Marabá, Pará: Casa da Cultura, Museo Municipal.
- Balée, William. "Cultural Forests of the Amazon," Garden. Nov/Dec 1987, p.12-14.
- Balick, Micheal J. 1985. "Useful Plants of Amazonia: A Resource of Global Importance," Key Environments: Amazonia. Pergamon Press.
- Bunker, S. "The Logic of Extraction," American Journal of Sociology. 1986.
- CACEX, Carteiras do Comércio Exterior, Belém, Pará: Banco do Brasil.
- Casa da Cultura. "Semana da Castanha," Nov. 1986 and "Castanha do Pará," Nov. 1987. Pamphlets. Marabá, Pará: Museo Municipal de Marabá.
- Castrillón, A.L., and A. Purchio. "Ocorrência de aflotoxinas," Acta Amazonica. Vol.18, no.1-2, 1988, p.49-56.
- CEAGAM. Estudo de Oportunidade de Investimento Industrializacao da Castanha do Brasil. Manaus, AM: Centro de Assistência Gerencial à Pequena e Média Empresa do Estado do Amazonas.
- CODEAMA. "Estatisticos sobre Castanha do Brasil." Manaus, AM: Centro de Desenvolvimento, Pesquisa e Tecnologia do Estado do Amazonas.
- CEPA/Acre. Estudo Sobre a Economia Extractiva da Castanha-do-Brasil. Rio Branco, Acre: Comissão Estadual de Planejamento Agrícola, 1980.

- Mutran, Délio. Interview: "Solução Encontrada Para o Polígono Esbarra na Indefinição do INCRA," Pará Agrário. No.2, Jan-Jun 1987, p.25-27.
- Nelson, B.W., M.L. Absy, E.M. Barbosa, and G.T. Prance. "Observations on Flower Visitors to *Bertholletia Excelsa* HBK and *Couratari Tenuicarpa* ACSM," Acta Amazonica. Vol.15, no.1-2, 1985, p.225-234.
- O Liberal. Belém, Pará, 1989, various articles.
- Schmink, Marianne. Contested Frontiers.
- Schmink and Wood. 1989. "Roads through Southern Pará," In Press.
- Schmink, Marianne and C.H.Wood. "The Political Ecology of Amazonia," Lands at Risk in the Third World. Boulder, CO: Westview Press, 1987.
- Schwartzman, Stephan. "Extractive Reserves," Fragile Lands in Latin America. Boulder, CO: Westview Press. (In Press)
- SEFA. Statistics from the Assessoria Economica. Belém, Pará: Secretario do Estado da Fazenda, 1982-1989.
- SEFA. Plano Integrado de Transportes do Estado do Pará. Belém, Pará: Secretario do Estado da Fazenda, 1986.
- Sindicato Rural de Marabá. 1979. Letter to Minister of Justice, Marabá, Pará, Sept.
- Sindicato Rural de Marabá. 1980. Proposal for "Preservação da Castanha e Regularização Fundiária Nas Áreas de Castanhais," letter sent to GETAT. Marabá, Pará, Sept.
- Sindicato Rural de Marabá. 1983. Letter to Ministro Extraordinário para Assuntos Fundiários. Marabá, Pará.
- SUDAM. Estudos e Pesquisas sobre a Castanha do Pará. Belém, Pará: SUDAM, Departamento de Recursos Naturais, 1976.
- SUDAM. III Plano de Desenvolvimento da Amazônia 1980-85. Belém, Pará: Ministerio do Interior, SUDAM, 1982.
- Tupiassú, A., and Oliveira, N.V.C. A Castanha do Pará: Estudos Preliminares. Belém, Pará: IDESP, 1967.
- Uhl, C. and R.Bushbacher. "A Disturbing Synergism between Cattle Ranch Burning Practices and Selective Tree Harvesting in the Eastern Amazon," Biotropica. Vol.17, 1985, p.265-269.
- Yoshioka, Reimei. 1986. Avaliação de Implantação de Nucleo Urbano na Amazônia, master's thesis. São Paulo: University of São Paulo.

Interviews:

Anderson, Anthony. Researcher, Museu Emilio Goeldi, Belém, Pará, 2/24/89 and 3/2/89.

Bejerra, Felipe José Seares. Agronomist and extension agent, EMATER, Marabá, Pará, 5/11/89.

Campos, José Ferreria. Director, FUNAI, Marabá, Pará, 3/30/89.

Castanheira, Patricia. Rancher, Marabá, Pará, 5/10/89.

Claudino de Pontes, Antônio Marcos. Judicial officer, MIRAD/INCRA, Marabá, Pará, 4/5/89.

da Silva Bentes, Rosineide. IDESP and NAEA, Belém, Pará, 4/27/89.

da Silva Brandão, José. Casa de Cultura, Marabá, Pará, 3/29/89.

de Miranda Leite, Clotilde. Titling officer (for 11 years), MIRAD/INCRA, Marabá, Pará, 4/5/89.

de Proenca, Raul Viera. Manager, Marabá Agro-Pastoril S/A, Marabá, Pará, 5/9/89.

Emmi, Marília F. Professor, NAEA, UFPA, Belém, Pará, 4/25/89.

Enjênia, Maria. Attorney, INCRA, Belém, Pará, 6/89.

Evangelista, João. Director of Rural Workers' Union of Marabá, Pará, 5/5/89.

Ferraz, João. Researcher, ORSTOM, INPA, Manaus, Amazonas, 4/19/89.

João Anísio Ferreira, former Director of Sindicato Rural de Marabá.

Ferreira, Rosane. Manages nursery for castanha seedlings, Belém, Pará, 2/27/89 and 5/12/89.

Lescure, Jean Paul. Researcher, ORSTOM, INPA, Manaus, Amazonas, 4/19/89.

Morbach, Fredrico. Journalist and lifetime resident, Marabá, Pará, 5/5/89.

Mourão de Oliveira, Pedro. Cartographer, SUDAM, Belém, Pará, 4/28/89.

Muller, C.H. Researcher, EMBRAPA, Belém, Pará, 4/27/89.

Nelson, Bruce W. Researcher, Botany, INPA, Manaus, Amazonas,  
4/17/89.

Neves de Souza, Norberto. Forestry Engineer and Director,  
division of IBMARNR, formerly IBDF, Marabá, Pará, 5/5/89.

Oren, David. Researcher, Museo Goeldi, Belém, Pará, 3/14/89.

Overall, William. Researcher, Museo Goeldi, Belém, Pará, 5/89.

Paraguassú, Eloris. Attorney, surveyor, Belém, Pará, 6/89.

Rodriguez, Alfonso da Cruz. Manager of nusury and castanha  
cultivation, Marabá Agro-Pastoril S/A, Bamerindus, 5/9/89.

Rosa, Antonio. Retired castanhal manager and lifetime resident,  
Marabá, Pará, 5/5/89.

Rosa, Jose. Former castanha worker and lifetime resident, Marabá,  
Pará, 5/5/89.

Uhl, Christopher. Researcher, EMBRAPA, Belém, Pará, 2/21/89.

Von Atzinger, Noé. Secretário Municipal de Cultura and director  
of GEMA, and environmental group, Marabá, Pará, 5/8/89.

Wambergue, Emmanuel. Director, Centro Agrario do Tocantins;  
former Director for Northern Brazil, Pastoral Commission for  
Land, Marabá, Pará, 5/11/89.