

**Production in the Shadow of the Naked Mountain:
Historicizing the Failures of Common Property Enterprises in the Brazilian
Landless Worker's Movement (MST)¹**

by Leigh Johnson

Adjunct Researcher
Setor de Estudos do Uso da Terra e Mudanças Globais
Parque Zoobotânico
Universidade Federal do Acre
Campus Universitário
BR 364 km 04, Distrito Industrial
Rio Branco, AC 69915-900 Brazil
tel: +1-510-868-0213 (USA direct dial)
email: leighjohnson@fulbrightweb.org

Presented to the Biennial Conference of the International Association for the Study of Common Property, Oaxaca, Mexico, 9-13 August, 2004

¹ Partial support for this work was provided through a William J. Fulbright Fellowship for research in Brazil, 2003-2004. For valuable provocations, suggestions, and support during the writing of various versions of the manuscript, I thank Charles Trocate, Jorge Neri, Kátia Carvalheiro, Gustavo Negreiros, Isaac Serruya, Paige West, Noah Brick, Gerd Sparovek, Maura Kelly, Jackie Vadjunec, Esther Johnson, Foster Brown, and Manuel Cesario. I am most deeply indebted to the ever gracious, hospitable, and insightful members of the *Movimento Sem Terra* in Palmares and Onalício Barros.

ABSTRACT

This study proposes that particular nucleated settlement strategies adopted by the Brazilian Rural Landless Worker's Movement, the MST, in the eastern Amazon, can be understood as the evolution of common property in response to the exclusionary land tenure system and capitalist structure of the Brazilian countryside. Although these collective management and production arrangements generally result in greater economic efficiency, land retention, and environmental preservation, rarely do any of these enterprises achieve stability over more than one to two years. The paper contests the presupposition that market opportunities necessarily bring stability, while simultaneously arguing that the failure of collective projects cannot be explained simply in microeconomic terms of utility or transaction costs. Household-level surveys indicate that, faced with the choice between individual and communal production, the latter is consistently more economically advantageous. The crumbling of common property systems has little to do with microeconomic forces; rather, it is influenced by a culture that values individual self-determination and products with immediate exchange values. The development of these specific cultural values can be understood through an analysis of the majority of participants' previous labor experience in Brazil's famous Serra Pelada ("Naked Mountain") gold mine and the particular enduring social relations that this mining phenomenon produced. These circumstances are found to influence directly the ability of collectives to come to a consensus about the direction and schedule of production, while they also encourage a tendency towards individualized ranching-based activities and away from agricultural production. Thus it is argued that larger international market forces driving development projects and mineral extraction in the Brazilian Amazon have fundamentally altered the social fabric of the region, and ultimately had a destabilizing effect on the success of common property institutions and community-based enterprises within the landless movement.

I. INTRODUCTION

Land remains one of the most critical but unequally distributed natural resources in Brazil today. Data from the 1996 Agrarian Census indicate that sixty-nine percent of the land is owned by the top five percent of the rural population, while the bottom fifty percent own only two and one-third percent of the land (Sparovek 2003, 18). In the Amazonian region of the

country, where this study concentrates its analysis, the inequalities are most pronounced: seventy-four percent of the land is owned by the top five percent of the population, and the bottom eighty-four percent own only fourteen percent of the land (Corbucci 1998, 288). Contrary to the trends of urbanization in the rest of the country, incentives have created steady pressure to occupy rural areas in the Amazon. According to the government's statistics bureau (IBGE), the rural sector averaged 3.89% growth per year from 1980 to 1991, and 3.5% growth from 1991-1996 (Corbucci 1998, 287; Hebette & Abelém 1998, 240). In the greater Marabá region, including Parauapebas, in the southeastern Amazon, government incentives for large development projects and colonization have created a highly charged atmosphere in which control of land is an issue of contention between large cattle ranchers, mining corporations, small producers, and migrant squatters (Muchagata 2003; Pinto 1990; Valaverde 1988).

Multiple conditions dating back to the 1960s set the stage for the *Movimento Sem Terra* (MST), the Landless Workers Movement, to become an active force in shaping the landscape of the countryside around Marabá and Parauapebas in the 1990s. The region became an area of particular interest to the government upon the discovery of enormous deposits of iron and manganese in the Carajás mountain in the late 1960s. Migrants were attracted by the National Integration Plan (PIN) initiated in 1970, which aimed to connect the Amazon to the rest of the country through a series of highways and colonization projects, notably beginning with the Transamazon highway, which originates in Marabá (do Rêgo 2002). Colonization programs were expected to alleviate population pressures and social tensions in the central west and northeast of the country, while simultaneously defending and “civilizing” the Amazon and bringing its enormous natural resources into circulation on the market (Dodds 1993; Slater 2000). Gonçalves explains: “since capital alone cannot add value to itself, but rather requires the force of labor in order to be valorized, the government would unleash an extensive campaign in an attempt to attract a labor force to occupy the ‘empty demographic’ of the Amazon” (2001, 95).² Touting the Amazon as a “land without men for men without land”, the government created colonization projects along the sides of existing roads in order to attract the labor force that would build massive infrastructure projects such as the Transamazon highway (Little 1999, Gonçalves 2001).

