Agriculture Intensification, Economic Identity, and Shared Invisibility in Amazonian Peasantry: Caboclos and Colonists in Comparative Perspective

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Introduction: Views of Agriculture Intensification and Shared Invisibility in Amazonian Peasantry

Obvious differences between Amazonian Caboclos[1] and recent Colonists[2] render unnecessary any elaboration of their socio-cultural and historical particularities.[3] At the same time, these diverse groups share striking similarities as they are lumped together under the rubric of "Amazonian peasantry." Regionally, both terms (but particularly Caboclo) carry several distinct, usually derogatory meanings. Whereas academic definitions take into account variation in historical context, ethnic background, geographic, and contemporary socioeconomic identity, the colloquial usage of the terms Caboclo and Colonist[4] share similar socio-cultural and economic prejudices. In essence, as small-scale rural producers, whether Caboclo or Colonist, they share a lack of economic, political, and infrastructure support. This paper aims to discuss the existence of commonalities underlying their condition of "invisibility." While trying to value their historical and socio-cultural particularities, I attempt to discuss, particularly, the implications of misinterpreting their agricultural systems for the construction of an economic and social identity of these rural Amazonians. I attempt to show that the so-called "invisibility" of Amazonian peasantry (whether economic, political, technological, or social) is in part a result of the dominant views of what is considered an agricultural system as it relates to its agronomic, aesthetic, economic, technological, and social efficiency and characteristics. A core element in this equation is how the "process of intensification" of agricultural production is defined, particularly given its comparative nature and its implications for understanding social and socioeconomic changes throughout the contemporary history of the region. Although for different reasons—and that I will attempt to illustrate by means of field data and examples both Caboclo and Colonist production systems tend to be disregarded in terms of their socioeconomic relevance and effectiveness when compared to exogenous, large scale, high input and capital-based agriculture. To some extent, this argument reinforces Nugent's idea of "manufactured invisibility" where these farmers are placed in a condition of "social pathology," a stumbling block that impedes regional development (1993). This view tends to emphasize the substitution of local land use strategies for external technology based on energy and capital intensive systems primarily focused on export-oriented agriculture. This tendency is liable to neglect investment to improve existing socioeconomic and physical infrastructure that would, in turn, enhance local production systems without displacing rural families or threatening local resource basis (and, consequently, the local economy and food security).

Explanations of land use intensification are usually based on conceptual models using parameters such as fallow cycle, or variables based on factors of production (e.g., labor, energy, technology, and/or capital—the so-called "input factors"). Alternatively, "output factors," such as the maintenance of productivity over time, are often used as a complementary measure of agro-pastoral intensification (for a review, see Brondizio and Siqueira 1997). However, fallow cycle models offer limited explanation to agricultural systems in frontier areas (by Colonists) where land occupation is primarily based on cycles of progressive expansion of the used area, as well as in Caboclo's swidden agroforestry where a clear distinction between the "productive" and the fallow period is not obvious. Both Caboclo and Colonist patterns of land use are often based on the co-existence of intensive and extensive activities that simultaneously minimize risk while guaranteeing farm consolidation and expansion of market activities. By the same token, another

element underlying our views of agricultural systems involves a subtle link between "agronomic" and "aesthetic" arrangements. Dominant views of productive agricultural systems include elements of field homogeneity and shape, types and composition of plant species, and crop varieties. It also includes particular patterns of land allocation representing the domesticated, technologically driven production, and a farmer's ability to keep it "clean." These characteristics, usually borrowed from temperate areas, generally defy even the most productive farm lots in riverine or frontier Amazônia. The rigid boundaries drawn between different food production systems usually place forested areas (as in the case of agroforestry systems) in the "fallow," "unproductive" or, at best, the "agro-extractive" category.

This paper builds upon two previous works that look at land use trajectories and intensification in Caboclo (Brondizio and Siqueira 1997) and Colonist areas (Brondizio et al. 2002). Both articles attempt to analyze patterns of land use trajectories and discuss the implications of using different measures of "intensification" to characterize these agricultural systems. In both cases, misinterpretation of their productive potential affects the economic identity and infrastructure support for these populations. Building upon the integration of survey, experimental, and multi-temporal remote sensing data, in the Caboclo study we argue for a producer's identity "from extractivist to forest farmer" (Brondizio and Siqueira 1997), while in the Colonist case we show the importance of understanding Colonists' land use within the context of generational cycles of lot formation and land allocation characterizing "the Colonist footprint" (Brondizio et al 2002). This paper attempts to bring these two pieces of research together to show that, apart from their socio-cultural differences, whether Caboclo or Colonist, small-scale producers in Amazônia share a condition of economic and social invisibility, at least in part fed by the ways we interpret (or misinterpret) their production systems. Consequently, the lack of political and basic infrastructure support for these areas leads to a sort of positive feedback process creating vicious cycles of economic failures and social poverty, further reinforcing their condition of invisibility and "lack of entrepreneurial minds."

Clarifying Terms and a Conceptual Framework for Smallholders in the Amazon

The current discussion relating to the use of the term "Caboclo" leaves one close to a "deadlock" situation on how to refer to and make generalizations about those we call Caboclo, and why we distinguish Caboclos from other rural Amazonians. The use of the term Caboclo to stress a historic-cultural group and/or to value an "ethnographic other" is overwhelmed by implications of its biased social construction. Several attempts to illustrate the nuances and contradictions between popular and academic usage of the term exist, from Wagley's classic work (1955) on the use of the term Caboclo to refer to distant subjects to Galvao's (1976), Moran's (1974), Parker's (1985), and Furtado's (1987) emphasis on a historically and geographically—situated social category, to yet more recent works by Lima (1992), Hiraoka (1992), Harris (1998), and Pace (1997) reviewing the term's ambiguity. In *Amazon Town*, a classic reference in Caboclo studies, Wagley (1953) states that the term Caboclo is used to refer to a person of lower class status than the speaker. Pace discusses the several "typologies" used to define Caboclos based on "racial," "ecological adaptation," and "cultural" characteristics. A significant criticism was developed by Pace (1997) in analyzing the derogatory nature of the term, posing the question "why do we insist on using the term [Caboclo], particularly when it carries such pejorative connotations?" (1997:2). On the one hand, he suggests the academic use of the term is embedded in prejudice and reflects the views of the regional elite. On the other hand, there is a need across the research community to create an exotic, legitimated ethnic subject in order to validate one's ethnographic status, vis-à-vis others dedicated to "true" Indigenous Amazonians. Pace (1997: 86) goes further in proposing a series of alternative terms to replace Caboclo. Examples include "roceiros" (small farmers), "extratores" (extractors of forest products), "seringueiros" (rubber tappers), "ribeirinhos" (river people), "varzeiros" (flood plain dwellers), and terms such as "Euro-Native Amazonians," or "Afro-Euro-Native Amazonians," or regionally used terms like "Amazonida" that refer, vaguely, to a regional cultural type.

Despite the importance of this discussion, one wonders whether we can change the regional pejorative views about Caboclos by changing its denomination. Can we use the term Caboclo in an analytical sense to criticize its own contradictions while stressing its "otherness" by valuing their distinct contributions to food production and environmental management vis-à-vis the vast array of "other" Amazonian peasantry? One could argue that the prejudice suffered by Amazonian Caboclos, although presenting particularities, is historically rooted beyond Amazonian borders and common to a broader array of Brazilian peasants.

Caboclo populations have been a challenge not only to the conventional categorization of peasants in economics and sociology, but also to the conventional category of ethnicity in anthropology (Chibnik 1991). Chibnik points out that the variation in the terminology for native non-Indigenous populations in Latin America is also a result of historic and demographic differences. He analyzes four "ethnic" groups in Amazonia: caboclo, cholo, ribereño, and camba. He defines as ethnic groups those that have identified themselves and been identified by others as belonging to the same group, however, neither of which happens among caboclos. All those four groups are referred to as "peasants," but differences are enormous in terms of class, mode of production, and participation in the larger society. For instance, whereas ribereño is essentially rural and riverine, the term caboclo may incorporate non-riverine, town-dwellers, and urban riverine inhabitants. Ribereño is a category—while geographical—that involves different social classes, while caboclos are essentially lower class—reflecting Chibnik"s use of the colloquial version of the term. Camba is a denomination encompassing most residents of the eastern lowlands of Bolivia, while Cholos, though detribalized, are not totally incorporated as part of a contemporary society.

Despite the inter and intra variability of these social groups, much of our understanding of these and other Latin American peasantry in general emerges from the conceptual construction present across rural development studies. An interesting parallel can be seen when we look at the threefold interpretation proposed by Cancian (1989) to categorize studies of peasant economic behavior: homogeneity, heterogeneity, and differentiation approaches. Homogeneity theorists emphasize the differences between peasants and other social groups. However, they tend to overlook internal differences inherent to peasant populations. There is a tendency to explain the poverty of the peasantry as a product of their resistance to social-economic integration within a wider society and to their avoidance of external and novel ideas. There is a strong emphasis on the role of history in characterizing the degree of relationship between peasants and the "external" world. Heterogeneity theorists tend to deny both the internal homogeneity of peasant groups and their economic behavior as distinctive from that of others. Variability becomes an intrinsic characteristic of peasants, and their reaction to historical forces is seen as more dynamic rather than unilateral. Differentiation theorists stress the role of historical circumstances in shaping peasant behavior. There is an assumption that contemporary peasants have incorporated capitalist features into their economies. Although they maintain the ability to carry out strategies of self-sufficiency (e.g., dependence on land resources), they take advantage of outside opportunities (e.g., wage labor) to support their internal economies. Thus, there has been a step forward in the way we look at the traditional self-providing economy as isolated from the market. In the context of this paper, not only Caboclo but colonist communities cut across these three analytical approaches, while presenting variation in agrarian history, social and institutional organization, and economic arrangements.

In a comprehensive review of the Latin American peasantry, Roseberry (1993) points out the negative assumptions behind the term "peasant" when used by the development "establishment." He does not neglect the use of the term as a general category, but recognizes the inviability of applying it as a concept in which economic development is framed. In this context, the construction of a new economic identity for Caboclos, as well as for Colonists, as small farmer producers necessarily requires a reinterpretation of their land use systems and recognition of their importance. This paper argues that in both cases, these farmers are strongly engaged in the regional economy, responding to incentives, coping with limitations while using a variety of strategies, and seeking economic and political representation against the odds that belittle smallholder production within a given region and in Brazil as a whole.

In a broader context, much criticism has been devoted to the misinterpretation of swidden agriculture systems and their sophisticated agronomic nature, especially following up on the seminal work of Harold Conklin (1957, 1961). Another good example comes from the work of Michael Dove (1983). He criticizes the so-called "political economy of ignorance," in the context of development projects involving swidden agriculture. These projects usually assume "widely-accepted myths," including the "myth of communally owned land," the "myth of destruction and wastefulness," and the "myth of a subsistence focus system" (1983:85). In Amazônia, interesting examples include the volume edited by Beckerman (1983), Balee and Posey (1989), Smith et al. (1996) and perhaps most important, Denevan and Padoch's (1987) reinterpretation of "swidden agro-forestry" systems in the light of intensification theory.[5] Revealing the diversity and complexity of indigenous agricultural practices, they have helped to reveal an "invisible" system where annuals, perennials, and secondary species are intercropped and managed intensively, helping to debunk a still dominant

view that the productive phase of a garden spans no more than 2 years (in a cycle of 20 to 30 years). Similarly, Pinedo-Vasques et al. (2001) and Padoch and Pinedo-Vasques' (in press) interpretation of timber management practices on what they call "invisible technologies" is an example that helps clarifying dimensions of regional resource management that defies the conventional interpretation of forest and productive land.

As previously developed by Brondizio and Siqueira (1997), this paper uses the term Caboclo in the sense of Netting's (1993) framework of "smallholder." While avoiding the use of the term "peasants"—and for this matter we can apply it to Caboclos and Colonists—due to the negative connotations attached to the concept, Netting's use of "smallholder" (or "small farmer" for that matter) contributes to a more positive socioeconomic identity of rural producers by calling attention to the important role that small scale farming systems play in the regional and national economies. Such an approach may help to redefine peasant societies in a more dynamic and dialectical way, as well as add to a more positive view of the role peasant farming plays and has played in the world of agriculture. On the other hand, the characteristics pointed out by Netting that typify smallholders are useful in order to understand the analytical concept of peasants. As rural and peri-urban inhabitants, they produce for themselves, but they also produce for markets; their econ-omy depends on family labor, but they often employ themselves off their farms in a market economy and employ others when needed; they are not specific to any historical time nor geographic place (i.e., they existed before capitalism and probably will exist "after" it and in different parts of the world). As a social category, they are not "inexorably" doomed to disappear, nor are they a ho-mogeneous group. The social, cultural, geographical, and historical diversities of this social category, as in the case of Caboclos as well as Colonists, must be recognized and taken into account. As rural producers, they are an important social category of our societies, and as such, they need to be recognized, especially by the political authorities establishing the regional economic and development policies.

A Framework for the Study of Land Use Change in Rural Amazônia

While expressing linkages among social, economic, and environmental issues, land use can be looked at from different theoretical perspectives depending on the level in question. Rural studies in the Amazon,[6] particularly those on peasant economy, have typically focused on the articulation between factors mediating micro-macro levels, the organization of social groups, and historical conditions defining their relationship (of relevance to this paper see for instance Nugent 1993; Schmink and Wood 1992). Most often, emphasis is on the internal structure of rural communities as it is subordinated to macro-level external "forces" characterized particularly by policy, market interests, and socio-cultural articulation between local communities and larger political structures. Highlighting the factors mediating these levels has contributed to our understanding of rural development problems, including commodity production and economic cycles, labor arrangements and control of capital, and feedback mechanisms underlying the economic and social behavior of householders and communities in relation to the "outside" world.

In this context, my point of departure is that the study of land use and local production systems needs to integrate a larger array of variables. Intensification does not proceed linearly as dependent on one factor (e.g., population growth or market demand), nor it is ahistorical (Balee 1998). Instead, it occurs as a combination of these factors with other variables such as internal population dynamics and opportunistic advantages of external sources (e.g., incentives from development projects). Thus, it rather responds to multilinear processes combining variables working at multiple scales that interconnect national, regional, local, household, and individual levels. For instance, external market demand for forest and agropastoral products has been historically one of the most significant elements underlying social and environmental change in Amazônia with strong implications for land use and livelihood strategies of rural populations. However, whereas long- and short-term market signals (e.g., price increases) may lead to intensification or extensification of land use activities in rural communities, this is a condition actually "filtered" by household variables such as one's land tenure and access to resources, experience and available technology, and household labor availability, creating a diverse social response within a single community.

Using a framework that integrates a large array of variables, I try to show in this paper that Caboclo producers have properly perceived changes in agricultural market opportunities (short and long-term market trends) occurring within an increasingly urbanized and integrated Amazônia, and have acted to seize such opportunities by means of intensifying their production system by using their existing knowledge-base (of production techniques), as opposed to switching to exogenous production

systems usually available by means of development projects and credit support. In the case of Caboclos, they have taken advantage of market opportunities to intensify açaí palm fruit production through management of floodplain forest associated with agroforestry planting techniques. However, at the household level, I try to show that the ability to take advantage of market opportunities (in the short run) is largely constrained by the structure of land tenure. As I will try to show later in the paper, this case underscores how Amazonian small farmers (Caboclos) actively insert themselves into the regional economy in response to long- and short-term market opportunities rather than being passive actors of a regional labor force. Land tenure, however, remains a significant factor constraining Caboclo's integration into the market (Brondizio and Siqueira 1997; Brondizio 1996, 1999; Brondizio, Safar, and Siqueira 2003).

In addition, the focus on "processes" of land use intensification (e.g., household feedback to external signals and the co-existence of land use strategies) becomes more relevant than characterization of "stages" of intensification (i.e., Boserup's frequency of crop). A land use-based approach makes it possible to grasp the process of co-existence between intensification and de-intensification as related to temporal variation of economic strategies. For instance, increased intensification in one production zone coexists with transient de-intensification in another. This is the case of many rural populations in the Amazon estuary, which have virtually abandoned swidden agriculture in the upland forest in favor of *açaí* palm fruit production and trading. However, the thriving re-growth of fallows subjected to swidden agriculture allows manioc agriculture to be reconsidered at any time if the need arises. Within this framework, variability in land use intensification can be re-interpreted in terms of flexibility of economic and ecological strategies, rather than in terms of site-specific input/output ratios at one point in time. In this sense, another important aspect to be considered in a "multilevel" analysis of intensification is related to the unit of observation and scale of analysis of land use systems. In order to place site specific measures into a regional perspective, one needs to scale up from a garden plot, to a farm, to a population, to a landscape, and finally to a regional context of intensification.

Study Cases and Data

Examples from the Amazon estuary (Ponta de Pedras, PA) and the TransAmazon region (Altamira, Brasil Novo, Medicilandia, PA) are used in this paper to represent Caboclo and Colonist populations, respectively. The data presented here are part of a larger data archive. In this context, the paper takes advantage of a considerable number of publications spanning the last 14 years by a collaborative research network to support a series of detailed information too large to be expanded upon here. These works are cited below to refer to different aspects discussed in the text.

1. The Açaí Palm Fruit Case

Brief Overview of the Study Area

The study area is located in the estuarine region of the Amazon, on Marajó island, in the municipality of Ponta de Pedras, state of Pará (Figure 1). Special attention has been given to three populations representing different economic and land use patterns. Ethnographic, socio-economic, and ecological accounts concerning these populations can be found in Murrieta et al., 1989; Murrieta et al. 1992; Siqueira et al. 1993; Siqueira 1997; Neves 1992; Brondizio and Neves 1997; Brondizio et al. 1994; Murrieta 1994. Methodology and results concerning the use of satellite images to classify land cover classes, including unmanaged floodplain forest, açaí agroforestry, and three stages of forest succession can be reviewed in Brondizio et al. 1993, 1994a, 1994b; Brondizio 1996, 1999; Moran, Brondizio, and Mausel 1994; Mausel et al. 1994.[7]

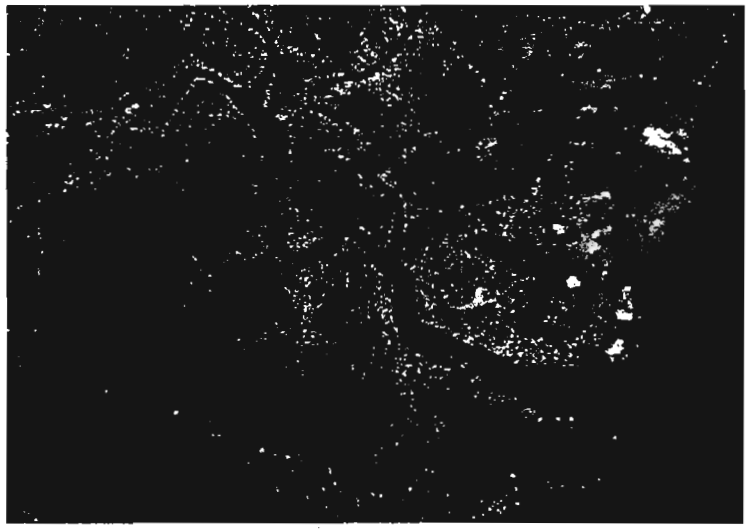
Particularly relevant to this paper is the data focusing on understanding the production system of açaí agroforestry. Vegetation stand inventories were developed for twelve fields characterizing different levels of management of açaí agroforestry. For fruit production experiments, four different producers, and eight different sites were selected to measure açaí production during the whole harvesting season of 1994-1995. A total of 20 production sites in different stages of management were studied. As part of the work, interviews were carried out with different segments of the açaí economy, such as small, medium, and large producers, and with different categories of sharecroppers, market brokers, *carregadores* (porters), local and itinerant middleman, as well as processors and exporters.