² “Como o capital não se valoriza por si mesmo, pois precisa da força de trabalho para o valorizar, o governo desencadeará ampla campanha procurando atrair mão de obra para ocupar o ‘vazio demográfico’ amazonico.”

Increased access to Amazonian resources meant not only timber and land, but perhaps most importantly, minerals. Along with Brazilian and foreign mining corporations, hundreds of thousands of itinerant miners and panners were attracted to the region. They came primarily from the northeast of Brazil, a “mass of excluded, true economic refugees pioneering the rich subsoil” (Veiga 1999, 94).³ In 1980, two major developments in the mining sector brought skyrocketing population pressures that increased the size of Marabá from 218,000 inhabitants to 405,000 inhabitants within four years. The first was the formal creation of the Grand Carajás Project⁴ (PGC) with a base outside of Marabá, and the second was the discovery of gold at nearby Serra Pelada, “Naked Mountain”, in January of the same year (Pinto 1990, 444-8). The PGC attracted the unemployed and landless workers to build the company town for the Companhia Vale do Rio Doce (CVRD), the present-day city of Parauapebas, as well as to construct the railroad that transports the minerals from Carajás to the coastal port of Itaqui, in the northeastern state of Maranhão. In addition to those attracted to construct these projects, Lara estimates that 120,000 rural migrant families moved along the axis of the railroad from Maranhão to Pará (1987, 44; in Pinto 1990, 443).

The Serra Pelada gold mine, only fifty kilometers away, also attracted tens of thousands of the unemployed and landless, who came to take advantage of unregulated extraction and unprecedented gold prices on the world market. At its peak operation in 1983, 80,000 men worked as *garimpeiros* (miners or panners) in an area of five hectares at Serra Pelada, extracting fourteen tons of gold that year and digging a giant pit that reached a depth of more than 120 meters. *Garimpo* (individual mining)⁵ and charcoal making (necessary for iron processing) became escape valves for the region’s poor, who found themselves in especially dire conditions when jobs in regional agriculture atrophied in the transition to low-productivity cattle ranching. By 1989, the Serra Pelada gold deposits were largely exhausted, though 15,000 *garimpeiros* and their families continued living in the area, struggling to survive off of the total 200 kilograms

³ “*Verdadeiros refugiados econômicos desbravadores do subsolo rico...*”

⁴ In its entirety, the Grand Carajás Project (PGC) covers 900,000 square kilometers, or 10.6 percent of national territory. It was explicitly conceived of as strategy to pay foreign debts through the export of iron, bauxite, manganese, gold, nickel, tin, and copper. Though PGC was financed largely through foreign investments, the state offered promises of infrastructure development (railroads, highways, dams, ports), tax incentives, loan guarantees, land concessions, a subsidy on 30 percent of energy costs, generous pollution allowances, and guaranteed supplies of low-cost ore and charcoal (do Rêgo, 302-303).

⁵ This paper will use the term *garimpo* to refer to mines (usually gold) worked by individuals, outside of any formal corporate structure. *Garimpeiros* refers to the individuals who worked these mines. Serra Pelada was a site of *garimpo*, while the Grand Carajás project and CRVD are corporate, regulated mines.

extracted that year (Pinto 1990, 445-450). Eventually the government closed the mines to *garimpeiros*, citing dangerous working conditions and clandestine sales, and turned over mine management to now-privatized corporations. The closing of the small mines meant widespread unemployment for the 250,000 *garimpeiros* throughout the Amazon region (Schmink 1988). Unemployed *garimpeiros* are to a certain extent the products of larger strategies of global capitalism articulated by the World Bank and International Monetary Fund in the 1980s and 1990s. These policies encouraged developing countries to ease restrictions on international investments in mining (Ballard and Banks 2003, 294), and thus encouraged the corporatization of mineral extraction and the elimination of the *garimpeiro*.