Five local producers of açaí fruit have collaborated in this research with private data about daily production and prices of açaí fruit from 1984 to 1995. The price of açaí fruit and transportation (from Ponta de Pedras to Belém) was adjusted in relation to currency changes over a ten-year period (1984-1995). The Brazilian currency has changed five times during this period, thus requiring rectification of values before any price index could be derived. Two indices were developed: Açaí Price Index (API)

Figure 1
Invisibility and Visibility of Acai Agroforestry, Ponte de Pedras, PA, Brazil

Classified image displaying area of floodplain forest not distinguishing Açai agroforestry management as a separate land cover (dark areas).

Classified image displaying area of floodplain forest under intermediate and intensive Açai agroforestry management (light areas).



Location Map

Source: Ponta de Padras PA, overlay classification on Landsat TM color composite (1991).

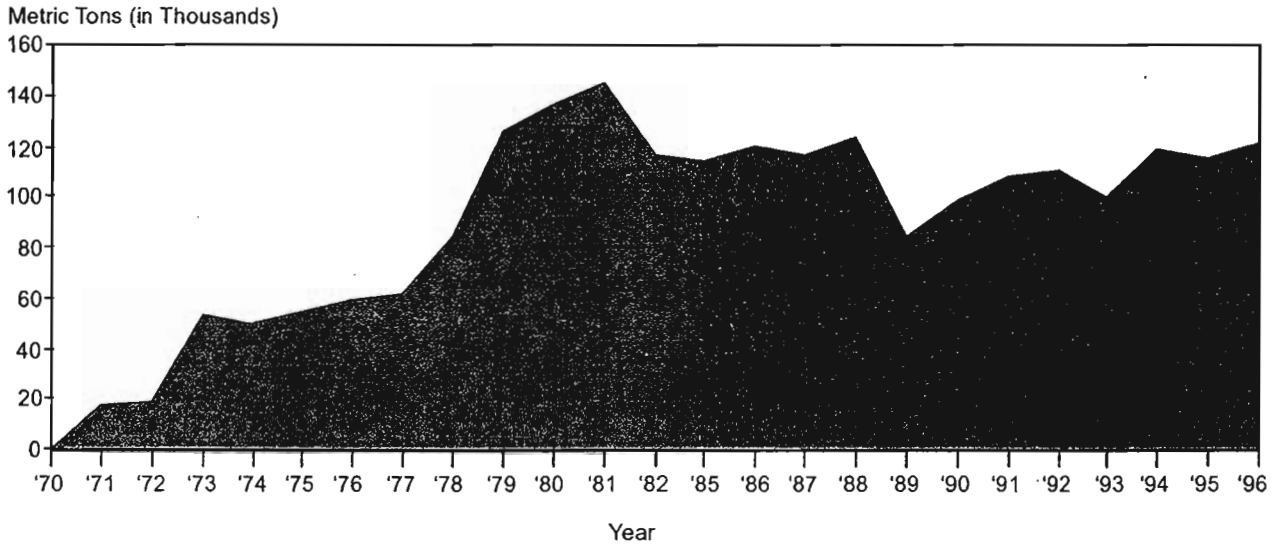
and Açaí Freight Price Index (AFPI). One index was selected as the most relevant for comparison due to its regional characteristics: IPA-PA (Agricultural and Husbandry Price Index for the Pará state), published monthly by Fundação Getúlio Vargas (*Conjuntura Economica* 1984-1995).[8] Data representing the distribution of the percentage of yield during each month of the season for each of the experimental sites allow us to derive figures respective to revenue/site/month (Brondizio 1996).[9]

Summary of Results: Caboclo Case

Brief Overview on the Market Growth of Açaí Fruit

The market of açaí fruit has increased exponentially in the last 30 years (Figure 2). A legacy of "indigenous diet" and production technology, *açaí* fruit has been a top-ranked staple food and a key cultural symbol of estuarine life for a long time. Along with manioc flour, açaí fruit has continuously provided a caloric base for the rural diet throughout the different historical periods of the region,

Figure 2
National Production of Acai palm Fruit (*Euterpe oleracea* Mart.) 1970-1996, FIBGE Data



from floodplain chiefdoms to missionary occupation to the period of social transformation marked by directorate policies all the way to the boom and bust of the rubber economy (e.g., Wallace 1853). In recent decades, açaí production continues to increase in order to meet the increasing "staple food" demand prompted by low-income urban population growth after 1970 (Lopes et al. 1982; Strudwick and Sobel 1988) as well as an increasing external demand prompted by the emergence of a national and international "fashion food" market that began in the early 1990s. For a detail discussion of the social and economic history of açaí fruit expansion see Brondizio in press.[10]

Açaí fruit looks like a blueberry, but only the appearance is similar. An *Açaí* fruit is hard since it is a round seed covered with a thin mesocarp. The process of making the juice involves the removal and dilution of the mesocarp. *Açaí* juice is a purplish liquid of varied thickness, depending on how it is prepared.[11] The juice can be bought daily at numerous *açaí* stalls in urban areas in the region or prepared at home. Its popularity transcends social classes in the region, although it plays different roles in the diet of different groups. It is an important caloric source for the urban poor as well as for rural populations. Reports (e.g., Rogez 2000, IBGE 1974-2000) indicate that consumption of açaí juice in Belém moved from 90,000 liters/day in the late 1980s to an estimated 400,000 liters/day in the late 1990s; this figure gives an estimated consumption of more than 60 liters/person/year, or, as noted by Rogez (2000), twice the amount of milk. Unknown until recently to most Brazilians, the expansion of açaí fruit consumption has been based on a myriad of new forms of preparation aiming at transforming the food in dietary and symbolic values. Recent examples of the expansion of the açaí fruit internationally include feature articles at the *Gourmet Magazine* (July 2002) and the celebrity-centered magazine *InStyle* (April 2002). One of the key distributors of açaí pulp in the United States, Sambazon, Inc., lists dozens of retailing shops across 12 states and features in its website celebrity accounts and recipes on the health wonders of açaí juice. Distributors, although often facing importation constraints regarding hygienic safety of the product, have been able to grow by combining the "health" and "green" markets and focusing on the youth sectors such as surfers, skaters, conservationists, and those who are health conscious.

The so-called *açaízação*[12] of the estuary symbolizes the importance that açaí agroforestry has gained during the last 30 years in the region. The growth of the açaí economy is represented by two main industries, namely açaí fruit and heart of palm. Although sharing a common resource basis, *Euterpe oleracea* Mart., these industries have taken relatively independent paths and are based on socioeconomic structures not necessarily integrated.[13]

Today, açaí fruit is the most important income source for a vast majority of riverine households. One can confirm this by looking at data from the regions of Ponta de Pedras (POEMA 1994), Abaetetuba (Hiraoka 1994), and the islands (e.g., Ilha das Onças) (Anderson and Ioris 1992). In a Ponta de Pedras community for instance, açaí represents 64 percent of household income generated from agricultural products (including rice, beans, and coconut). In Abaetetuba, açaí fruit is responsible for 50 percent of the household income of families involved in agroforestry, whereas in Ilha das Onças, açaí reportedly represents 63 percent of the income generated by commercial products (POEMA 1994). The evolution of the açaí economy in the past thirty years has created a complex structure of production, distribution, commercialization and processing significantly specialized and ranked (for a detailed description, see Brondizio 1996).

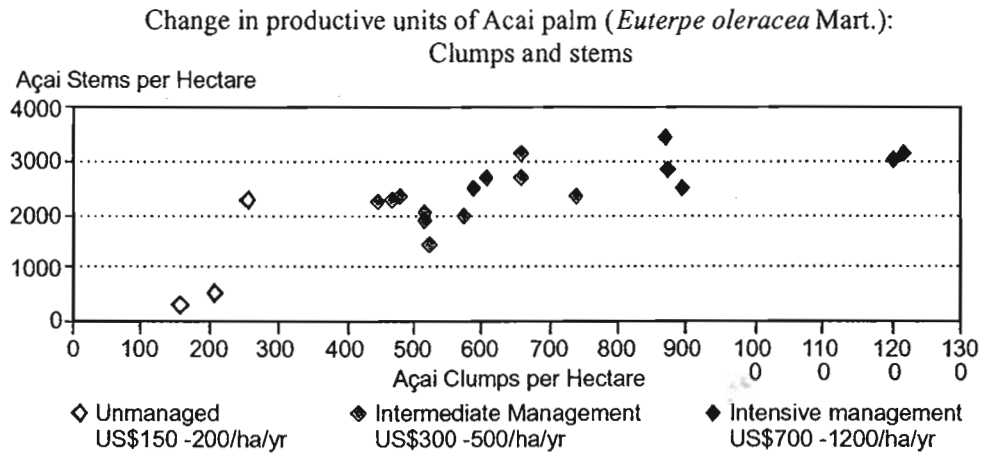
Management and the "Invisibility" of a Production System

Açaí agroforestry management has been the focus of numerous works in the estuary (Calzavara 1972; Anderson et al., 1985; Jardim and Anderson 1987; Anderson 1988, 1990; Anderson and Jardim 1989; Anderson and Ioris 1992; Brondizio et al. 1993; Brondizio et al. 1996; Moran, Brondizio and Mausel 1994; Brondizio in press). Contrary to a system based on extractivism, management and planting of açaí agroforestry requires clear input of specialized agricultural and forestry labor in order to maintain and increase the stand crop productivity. Different management and planting strategies transform these areas into açaí agroforestry, locally called *açaizais*. The term encompasses different intensities of management; tree, sapling, seedling population densities and structure, and, a diverse range of species composition. Despite encompassing a large range of management stages, the term *açaízal* is designated in this work as açaí agroforestry. The three main means of açaí agroforestry development are: (1) management of native stands; (2) planting of açaí stands following annual or biannual crops—that is, *roçado de varzea*; and (3) combined man-agement and planting in native stands. In simple terms, management of açaí stands can be understood on two different levels: forest stand and plant levels. On the forest stand level, thinning and weeding techniques are used. On the plant level, management focuses on pruning techniques.

Stand thinning and selection control the density of individuals of all species competing with açaí palm and the balance between açaí basal area and other species. *Propagation* constitutes the planting and dispersion of seedlings and seeds of açaí, while simultaneously introducing other economic species to the stand. Finally, *pruning* controls the selection of productive clumps and stems. In the case of pure planted stands (i.e., rocado de varzea) there is a need to include inter-cropping techniques between annual and perennial crops. These techniques demand intensive care of the crop site, including weeding, pest control and pruning of other crops. Despite the considerable modification of species composition, the managed areas largely retain the functional and structural characteristics of the floodplain forest, but with an overwhelming concentration of individuals of economic value.

The production pattern resulting from the experimental sites closely corresponds to the patterns found in relation to level of management at the sites were inventories were carried out. The three basic groups of açaí agroforestry distinguished by variation in stem/clump density can thus be related to fruit yield/production (Figure 3). Group 1, occurring in unmanaged sites evidences an average of 250 clumps/ha. In this group production output averages around 1,390 kg/ha/yr, that is, an average of 116 fruit baskets/ha. Group 2, occurring in initially and intermediately managed sites, has an average of 600 to 730 clumps/ha. In this group, output production varies between 2,600 to 3,780 kg/ha/yr, i.e., an average of 269 fruit baskets/ha. Finally, group 3, characterized by more intensively managed sites, has an average between 890 and 1,200 clumps/ha. In this group, production varies more widely from 6,400 to 12,200 kg/ha/yr, an average of 760 fruit baskets/ha. Respectively, economic return in these groups range between US$ 150–200/ha/yr, US$300–500/ha/yr, and US$ 700–1,200/ha/yr. However, in all cases, the economic return depends upon harvesting schedules in relation to price fluctuations during the harvesting season. Based on our estimate integrating field inventories and Landsat TM data (Brondizio et al. 1996), the area under intensive açaí planting and management represents about 6 percent of the study area, surpassing in economic and spatial importance any other production system in the region. Whereas, if considered a mere "extraction forest" (floodplain forest) this immense area under direct productive management tends to go unnoticed (see Figure 1 to compare maps including and excluding açaí agroforestry as a separate land use class). These figures show the potential invisibility of this production system due to its forest characteristic and subtle differences between managed, planted, and unmanaged stands.

Figure 3
Levels of Managmenet and Range of Economic Return in Acai Fruit Production Areas



Note: All symbols represent inventoried areas.
Source: Adapted from Brondizio 1996; Brondizio and Siqueira 1997)

Responding to Price and Long-Term Choice

Comparisons of the açaí price index (IPA) for the period between 1984 and 1995 are presented in Figures 4 and 5. As the figures show, the pattern of increase is marked by seasonal variation of fruit production. It reflects a general pattern of supply exceeding demand during the peak of the production season followed by the opposite trend towards the end. In order to put açaí prices into perspective, one can compare them with other indices, such as the Agricultural and Husbandry Index for the state of Pará (IPA-PARA), both shown in Figure 4. This figure shows a similar growth of both indices. This is an important parameter in the success of the açaí economy over the ten-year period of study. Using a ratio between the two indices (Figure 5) one observes that the açaí price index has followed and surpassed the inflation rates of the main rural products of the state (note price trajectories above value 1). Overall, açaí producers seem to have received a better price than the average price of all agricultural and husbandry products of Pará. Analyzing the evolution of this ratio, we can see that açaí producers had an incentive to grow açaí, as its prices have followed those of other products, and during the end of the harvesting seasons, even surpassed them. We can, roughly speaking, assess the different opportunities Caboclos face, and whether the choice of intensifying açaí production has an economic basis reflecting trends in regional markets.

As previously suggested, the main difference in economic return is related to the land tenure condition of the producer (Brondizio, Safar, and Siqueira 2003). In these experimental areas, the small owners spread out harvesting over the whole season, and thus had the chance to wait for higher prices, whereas the sharecropper producer was ordered to completely harvest his production area, mostly during November and December. During this period, açaí attains its lowest market price. In addition to low prices during the months of October and November, the cost of transportation during this period was higher in comparison to fruit prices.[14] The resulting variation in revenue is more related to harvesting period than to total area and intensity of production. Two main factors are working here. The first is the decision about the beginning and periodicity of harvesting, and the second is the decision concerning to whom they will sell their products. The decision regarding the harvesting period is directly related to market fluctuations and household needs. Since market supply is concentrated during the middle of the main harvesting season, it is likely that better prices can be demanded at the beginning or at the end of the season. Whereas owners have the autonomy of taking the risk of waiting for better prices, sharecroppers need to follow their landlord's schedule and decisions. Thus, sharecroppers may be subjected to selling all their production when the lowest prices are in place.

Figure 4
Evolution of Acai Fruit Prices, 1984-1995:
Acai Fruit Price Index (API) and Para State Agro Pastoral Price Index (IPA)

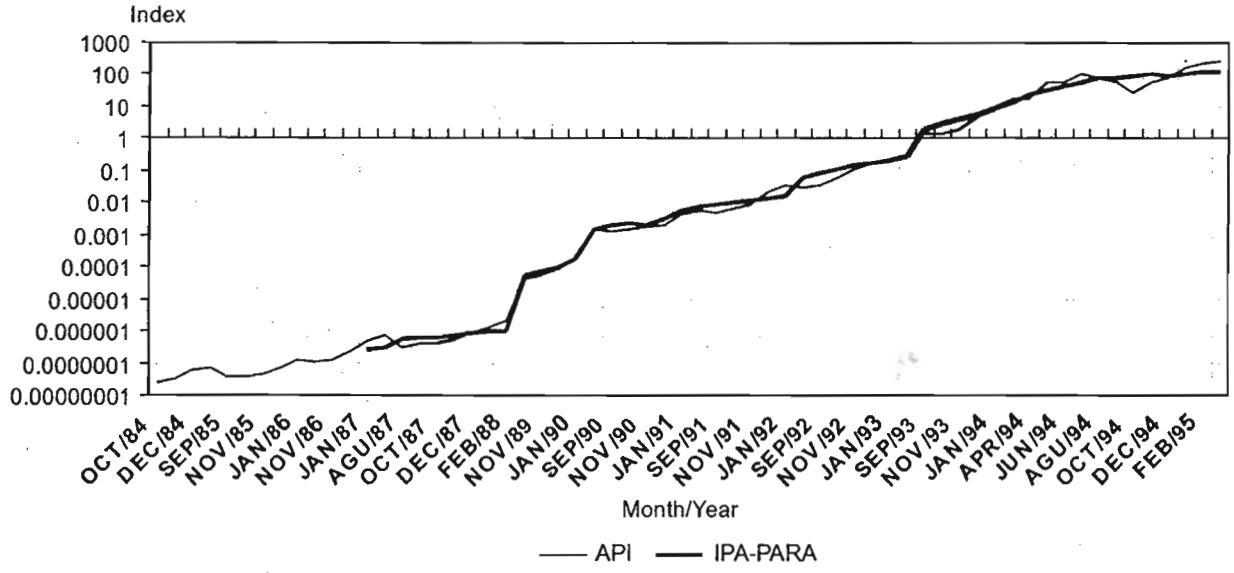
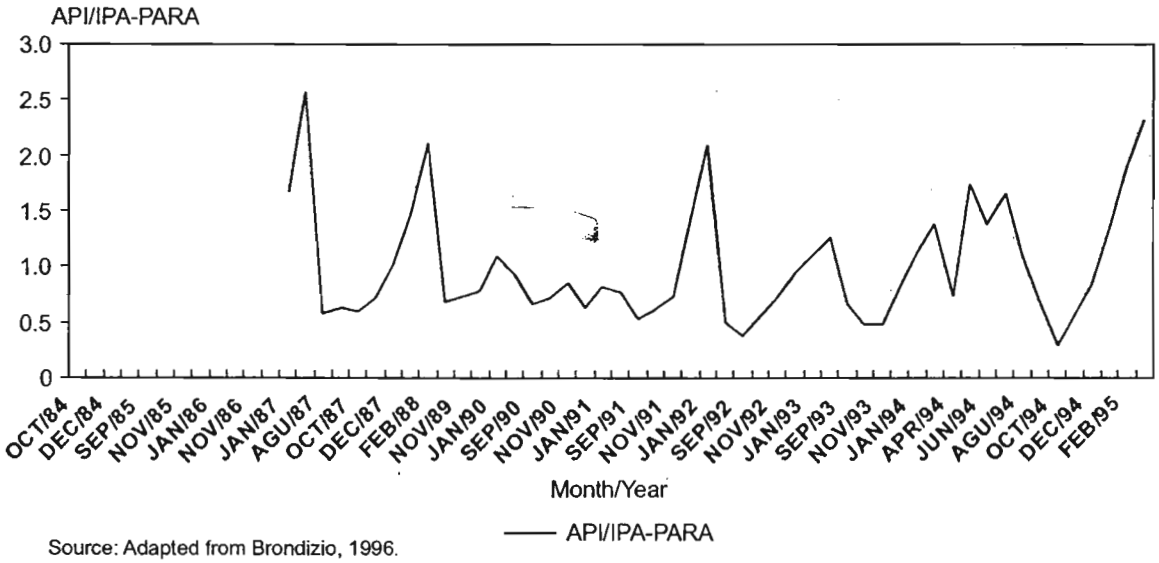


Figure 5
Comparative Performance, 1984-1995:
Acai Fruit Price Index (API) / Para State Agro Pastoral Price Index (IPA)



Source: Adapted from Brondizio, 1996.