In the “bust” after Serra Pelada, and the coinciding termination of large infrastructure construction projects for CVRD, hundreds of thousands of unemployed workers descended on the town of Parauapebas, which was quickly filled beyond capacity. *Favelas* such as the 100,000-person Rio Verde sprung up on the outskirts of the town (Valaverde 1988:15, in Pinto 1990, 444). The influx of unemployed men put an even greater pressure on the already developing cause of land reform. Many of these men sustained a meager existence as sharecroppers on the land of larger farmers, or hired out to work on farm construction projects. They desperately wanted their own land to farm, desiring to be responsible for their own production and not subject to the whims of a landowner. In this devastating climate of unemployment, landlessness, and poverty, the MST found thousands of workers eager to take up more militant activity to improve their quality of life. The settlements of Palmares and Onalício Barros, home to the collectives analyzed in this study, are two of the six MST communities in the area.

The MST’s mission is to combat the inequality of land distribution throughout Brazil by mobilizing landless workers to occupy unproductive agricultural lands of large landholders and demand formal government reallocation of the area for worker’s productive needs. In the typical course of events, the initial occupation of land is based on a system of common property, in keeping with the movement’s philosophy to redistribute the property of the few into the hands of many. In the encampment stage, before the occupation is recognized with legal status by the National Institute for Colonization and Agrarian Reform (INCRA), all families work in collective groups called “nucleos”, which act as organizational units for production and political decision-making within the community.

The period of encampment is full of struggle and uncertainty, and all families are expected to unite in collective agricultural production and common opposition to the large landholders and the gunmen often hired to threaten, torture, and sometimes kill the occupiers. Settled workers often credit the bonds created during these initial difficulties as the basis of a tradition of common work. One worker living in a settlement founded on the site where two MST activists were murdered explained, “For many nights in a row, we wouldn’t sleep. We just stayed awake, listening for the gunmen. It was hell. They would come in the middle of the night with dogs and tie people up. They would throw *companheiros* in the corral and force them to eat underbrush and grass. The psychological pressure to leave was immense. Everyone felt humiliated and threatened. We had to share everything to overcome the difficulties.”⁶

The spirit of cooperation in the community remains quite strong when the danger of losing the land is still present, but once the encampment gains legal recognition and is consolidated as a settlement, there is an overwhelming tendency towards individuation. Years of poverty and landlessness create an overwhelming desire to possess legally a lot in one’s own name. Leaders in the MST term this tendency “lot culture”. Families become so preoccupied with their own property that the formerly collective structures of the MST encampments founder. Settlers soon feel the consequences of not working cooperatively, however, as production falls and many individual families give up their land in financial desperation. Small landholders have great difficulty barely eking out a living in their first few years on the land. Many are first-time farmers unfamiliar with the best cultivation strategies or have the bad luck to be allotted a piece of land in an area with especially poor soils. Since the lands the MST occupies are commonly degraded pasture lands, the soil fertility is far from optimal for basic crops such as rice, beans, and corn. These factors, coupled with government subsidies to agribusiness, as well long distances and high transportation costs to markets, mean that the individual small producer often simply cannot compete. Families frequently have no other way to survive than to capitulate to ranchers or loggers who offer to buy their land. On a national

⁶ The study areas, both located in the municipality of Parauapebas, Pará, fall in a notoriously violent region of the Amazon, well-known for flagrant and unpunished violence against rural workers. Fifty-five kilometers to the east lies Eldorado dos Carajás, the infamous site where military police killed 19 Sem Terra (and two more subsequently died from wounds) marching to the capital in the early morning of April 17, 2001. The social consequences of mining have left a tradition of violence in the region: Curionópolis, forty kilometers to the east, was known in the 1980s as one of the most violent regions in all of Brazil. (Pinto 1990, 450).

level, the result is that around one in every four plots is abandoned or sold in the first two years after distribution (Margolis, 2002).

II. TRENDS AND BENEFITS OF COMMON PROPERTY MANAGEMENT

In an attempt to avoid the common trajectory of lot abandonment, some MST communities began implementing both semi-collective and collective land titling. Leaders hoped that land titled in the collective name of multiple families in the community would be retained for longer periods of time. INCRA has also begun to view collective titling as a way to decrease land turnover and increase retention rates of settled families (Trocatte 2002). Analysis of other collective agricultural projects has led some environmental anthropologists to propose that collectives may engage in greater degrees of environmental protection of their lands than individual farmers do because of the collective's far-ranging view of the future as opposed to the farmer's short term goal of profit (Bennett, 1993). Finally, numerous studies have found that collectives have the potential, though it is not always utilized, to be more economically efficient than individual producers, due particularly to their increased access to capital and labor force (O'Leary and Watson, 1982a).