The evolution of açaí prices observed during this decade has shown a respectable performance, even when compared to all major crops and husbandry products in the state. Another important point is the consistent market for the product during the last decade, which shows signs of a well-structured production system. Production has increased five-fold during the past 15 years based on management and planting, rather than extraction from untapped sources. The increases in production and price maintenance have been followed by the emergence of a

socioeconomic organization around production, distribution, marketing, and processing, introducing a new class of producers and workers emerging from an extractivist economy but already functioning as a category of agricultural producers.

2. The Colonist Footprint Case

Brief Overview of Study Area

In 1970, with financial loans from international banks and multinationals, Brazilian government started a new "modernization" program of the country as a whole, and especially for the Amazonian region. The National Integration Plan (*Plano de Integração Nacional—PIN*) was created and aimed at interconnecting the various parts of the Amazon region internally and with the rest of the country, while inducing human occupation of the region through governmental programs of colonization (Moran 1981; Mahar 1979, 1988, among many others).

The colonization plan aimed to settle 100,000 families in 100-hectare lots along the Transamazon Highway in 5 years. According to the plan, small farmers would specialize in food crops in the first three years, and each year Colonists would plant more of their land in permanent and cash crops such as coffee, sugar, black pepper and guaraná. The Colonist should also leave 50 percent of his total area as a reserve of untouched forest. The bulk of the candidates were landless people from the Northeast and from other parts of the country. Candidates from the South and Southeast regions, the most economically developed regions of Brazil, were considered essential as "cultural brokers," since government planners believed Colonists from these regions could bring innovative technologies to the area and would help "modernize" Colonists from other parts of the country (Moran 1981). However, the first three years of colonization were considered unsuccessful, and they were interpreted as a failure of the plan (e.g., Browder 1988; Hecht 1985; Ianni 1979; Mahar 1979, 1988; Velho 1972). "Blaming the victim" (Wood and Schmink 1979) is probably the best expression to describe the end of the government-directed small farmers colonization projects in the Amazon. After 1974 the government changed its focus from small farm colonization and started a process of financing large enterprises, such as cattle ranchers, mining, lumber and large-scale agriculture for export (a process well described in Moran 1981). Fewer and fewer resources were devoted to colonization projects. By 1980, INCRA (*Instituto Nacional de Colonização e Reforma Agrária*)—the governmental institution responsible for the colonization project—recognized that less than 8,500 families had been settled in the Amazon through their program (Miranda 1990:41).

The Altamira region was one of most important foci of the government colonization program briefly described above. Altamira grew from a small riverine town based on rubber collection into a booming town of 85,000 due to agro-pastoral production stimulated by the Transamazon Highway built in 1971. It has one of the most significant patches of alfisols, or *terra roxa estruturada eutrofica*, in the Brazilian Amazon.

The study area is defined by a group of approximately 3,800 farm lots arranged according to different adjacent projects implemented by INCRA during the past 30 years. It cuts across the municipalities of Altamira, Brasil Novo and Medicilândia, in the state of Pará (see Figure 6) and encompasses an area of about 355,000 ha, stretching approximately from Km 18 to Km 140 of the Transamazon Highway west of the town of Altamira. By reconstructing the history of occupation of the study area through remote sensing data, we were able to stratify farm lots by time of arrival and deforestation trajectory. The data presented in this paper are part of a broader study, which addresses the relationships between household demography and socioeconomic characteristics and the patterns of land use observed at the level of the farmer's individual plot.[15] Figure 7 highlights variation across neighboring farm lots. In this project, we highlight the need to study land use change on the frontier as resulting from both temporarily defined *period effects*, such as fluctuations in migration, different credit policies, inflation, etc.; *cohort effects* associated with the arrival and occupation of farm lots by groups of families, and; *age effects* associated with the transformation over time of households and their farms (McCracken et al. 1999; Moran et al. 2002; McCracken et al. 2002; Brondizio et al. 2002; Siqueira et al. 2003).[16]

Summary of Results: Colonist Case

Cycles of Farm Lot Formation

Consolidating a farm in an Amazonian frontier puts the Colonist in a paradox: having to open a rural property, consolidate its land use, and at the same time "avoid" deforestation. This is an awkward position wherein they are either victims or aggressors depending on one's perspective. These issues raise questions about the role small Colonist farmers are expected to play in frontier areas, the role of government policies, and the role of the scientific community in evaluating the causes and consequences of frontier occupation. Combining the need to develop a settlement, provide for their families, and cope with a new environment, a farmer's decisions about

Figure 6
Colonization Settlements Along the Trans-Amazon Highway, Municipalities of Altamira, Brasil Novo, and Medicilandia

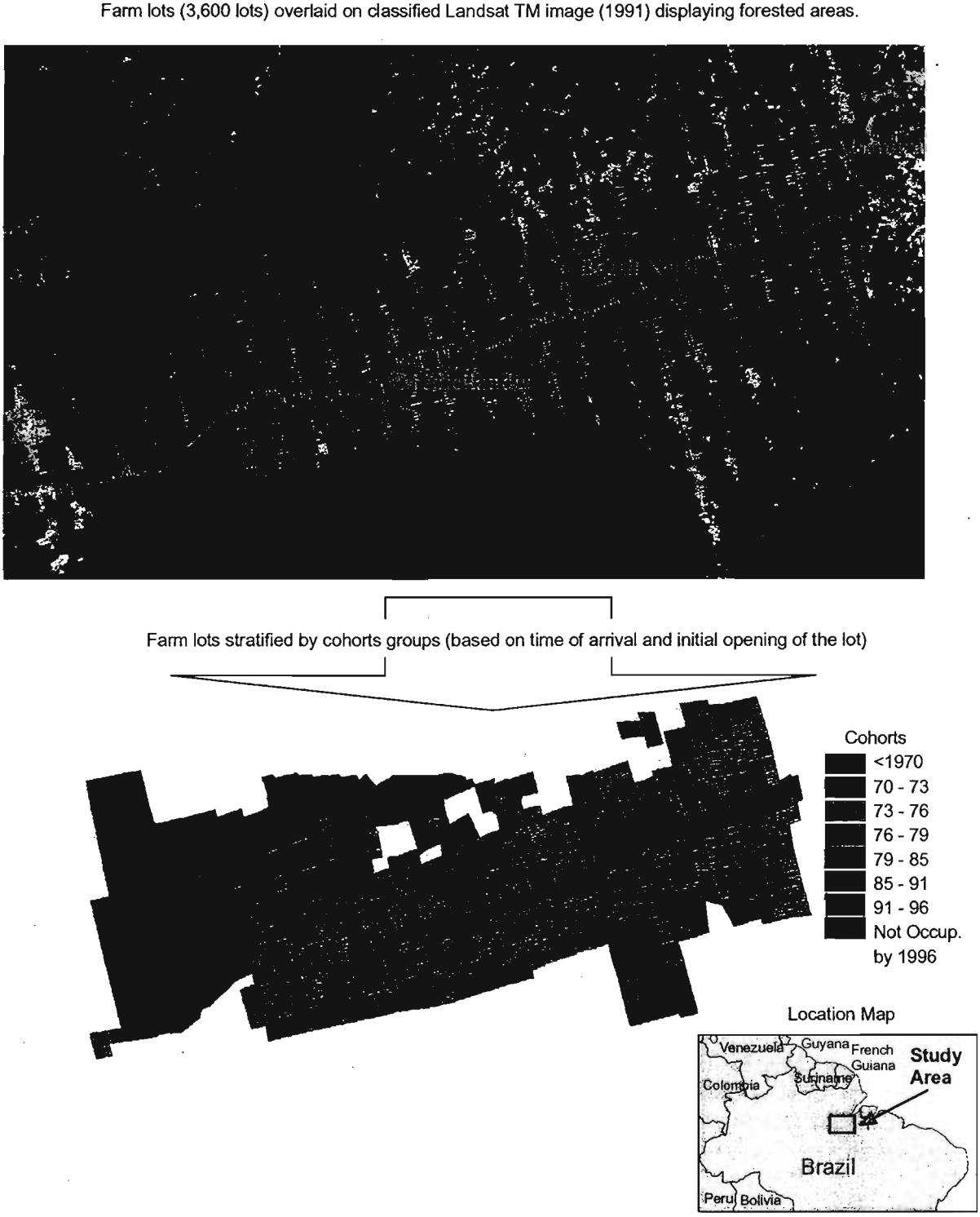
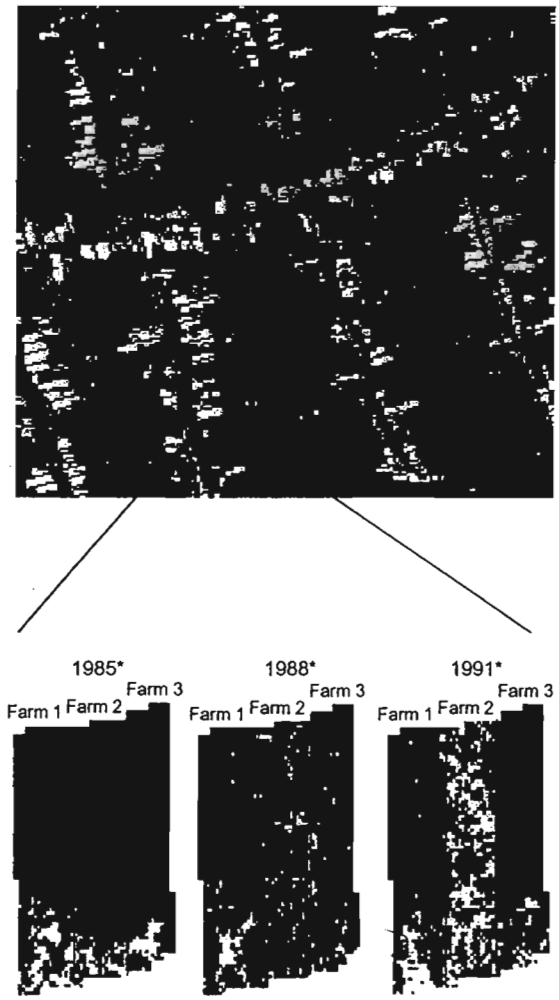


Figure 7
Variation in Farm-level Land Use Allocation and Land Cover Change: Examples from a Stretch of the Trans-Amazon Highway



* Classified derived from Landsat TM (1985,1988,1991)
Source: Adapted from Moran and Brondizio, 2001.

how much to deforest, what to plant, how to expand and consolidate a farm lot play a key role in their future success in the area (Brondizio et al. 2002; Futemma and Brondizio 2003).