The first fieldwork period for this study, in 2002, addressed the benefits of common property strategies within two MST communities, while the second period, in 2004, addressed the long-term failure of community-based production systems. The three nucleos studied, *Balayada*, *Ligas*, and *Filhos*, were each comprised of between seven and ten families. *Balayada* specialized in collective dairy production, while *Ligas* and *Filhos* both specialized in fruit, vegetable, and grain production. *Filhos* was also attempting to commercialize fish, organic seeds, and tree saplings. In 2002, household-level surveys and landscape mapping indicated that collective systems had higher rates of production and investment in agricultural projects, greater prospects for environmental conservation, and lower per-person expenditures. Workers also cited increased camaraderie and encouragement to remain on their land in common-property systems. To understand the implications of the failure of two out of these three systems by 2004, a more detailed account of their successes in 2002 is in order.

By far the most commonly lauded benefit of collectives cited by workers was their economic efficiency. "You always get more working together," one worker stated simply, summarizing most interviewees' comments. Workers mentioned the production benefits of

having a large labor force, commenting that, unlike in individual plots, no time or production would be wasted if one worker got sick or had to attend to business in town. They also commented on the benefits of pooled financial resources, citing capital- or labor-intensive production projects that their *nucleos* developed, projects which would never have been possible for an individual owner to implement. One leader of *Filhos* claimed, “our experience definitively shows that you earn more in the *roça* (small agricultural fields)⁷ and more with cattle when you work collectively.” Even some individual holders who had opted not to join the collective systems commented that collectives can achieve greater production and develop projects far beyond the reach of the individual.

Household surveys generally confirmed these impressions. Of the strictly individual families for which data was obtained, only half had any sort of production, either livestock or agriculture, and only a third had agricultural fields. Though most of the remaining families planned to begin their *roças* in the coming planting season, for the time being they relied on income from pasture rental or temporary employment with other farmers. All collective systems had some form of production, and two out of the three had developed long-term agricultural production.

The lack of production in individual families, coupled with the fact that these families generally purchase more for themselves than collective families, makes the cost of individual living greater. In the individual households for which monthly expenditure data was available, there was an average R\$51.75 (at the time, US\$23) expenditure per person per month. In the collective households for which monthly expenditure data was available, the average expenditure was only R\$35.6 (at the time, US\$15.50) per person per month. Collective production units appear to provide a more economical option, at least as far as the costs of living are concerned.

The land use plans of individual families confirm the theory that collectives optimize environmental and financial resources in ways that are not possible on individual plots. Two-thirds of the individual families surveyed owned plots that still contained forest. Every one of these families had plans to cut part, if not all, of their forest in order to make agricultural fields. This contrasts sharply with the land use plans of the two collectives (*Filhos* and *Ligas*) whose

⁷ *Roças* are generally planted with traditional crops such as rice, beans, manioc, and corn, along with smaller vegetable plots for squash, melons, and other less frequently consumed crops.

plots contained forest at the time of settlement; both groups designated their forests as “reserves” and resolved not to cut into any part of them. Both collectives had agricultural fields on areas that were previously pasture, not forest. Workers were usually quick to mention the benefits to the environment enabled by collective systems. They cited the increased organizational capacity and resources of collectives, and often referred to their nucleo’s preservation of forest. Production diversification may indirectly provide an alternative to increased reliance on pasture rental systems, thus decreasing soil compaction and pasture degradation.

From a planning perspective, the pooling of individual lots to form a collective enterprise is environmentally and economically savvy. Collectivization of individual twenty-five hectare lots to form one enormous plot has given all members of *Filhos* and *Ligas* access to pasture, forest, and riverine habitats; without collective land, individual families would have access to only the resources on their plots. Some of the twenty-five hectare plots are almost entirely pasture, and without collective land, the owners of these plots would have no access to forest resources such as construction materials and medicinal plants. On the other hand, some plots contain large areas of forest, and without the pastures available in other areas of the collective plot, families would find themselves under significant financial pressure to clear the existing forest in order to plant crops or raise cattle. In all collective systems surveyed, current pasture and agricultural fields exist on lands that were already *capim*, or scrub pasture, at the time of occupation. The nucleos have resolved to leave the existing areas of forest as reserves because the members realize the day-to-day value of the forest as a resource.

Environmental preservation is not only a result of collective land pooling or production diversification, however. Other important factors influencing conservation on the part of the collective include technical access, outside salaries, and education. *Filhos*, a particularly advanced nucleo which boasts a mahogany reforestation project, tree nursery, coffee plantings, fruit trees, organic garden, and typical *roça* crops, demonstrates that some environmental initiatives require technical expertise and assistance. The availability of technical assistance may be out of the control of nucleo members and instead be largely dependent upon the settlement’s economic well-being and the leadership’s priorities.

Outside income also plays a role in the nucleo’s ability to divert funds away from short-term production towards long-term environmental efforts. As evidenced by *Filhos*, the

disposable income from four members' outside salaries and pensions enabled (1) more nucleo income to be reinvested in capital-intensive projects such as reforestation and (2) less pressure to produce high-grossing products or exceed pasture carrying capacity at the expense of environmental integrity. From this angle, MST militants or leaders with salaries from the movement might be viewed as an asset, not a hindrance, to the nucleo. Classroom and field education must not be ignored as a large factor influencing conservation. Here, militants who have been schooled in the environmental theories of the movement play an especially important role in guiding nucleo discussions and influencing eventual decisions about land use.

The most critical factor that has enabled the innovations of *Filhos*, however, was an outside grant from a Swiss non-governmental organization that provided the nucleo with 15,000 to 20,000 Euros every six months for a period of three and a half years. The goal of the project, called "Germinate", was to create a fully functioning alternative agriculture hub to serve as a working example to other Sem Terra families. In 2004, the grant period ends and the members expect the project to be self-sustaining; but without the initial outside support, it is highly doubtful that the nucleo would have endured to this point.

In 2002, another commonly cited benefit of working collectively was the support, union, and camaraderie felt within the nucleos. Working together, many said, encouraged them to keep on struggling during extremely difficult times. One woman explained, "it's easier to resist pressure to quit when you're together, not only because there are more workers, but also because of the company other workers give you. When you have someone to talk with, you support each other." Without the support of the other families, many families admit they would have quit long ago. Support may be physical as well as moral; one woman whose family left a collective nucleo and returned a year later commented on the bitter loneliness and sadness she faced on the isolated individual plot. "I would go days," she said, "without seeing or speaking to anyone. I once hurt my foot quite badly, but my husband was gone and I sat for two days alone because I couldn't walk, just waiting for someone to come." Several interviewees concluded that the camaraderie and support offered by collective systems made them more dedicated to their land than individual owners and more determined to resist pressures to leave.

III. CRUMBLING OF COMMON PROPERTY AND THE PERSISTANCE OF *GARIMPO* LOGIC

Despite the successes of the collective nucleos outlined above, the fact remains that more collective nucleos have failed than have succeeded. Of the four original collective nucleos of Onalício, only two (*Balayada* and *Ligas*) remained by May 2002, and neither of these survived 2003. Of the two collective nucleos of Palmares, only one remains (*Filhos*), and it retains less than half of its original members. In each case of failure, members unanimously decided to divide the commonly-held lot into individual holdings.

The Ubiquitous Phenomenon of Pasture Rental

Upon individuation, the vast majority of families opt to rent out their land as cattle pasture, rarely retaining even a small portion for their own agricultural production. Pasture rental is a double-edged sword: not only does it create economic dependence on the cattle rancher, thus extending the capitalist system's reach and defeating the MST's cause; it also encourages environmental degradation of the small-holder's land, making the land unfarmable for many years to come. Studies have found that pasture lands risk becoming overly degraded if stocking density exceeds one cow per hectare, though a maximum of two cows may be possible if the soil has been recuperated (Mattos and Uhl 1994). Large ranchers generally work with a stocking density between 0.4 and 0.7 heads per hectare (Arima and Uhl 1997). When families become dependent upon rental fees, they are likely to concentrate as many cattle as possible on a fixed size of pasture, exceeding the recommended stocking densities. A single family with a twenty-five hectare plot will earn only R\$100-200 per month if they follow the one or two head per hectare guideline; their profits will multiply by the number of times they exceed this guideline. All families with cattle production were already at or exceeding the two head per hectare guideline.

The economic pressures to concentrate cattle have unintended environmental effects: the greater the number of cattle, the larger the extent of soil compaction and pasture degradation. Compaction has long-term effects on vegetation regrowth and seriously decreases the ability of the land to sustain any agriculture or secondary forest regeneration in the future. So while pasture rental systems increase the small-holder's economic dependence and decrease self-

sufficiency, they also systematically alienate the small producer from the productive potential of the land through environmental degradation.

The Puzzle of Failure: First Steps towards Reconstructing an History of Labor

If the microeconomic gaze points towards greater efficiency and production of collective systems, why are they failing so dramatically? To understand how production units fall apart requires an extended examination of how they came together. What are the experiences and internal contradictions brought to the collective table that work against any microeconomic advantages and deny an easily reducible market analysis? The recent history of the region serves as an invaluable tool in navigating the conflicts surrounding organization of common property. This history reminds us of the multiple economic and social forces at work in shaping the landscape of Parauapebas, and demands the recognition that the national and global market has fundamentally altered the background upon which individual actors carry out their daily lives.