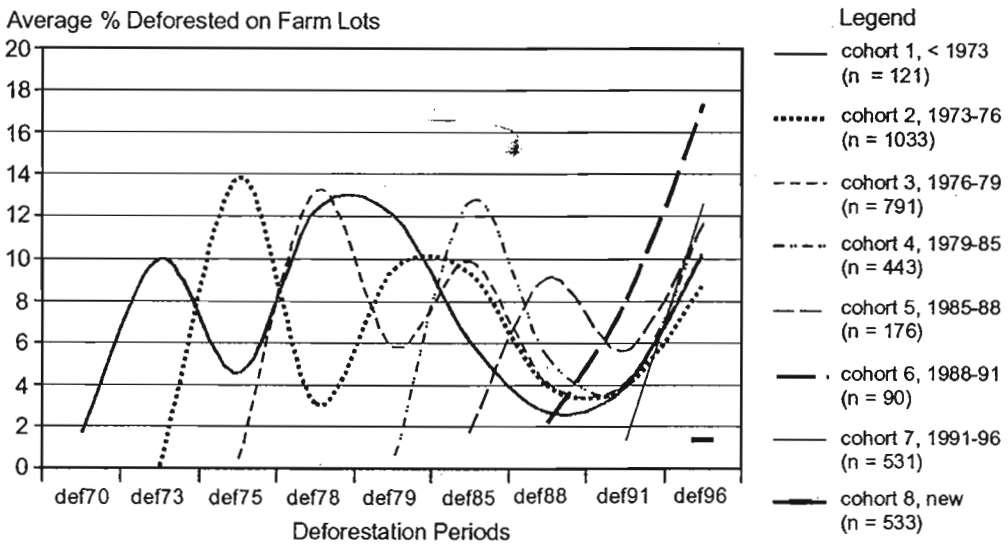
Figure 8 summarizes deforestation trajectories by taking into account average deforestation on farm lots across cohorts. Deforestation trajectories present a clear pattern across cohorts. Pulses of deforestation associated with crop and pasture development and secondary succession management mark these cycles of lot formation. Independent of cohort group, frontier farms show a developmental process associated with periods of establishment, expansion, and consolidation of land use activities. The magnitude of these pulses of deforestation relates to the interaction between farmers' decisions (in the household sense) and regional period effects ("signals" as used earlier), such as changes in economic, institutional, and infrastructure conditions motivating or inhibiting a particular land use behavior. We observe that intervals between pulses during stages of expansion and

consolidation of a farm lot reflect processes of intensification and extensification, and relates to time of settlement, soil fertil-ity in the lot, available household labor, and opportunities created by credit and market—socalled period effects (McCracken et al. 2002).

Whereas positive significant correlation exists between time of settlement and deforestation, this is offset by the internal variability within cohorts, which is stronger than across cohorts (see Brondizio et al. 2002 for more detail). Such variability is even stronger in older cohorts suggesting variation in rate, extension, and direction of land use change probably associated with different trajectories in household economic strategies, composition, and in farm production potential. Decisions regarding deforestation may be taken to seize a "period" opportunity, but not necessarily focus on long-term investment. This is the case, for instance, when a farmer allocates land to a particular crop in order to take advantage of a credit opportunity, then decides to discontinue the crop after the subsidy expires. As a result, large areas of secondary succession may appear. This reinforces the idea posed by the conceptual model presented by McCracken and colleagues (1999) that an initial period when farmers tend to deforest as much area as needed to establish their farm is followed by a consolidation period characterized by investment in perennial crop and secondary succession management.

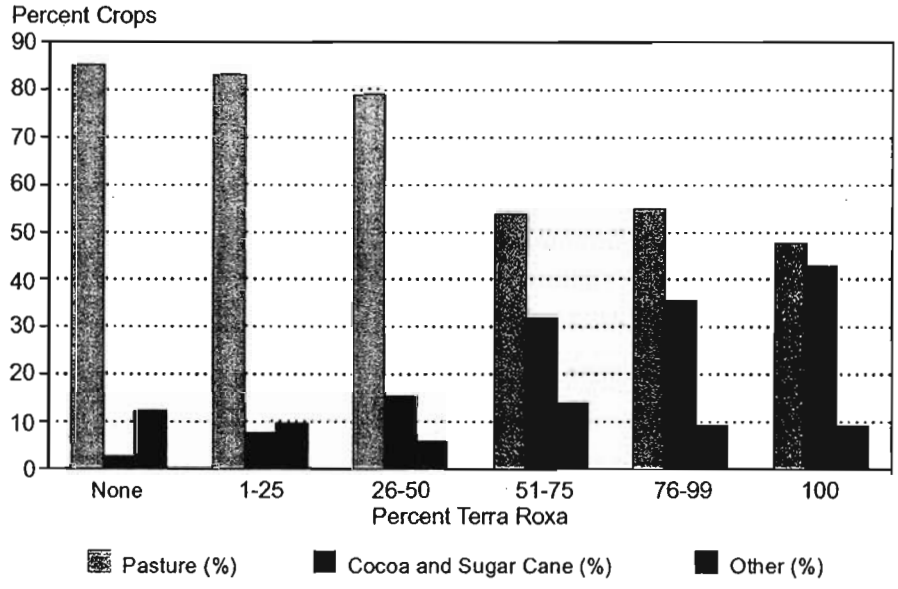
The same conceptual framework used to explain the differential behavior of Caboclos in relation to açaí fruit market signals applies here. Whereas signals of credit incentives and crop prices are regionally available, only farmers with necessary soil and labor endowment (as well as experience with the activity) are able to seize the opportunities. Figure 9 illustrates this point and the role of soil endowment upon land use decisions. Differences in soil quality explain much of the variance in crop choice and farmer persistence on rural properties. Upon arrival, most Colonists did not recognize differences between alfisols and oxisols. However, over the past 25 years, Colonists have learned the differences and today there is a clear association between the percentage of the property in alfisols and crop choice (see Figure 9 on Cacao and terra roxa). Crop choice is also constrained by the initial decision (and chance!) to locate on a specific property lot. Those who arrived early to the frontier acquired most of the plots with *terra roxa*—and these plots have not been re-sold as often as poor quality properties (see Moran et al 2002).

Figure 8
Deforestation Trajectories by Colonization Cohorts
(Distribution of Deforestation Events Averaged by Cohort of Farm Lots)



Source: Brondizio et al 2002.

Figure 9
Soil Endowment (Percent *Terra Roxa*) and Land Use Allocation Among Colonist Farmers, Trans-Amazon Colonization Area



Source: Survey in Altamira 1998, N = 402.

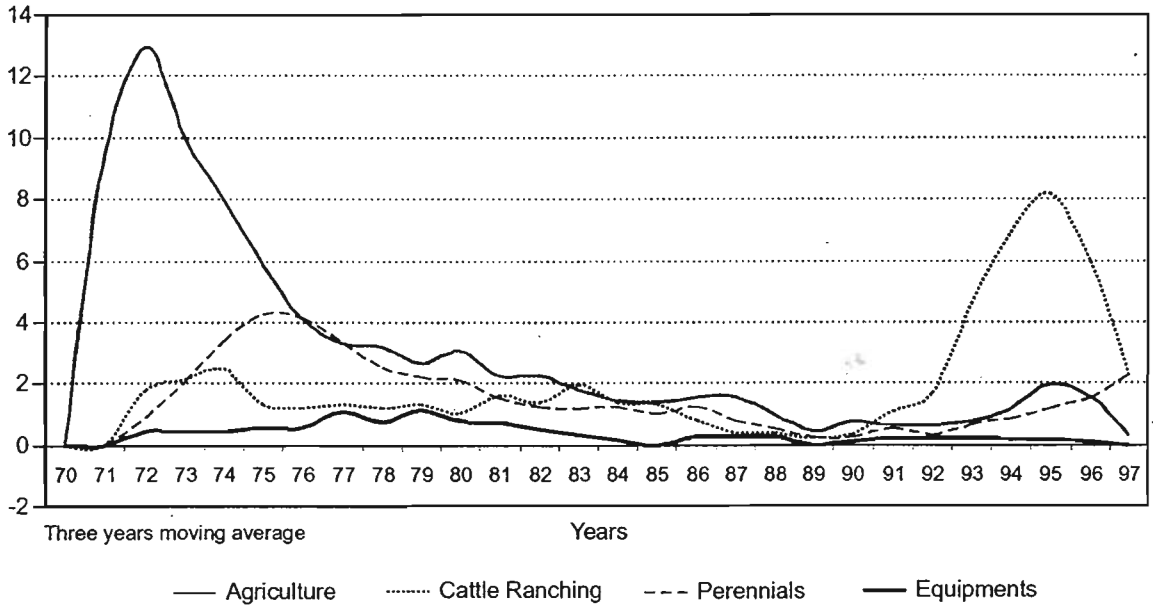
Response to Credit Incentive

In many respects, it is difficult to quantify the effects of subsidized credit on the behavior of farmers in the Amazon, due to the lack of data availability and the difficulties in determining the effective use of the subsidized credit directed toward agriculture (Fiorini, Brondizio and McCracken 2000). In the region of Altamira, 56 percent of the households interviewed received credit at least once. Figure 10 presents allocation of credit by type of land-use. Historical events clearly condition the variation and amount of credit allocated to different agricultural activities. Initial focus on annuals and perennials in the 1970s and early 1980s has changed to cattle ranching after 1991. During the 1990s, Fundo Nacional do Norte (FNO) has been almost the sole credit program available to small farmers; although privileging cattle ranching, it mandates for the inclusion of a small area of some pre-defined perennials, which most of the time does not reflect the farmer's own crop choices (Fiorini, Brondizio and McCracken 2000).

Credit used by the Colonist farmer for equipment acquisition has been generally unavailable and consistently low over the entire colonization period. This has been one of the main constraints to maintain opened areas in production as attested by most farmers we interviewed. In the area, the only significant equipment is the chainsaw, owned by 77 percent of the farmers interviewed, followed by generators (owned by 22 percent of the farmers).

Data show that access to credit for agriculture in the area is not significantly correlated to variables like educational level or age of the household head, or to the economic conditions of the household at the time of settlement. On the other hand, Fiorini and colleagues observed a higher tendency to receive credit among farmers that arrived from the Northeast, Southeast, and South of Brazil, or those born in the region, compared to farmers from other parts of Amazônia or the Midwest of Brazil. Previous experience with credit also was associated with higher levels of credit received. With regard to the characteristics of the lots, we observed a higher tendency to receive credit among farmers with terra roxa (62 percent) on their property compared to farmers without terra roxa (52 percent). The present study highlights clear links between frontier farmers and regional and national economic and social policies. Credit represents a resource used by Colonists to expand and/or consolidate a lot.

Figure 10
Credit Adoption by Land Use Activity Among Colonist Farmers, Trans-Amazon Colonization Area



Source: Adapted from Fiorini, Brondizio, and McCracken, 2000.

Discussion

Limitations of Intensification Theory to Capture Caboclo and Colonist Agrarian Systems

Application of conventional measures of intensification to Amazonian agriculture is challenged by numerous constraints. Nevertheless, as previously discussed, these limitations are not unique to the region, but rather, are common to the majority of small-scale agriculture in the tropics. A primary problem is the focus on a single agriculture activity instead of land use systems in which an agriculture field fits as part of a larger economic strategy. This assertion recalls two concepts discussed above. The first concept is the importance of seeing agriculture within a spatial context, and the second is the coexistence of intensification and de-intensification of agriculture as part of a larger land use strategy (Futemma and Brondizio 2003; Netting 1993; Guillet 1987). To these remarks one can merge a large body of literature on Amazonian floodplain populations showing more intensive use of the floodplain, associated with extensive swidden in the upland, both correlated to other economic activities, such as fishing, extractivism, hunting, cattle ranching, trading and off-farm jobs (Moran 1989; Roosevelt 1989; Denevan 1984; Hiraoka 1985; Padoch 1989; Brondizio et al. 1994).

The most problematic application of intensification models is related to agroforestry activities, especially in cases such as açaí agroforestry, where the distinction between agroforestry and native forest is not clear. Concerning the case of Açaí agroforestry, the flaws of intensification measures to evaluate the production system can be explained (in summary) by the following five main reasons: 1) *technology* is based on indigenous management knowledge; 2) the *agroforestry structure* can fit into both extremes (intensive or extensive) of Boserup's frequency model; 3) *spatial dimensions* overlap areas of intensive, intermediate, and unmanaged areas; 4) the *multiple productive dimensions* produce a "hidden harvest" within these areas, and; 5) *floodplain cycles* dictate cropping frequency more than fallow period (see detail discussion in Brondizio 1996; Brondizio and Siqueira 1997).

By the same token, frontier areas challenge the application of conventional models of land use intensification based on fallow cycle and factors of production frequently used to explain the relation between agro-pastoral systems and deforestation in other areas. One of

the most significant characteristics of a frontier area is the level of variability in deforestation and land use across farm lots of similar age and environmental conditions (see Figure 7). The Colonist footprint is characterized by the coexistence of extensification and intensification of production strategies marked by cycles of expansion and consolidation of the farm operation. These processes, however, are characterized by high variation within farm cohorts resulting from differential rate, extent, and direction of land cover change across farm lots. Understanding deforestation trajectories and the Colonist footprint require a combination of variables related to time of settlement (e.g., cohort and age effects), cohort and household dynamics (e.g., household labor composition, experience, origin), and period effects (e.g., credit, inflation), underlined by environmental, market, and infrastructural conditions. In the frontier, agricultural systems combine activities aimed at increasing land value, consolidating tenure rights, and diversifying activities to minimize risks and to allow experimentation in a new environment.

Understanding these processes will help to put more attention on the improvement of existing infrastructure as well as value local experiences in order to help existing farmers maintain forest in their lots, increase agro-pastoral production, and improve the quality of life of their families—all of which are key elements for better policies aiming to decrease deforestation rates in the Brazilian Amazon.

Economic Rationality and Market Opportunities

Caboclos and small scale Colonists are generally regarded as marginal actors of the regional market economy and are frequently questioned about the "rationality" of their economic behavior, which is seen as backward and unfit to contemporary economic demands. A close look at the last ten years of the açaí fruit economy, on one side, and the adoption of credit and land use systems by Colonists on the other, shows signs to the contrary. Market demand and price changes have been the main motivation for the Caboclos' decision to implement açaí agroforestry as their main agricultural activity.

The açaí agroforestry case helps us to re-think land use intensification in Amazônia from a market and socio-cultural perspective. The Caboclos' ability to participate in the açaí economy emerges from their aptitude to increase output production from an existing set of management techniques, instead of adopting an exogenous system. This allows a progressive and flexible market insertion, which incurs fewer risks by combining subsistence and market outputs. However, whereas açaí production occurs across all property systems, the economic return of a producer is constrained by ones ability to decide when to best place one's yield on the market, a choice limited to sharecroppers. Thus, the açaí case reported here suggests that intensification in output production does not necessarily translate into improved return, but rather it depends on one's ability to take advantage of daily and weekly price fluctuations. In this case, land tenure, not a farmer's economic ability, explains the main differences between the marketing strategies of small owners, large owners, and sharecroppers.

Similarly, credit acquisition data show that Colonists have responded to incentives, but in the case of most programs they were discontinued or mismanaged, leading to land use failures and abandonment of activities. Overall, most Colonists have fulfilled their part (in planting and paying for credit), but were left without support (for instance during commercialization) or even roads to take advantage of their yields. The transportation and marketing infrastructure has historically been one of the main constraints of the regional economy. Distance, isolation, transportation means, and lack of capital have excluded a large number of Amazonian producers from taking part in the market without the reliance upon middlemen. In frontier Amazônia, roads abandoned by discontinued policies are well known for letting successful crop yields rot on farmers' lots. This has created a complex structure of middlemen and a level of dependency on "intermediate" markets for small farmers all over the region. This condition of unequal exchange further reinforces rural producer's invisibility in Amazônia. Colonists are eager to seize investment and market opportunities to consolidate their farm operations, but constantly face economic and infrastructure constraints.

Adaptation and Maintenance of Subsistence Basis

Worldwide, the economy of small-scale tropical agriculturalists involves more than edible products (Ellen, 1982). The literature on non-timber products of tropical forests has flourished in the last few years, and the search to alternatives to deforestation and better knowledge of local economic strategies has taken place (Plotkin and Famolare 1992; Nepstad and Schwartzman 1992; Hecht, Anderson, and May 1988). Studies have shown that forest products account for a considerable part of the local economy, and in some cases may exceed other activities, such as agriculture and ranching (Peters et al. 1989; Hecht 1992). A good example is Hiraoka's (1994) work in the estuary (Abaetetuba) showing the importance of *miriti* (*Mauritia flexuosa*) to the household budget. The market of

miriti fruit represents 13-15 percent of total household income. In the estuary, açaí agroforestry provided staple food production and raw material. This can be contrasted for instance with local development projects that emphasized production of crops not consumed locally (Murrieta et al. 1992; Murrieta 1994). In summary, access to a large portfolio of timber and non-timber products presented in agroforestry areas guarantees market independence in terms of raw materials, and an important part of both household and market economy that should be considered when accounting for agroforestry productivity.

In the case of Colonists the focus on diversification of land use types reflects a strategy that helps to address market demand while providing for consumption. Planting annual crops (*lavoura branca* usually including rice, beans, corn, and manioc) followed by pasture formation allows one to address market and consumption needs while increasing property value by expanding the opened area. In most cases, areas of perennial crop are also present. By the same token, cattle ranching activities provide a stable source of income, less dependent upon transportation (easily sold on the property), storage, and price fluctuation (Hecht 1993).

In both cases, we see a strategy that maintains intensive and extensive areas in production to attend both consumption and market needs. As previously noted, the co-existence of land use strategies can be re-interpreted in terms of flexibility and risk minimization by small farmers' households used to dealing with disadvantageous infrastructure and economic vulnerability.