The remainder of this paper will argue that the crumbling of collective systems can best be explained through the consideration of these particular landless workers as refugees from other economic and social relations of production, particularly those at the Serra Pelada mine. It proposes these *garimpeiros*' "former lives" in the exceptionally brutal and exploitative world of an unregulated mineral extraction project—and the enduring social relationships that these conditions engendered—produced in them a decided mistrust of fellow workers, concern for individual self-determination, and valorization of products with immediate exchange values. These characteristics, not coincidentally, are precisely the ones cited as hindering the maintenance of successful collective nuclei. Without trust, cooperation, and a common vision of long-term production, nucleo members come to blows over the direction and schedule of labor and financial resources and eventually opt for individual plots.

Garimpo is a particularly marked practice in this region of the Amazon; according to local lore, it is a profession from which one never quite recovers. A popular proverb runs: "It is much harder for a miner to turn back into a man than for a man to turn into a miner." The implication of the adage, suggestive of the classic Faustian bargain⁸, is that there are particular undesirable customs and habits that become so engrained in the *garimpeiro*'s behavior that he

⁸ And reminiscent of Nash's findings in Bolivian tin mines, *We Eat the Mines and the Mines Eat Us* (1979).

can never be reformed into a properly socialized “man”. The tradition of *garimpo* mining in the populations of Onalício Barros and Palmares is very strong; although a complete population survey was not possible, it was estimated that mining outpaced any other previous income-generating activity by a ratio of 5:2 within the male population. Many of these men had a long history as *garimpeiros* previous to arriving at Serra Pelada; some proudly told stories of their travels to Venezuela, Suriname, and Guyana following the gold rushes.

In the following pages, this study will attempt to trace some of the effects of this mining culture on the social fabric of the two MST communities. First, however, we should note one of the subjects most obviously and traditionally ignored in discussions of mining, that of women and gender roles. In focusing on the effects of prior labor experience in an almost exclusively male industry—rather than analyzing a more gender-inclusive enterprise such as agriculture—this study will unavoidably refer to male workers with more frequency than it addresses female workers. This is partially attributable to the reality, as Ballard and Banks attest, that “mining is an exceptionally masculinized industry, in terms of the composition of its workforces, its cultures of production, and its symbolic despoliation of a feminized nature” (2003, 302).

The absence of women’s voices as determining factors in the direction of nucleos is largely due to many men’s general lack of attention or respect for women’s work or women’s opinions. To be sure, there are strong female leaders in the larger community. Out of the three nucleos, however, only one woman occupies a de facto leadership role. Despite the MST’s emphasis on gender equity, and the equal presence of women on statewide boards, the day-to-day reality in Palmares and Onalício Barros is quite different. One male MST leader lamented, “We are trying to widen scope of discussion to include women, children, schools, and healthcare, but people continue thinking only in terms of the relationship between man, labor, and property.” Women interviewed deferred to their husbands’ opinions about production and collective organization or claimed not to know anything about the subjects.⁹ Though it is beyond the scope of this work to draw any conclusions about the factors influencing women’s exclusion in these communities, we should consider the possibility that a highly masculinized *garimpo* mentality that excludes women as relevant political actors may endure. At any rate, there is a distinct need for further study of women’s roles in collectives, their positions in

⁹ But as Ballard and Banks (2003) note, an irony of the masculinized mining sector is that it often leaves women holding the greater responsibility for subsistence production and household management.

relation to resource control, health, and family planning, and their influence on the nucleo's decision-making process.¹⁰

Garimpo and Community-level Characteristics

The legacy of Serra Pelada has other pronounced effects that make community cooperation quite difficult in Palmares and Onalício Barros. The very composition of the population has been fundamentally shaped by the waves of migrants that came to the area in search of gold or work in the 1970s and 1980s. According to the 1996 Agrarian Reform Census, 34.8 percent of all settlers in the Amazon migrated from other states, the highest rate of immigration in the country (Bergamasco & Ferrante 1998, 185). In the Parauapebas region, this percentage is no doubt even greater. The majority of workers interviewed in both settlements came from the northeastern state of Maranhão; many others hailed from the states of Piauí, Ceará, Bahia, Rio Grande do Norte, and Mato Grosso. Complicating matters further, disparate work experiences exist within groups of similar geographical origin. Some immigrated to Serra Pelada from urban areas and had never held a hoe before the day of land occupation, while others had grown up in the *roça*. Attracted to the promise of gold riches from disparate backgrounds and cultural traditions, the populations of both communities often have immense difficulty agreeing on a common goals and policies.

The immigrant nature of the population is particularly relevant at the point of collectivization; respondents frequently cited geographic background as a source of crippling disagreements over what to produce and how to manage that production. One former member of the *Ligas* nucleo explained in 2004:

Everyone has a different way of working. The guy from Maranhão cuts the pasture with a knife, while the guy from Mato Grosso is used to mechanization. The guy from Piauí wants to do it a different way still. And they all have different schedules and visions of work, some will get up at five A.M., and others won't show up for work until nine. And from one state they want to grown corn, from another they want nothing to do with corn, but insist on beans, and from another state they want to grow coffee. It's a mess!

¹⁰ A particularly unique feature of the Onalício Barros settlement is the high number of divorced and widowed female heads of household. Though none were interviewed for this study, their perspectives could provide a fascinating counterbalance to those of married women.

Another respondent and life-long miner suggested that the lack of technical agricultural assistance aggravates these conflicts: “when you don’t have any technical knowledge, each one ends up reverting to his traditional agricultural knowledge. Since there’s no shared agricultural tradition, conflict is inevitable.”

When asked why collectives failed, most respondents cited the region’s high immigrant population as an important factor. One responded, “it’s true that collective work is better, but it only works in areas of low immigration. Pará is a state of immigrants, coming for gold mining and to work for the CVRD mine. It’s much easier to work collectively in a state with fewer migrants.” Another commented, “the collective is the best way to grow, but our region just doesn’t have the conditions for collective work. In the south of Brazil, where the population is less mobile, there’s lots of collective work that turns out well.” A leader of the movement in Marabá confirmed: “one of the most significant problems we face today is how to homogenize all of these conflicting agricultural cultures in a single area.”

Cultural differences are exacerbated by the tradition of extreme individualism established at Serra Pelada. In order to be successful, workers scrambled to boost their own extraction at the expense of others in the mine; an extreme air of distrust permeated the working environment and cooperation was nonexistent. The endurance of this mentality, which is antithetical to the proper functioning of collectives, manifests itself in the explanations workers gave for the dissolution of nucleos. One former member of *Balayada* explained, “the form of work with collaborators was very difficult, impossible even. We had no tradition of working together.”

Remuneration for collaborative work also became an issue of contention. The logic of *garimpo* dictates that individual toil will be repaid with individual reward, an equation that is fundamentally at odds with the collective structure of nucleos. An individual owner who had removed his family from a collective complained, “whoever works more is always discontent because he feels he’s not receiving” his proportional share. This complaint was common in all collectives, and has emerged to explain the historical failure of other communal systems. O’Leary and Watson (1982b) suggest that one of the major problems with work-distribution systems in Chinese communes was “the fact that extra efforts by individual peasants did not lead to an increase in their own income but to an increase in total team or brigade income, which was then divided equally among everyone” (602). It was this disenchantment with work

distribution and the subsequent demise of work incentives that led to the partial reinstatement of individual holdings in China in the 1960's (O'Leary and Watson 1982a, Chen 1968).

Conflicts over remuneration are especially pointed in the MST case, where the *garimpo* tradition of individual gain and deep distrust of fellow workers and leaders became a primary stumbling block. One worker complained, "you can't get people to work even seven or eight hours a day on a collective, whereas they'd work 20 hours a day for themselves!" The culture of highly individuated, competitive labor in Serra Pelada appears to continue to divide workers, who have failed to develop a common class identity. There is not only an historical correlation between the lumpenproletarian communities of the *favelas* of Parauapebas and these MST settlements; the logic of the fragmented and outcast lumpenproletarian *endures* and complicates MST leaders' attempts to create a "new socialist consciousness" in the countryside.

Garimpo and Individual Characteristics

The *garimpo* tradition manifests itself most clearly in individual decision-making processes that place a higher value on self-determination and immediate exchange value than on consensus or long term planning. The idealized proud *garimpeiro* answers to no one, collects his pay frequently, and does with it what he wishes. Individuals repeatedly cited their desire for self-determination and individual control to explain their departures from collective nucleos. One respondent whose family left *Ligas* before its failure complained that he was not a "*cara liberta*" ("free man") when working on the collective. He felt he wasn't realizing his dreams, and wanted to be able to work when and how he wanted. He also complained that his seven-person family made collective living more financially difficult for him than for others with fewer children. When asked if the switch to an individual plot had lessened his financial burden, however, he admitted that it had not, but followed up with the exclamation that he least he no longer had to "compromise with anyone else!" This desire to be in charge of one's work and possessions was explained by one leader as an outcome of the "*cultura do chefe*", literally, the "culture of the boss". This leader proposed that male heads of households feel a large desire to exercise control over their familial and work situations. Such inclinations make the compromises necessary to work a collective system appear especially disagreeable.