Building Upon Local Knowledge and the Need for Technological Support

It is common sense to say that Caboclos have inherited the agricultural knowledge of pre-Colombian populations related to floodplain agriculture. However, as discussed earlier, the application of this knowledge has been shaped by both, historical factors, land tenure, and by available market opportunities. Although it appears technologically simple, this process involves specialized knowledge about the species and plant-soil interactions. Therefore, any account of technological input in these systems cannot rely simply on comparison with energy intensive agricultural technology, but should include considerations of accumulated management knowledge, specialized labor, and efficiency of production. The participation of Caboclo farmers in the intensification of açaí fruit production reflects their technological background and ability to implement this knowledge. However, in the context of contemporary Amazonian economy, technological assistance for production and processing is a major need in these areas.

Colonists tend to reproduce systems that reflect their previous experience. However, most Colonists are eager to experiment and develop new techniques to cope with the particularities of the local environment. Elsewhere, we have shown (Brondizio et al 2002) that older Colonists are able to keep open areas in production for longer periods. In part, this is due to their advantage in selecting the "best" lots as they had a chance to interact with local Caboclos and learn about soil selection criteria (Moran 1981). It also reflects the trial and error experience they developed in the region. In areas such as the Trans-Amazon, farmers have built up enough knowledge to inform at least better land use policies to foster regional development while attending to both market and household demand. Most Colonists opt to increase the area deforested in the absence of technology and financial support in order to keep areas producing longer.

Conclusion

On one level, this paper has tried to argue that the "invisibility" of Amazonian Caboclos is common to most smallholder rural populations in the region, despite their historical, cultural, geographic, and environmental differences. This is, at least in part, a result of historical social prejudice and misinterpretation of small-scale agriculture systems. However, at the same time, our data stress two important components that must be taken into consideration. First, particular to both cases, one finds an internal variability across and within these populations. Second, it becomes clear that sociocultural differences must be stressed and valued. In this sense, Caboclos offer a unique contribution to the region based on their environmental knowledge, production techniques and management, and the historical context they bring, including a rich "cultural inheritance" that characterizes Amazônia today. Even recent Colonists, one may argue, bring a new blend of techniques that are transformed and translated into a new socio-economic and environmental reality that should not be dismissed. Today, Colonists take the place of Caboclos as the demographically dominant rural inhabitant.

In the context of creating a new economic development concept based on social justice and environmental grounds, it is important to modify our conception of Caboclos and Colonists as social categories as well. Improvement in their agricultural system should come with social-economic infrastructure and extension services that will help to target technological changes

towards production systems without displacement of local resource bases. Estuarine and frontier populations focused upon in this paper, as well as other rural populations of the region, have virtually no access to health and education services, nor to adequate agricultural credits. In such circumstances, underemployment in urban areas has been more attractive than farming. The lack of infrastructure in terms of energy, transportation, extension services, and cooperative organization lead rural producers to political isolation and continuous economic dependency on middleman and patronage. Products that have high market price (e.g. heart of palm [estuary] and lumber [Transamazon]), have almost no economic value to the small producers. Small-scale transformation industries should be promoted as a way to aggregate value to local products, as well as increase employment and circulation of money within the region.

In summary, redefining the Caboclos' identity as rural producers in the context presented by Netting's small farmer is an important step towards overcoming the prejudices embodied in the term, as well as to overcome their extractivism background. This may help to change rural "modernization" paradigms, which are so often presented on development projects in the region. Social and political recognition of Caboclos as rural producers needs to be achieved and reinforced. Recognizing the role they play in regional agriculture may contribute to a shift that sees their production system no longer as extractivist but no less than forest farming (Brondizio and Siqueira 1997). Similarly, Netting's small farmer framework may be applied to Colonists. In lieu of nonexistent and inconsistent support, agrarian reform areas like Altamira are turning to property aggregation, thereby repeating a vicious cycle of attraction and expulsion of small farmers.

At a regional level, an identity of Amazonian small farmers including a wide range of Caboclos and Colonists will surely help to increase political attention and foster more support. An important example is the rural union-based, *Grito da Terra*, initiative, which brings together all these categories under the identity of rural producers, furthermore linking them to a broader political and social movement in Brazil as a whole. Unfortunately, new development efforts, such as the *Avança Brasil* program is showing signs of repeating similar errors as its predecessor PIN. In various areas designated for agrarian reform, new incentives to large-scale soybean, logging, and ranching may continue to lead to high rates of lot aggregation, Colonist out-migration and consequent swelling of urban areas. As a whole, we continue to reproduce a sense of shame, not pride, towards rural Brazilians, thus perpetuating a cloak of "invisibility" for both Caboclos and Colonists alike. In this sense, the historical stigma of the term Caboclo is just a reflection of a national, historic prejudice towards rural populations in general; as well as misinterpretation of agricultural intensification processes and the role of small-scale agricultural systems in the national economy.

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Notes

[1] Particularly, in this paper, the term Caboclo refers mostly to the riverine and inter-fluvial rural populations of the Amazon estuary represented by the study case discussed here.

[2] The term Colonist is used in this paper to refer to the families arriving in the region since the late 1960s through government-sponsored and spontaneous migration to areas previously occupied by Indigenous groups or Caboclo settlements. In particular, in this paper I concentrate on Colonists settled as small farmers (that is, in lots varying from 50 to 150 hectares) during the last three decades as a result of government incentives for colonization. Whereas clear differences exist between these more recent migrants and Caboclos, one may find it difficult to distinguish between communities occupying areas of century old colonization, like the Bragantina region, and Caboclo communities interweaved within and around them.

[3] As noted by Pace "In all these definitions [n.a.: pointing to the same citations used in this paper to refer to Caboclo studies] it is acknowledge that Caboclos are nontribal—not Native American—and non-settlers—not migrants who have come to Amazônia since the 1950s..."(1997:82).

[4] In the Colonist case, examples of terms with derogatory connotations include *arigó* (particularly for those of Northeastern origin) and *quiçassa* (a term also used for abandoned areas in Western Amazônia), among others.

[5] A large literature not possible to be reviewed here has been developed around swidden agriculture in Amazônia.

[6] I use the term "rural studies" here to refer to various lines of research in anthropology, sociology, and geography concerned with rural development, socio-cultural change, extractivism, and political ecology, among other themes.

[7] Data representing Caboclo populations of the Amazon estuary (Ponta de Pedras, PA) include Landsat TM-based land use change analysis (1980s and 1990s), socio-demographic and land use surveys (86 households), experimental plots of açaí fruit production (season of 1994-1995), daily price variation and ethnographic material on agroforestry systems and resource management. Analysis includes measures of management intensity, productivity, labor allocation, market transactions, and economic return to compare this system to other regional land uses.

[8] This index is the official indicator of prices received by farmers in Pará State for agricultural and husbandry products. Its regional focus is especially important since it more closely reflects the economic context faced by açaí producers. The index is based on the price received by farmers for 24 agricultural products (including annual, biannual, and perennial crops) and seven husbandry products (including beef and poultry).

[9] To calculate the revenue on each of the experimental sites, the amount harvested each month was multiplied by the average monthy price of açaí fruit. The "net revenue" was calculated by discounting the cost of transportation and wage when applied. The production season stretched from September to February (data from market and experimental sites), although clear variations existed across the estuary.

[10] An important advance in the growth of the açaí economy during the early 1970's was the development and dissemination of electric machines used to process açaí pulp to make *vinho do açaí* (açaí juice). These machines replaced the *amassadeiras de açaí* (women who crush the fruit by hand), and hand processors made of wood. Nevertheless, the latter are still the main means of processing in rural households. Manual açaí processing requires hard labor and could not handle large quantities of fruits as required by the large urban market. Despite its dominant consumption by low-income populations, açaí is valued by other socioeconomic urban classes, not only in the form of staple food, but as a delicate dessert (ice cream, pudding, liquor, cake, among others). More recently, açaí juice has become popular throughout Brazil. For a detailed ethnographic account of açaí uses see Strudwick and Sobel (1988); Brondizio 1996; Brondizio in press;Brondizio, Safar, and Siqueira 2003.

[11] Rogez (2000) presents the most detailed study on açaí composition and processing.

[12] The term *açaízação* was used by Hiraoka (1994) to express the phenomenon of expansion of açaí agroforestry areas in the region.

[13] Despite other potential industrial uses, such as paper pulp (trunk), oil (fruit/pulp), animal food (fruit/seed), and ink (fruit/pulp) (Calzavara 1972; Lopes et al. 1982; Strudwick and Sobel 1988), there has been no significant commercial application of açaí besides heart of palm and fruit. However, it is important to consider the role açaí played during the 1960s in supplying fuel (use of stems as charcoal) to the brick (*olarias*) industries that prospered in the estuary during that decade, and even today in some areas, such as in Abaetetuba (Calzavara 1972; Hiraoka 1994).

[14] Owner-sharecropper relationships during the harvesting season are typified by a number of informal and formal rules in relation to harvesting periodicity and schedule, price, and transportation costs. It has become more frequent for owners to organize a general meeting with the sharecroppers to decide on these issues. Owners usually decide on a starting date for harvesting that coincides with that of different sharecroppers working on the same property.

[15] Data representing Colonist populations of the TransAmazon highway (Altamira, PA) include 402 detailed socio-demographic, economic, and land use questionnaires (household/farm lot level) sampled across colonization cohorts using a spatially-georeferenced sampling frame (3,800 farm lots). This includes remote sensing data capturing the entire period of frontier occupation (1970 to 1996) and a property grid that al-lows analysis at the level of settlement, cohort of farms (8), and household/farm lot (3,800 farm lots) level.

[16] In terms of economic and land use/agriculture trajectories, our study area can be divided into three main periods: 1972-1978- subsistence crops, such as rice, beans were dominant in the region; 1978-1988- highest production of perennial crops, such as cocoa and black pepper; 1988- to now, cattle ranching expansion and co-existence with other farming activities. (Castellanet et al. 1994).

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