The implications of control over one's own labor, however, are more complex than simple explanations of bravado and masculine control would suggest. One worker described his

and others' strong desires to be "*dono de seu proprio nariz*", literally, "the owner of one's own nose". The force of this seemingly humorous expression becomes more apparent when one considers the inverse of the statement, that is, what is the implication of not owning one's nose? This possibility, implied in the original expression itself, invokes the Marxian imagery of alienation even as it applies to something as personal and sacred as one's own body. Furthermore, examining the deromanticized daily life of most *garimpeiros* in Serra Pelada, it is clear that, although they worked for themselves, they had little control over their own bodies. This was particularly true of the majority who worked as uncontracted *formigas*, ("ants"), climbing treacherous ladders while hauling massive sacks of earth out of the pit. The structure of the industry relegated tens of thousands of workers to this position; photographs of the pit (most famously those of Sebastião Salgado) depict the tiny bodies ascending and descending the pit as though they were simply cogs in the towering machine of extraction. It should not come as a surprise, then, that workers place a high priority on finally controlling the schedule and direction of their own labor. Consequently, the collective was often portrayed by respondents as disarming individuals of their own autonomy in favor of the questionable betterment of the community.

The collective was also characterized as frustrating the pursuit of immediate exchange value, instead situating its efforts in long-term investments such as fruit plantations. The "logic of immediatism", as one leader put it, was inherited from *garimpo* culture and disposes workers to favor projects with instantaneous returns. The privileging of commodities with immediate exchange values (i.e. cattle), rather than those with use value (i.e. agriculture) translates into conflict for collectives, particularly since production in nucleos' initial stages is often limited, if not nonexistent. Many members who left collective nucleos cited their dissatisfaction with the lack of production or failure of projects. Every interviewee who had opted to leave a collective complained that "*nada dava certo*", or that "nothing was going right" with production. Though this lack of production was almost always equally applicable to individual lots, the parallelism of the situations was rarely acknowledged.

Part of the production predicament is due to the fact that many nucleos opt to invest in long-term projects (such as fruit trees, which take years to mature) or high-risk projects (such as fish farming, which has a high rate of failure). One former family of *Filhos* quit the project largely because they lost faith after a fish project failed, while a former *Ligas* member

complained that the *cupuaçu* and banana plantings were producing nothing. The other side of the production dilemma appears largely psychological, in that almost all of those who left collective projects expressed the belief that they could do better on their own, despite evidence to the contrary exhibited by already existing individual plots. Surveys of production and earnings indicated that individual holdings were rarely producing even basic agricultural crops such as rice, beans, and manioc, much less approaching the production stratification and diversification found in *Ligas* and *Filhos*.

Cattle ranching and the organization of space

As mentioned above, the predilection for dealing in commodities with immediate and definite exchange values disposes most workers to favor cattle ranching over agricultural production. The continuity between *garimpo* and ranching was not lost on one leader, who exclaimed, “It’s the same logic as it is with gold!” Similarly, a survey conducted by Piketty et al. (2003) of small, medium, and large scale cattle ranchers in the state of Pará indicated that the assured return and liquidity of the investment were primary factors in the choice to work with cattle. “In whatever place on the agricultural frontier and at whatever time, a producer can sell a cow for a price related to the commodities exchange in São Paulo” (ibid., 175).¹¹ Not only can a cow itself be sold at a moment’s notice, but milk production can provide a small yet dependable daily source of income (Poccard-Chapuis et al. 2003; Piketty et al. 2003).

Among small producers, there is a widely held belief that cattle can break the omnipresent cycle of poverty. Piketty et al. (2003, 180) term this notion the “*mito do fazendeiro*” (“myth of the rancher”). Again, the congruity between cattle and gold is startling; in the 1980s, it was gold and *garimpo* that promised the possibility of dramatic upward mobility of the peasantry (Veiga 1999). But like gold mining, ranching has proven to be a largely phantom savior for the Sem Terra settled in the region. With high costs for vaccinations, mineral supplements, and pasture upkeep, they concentrate excessive numbers of cattle on their meager twenty-five hectare lots, accelerating the soil compaction and pasture degradation that eventually makes the land unusable.

¹¹ “[E]m qualquer lugar da fronteira agrícola e a qualquer hora, um produtor pode vender um bovino pelo preço relacionado ao preço da bolsa em São Paulo.”

The intentional neglect of small-scale agricultural possibilities in favor of ranching enterprises in the region has its genealogy in government-initiated projects at the end of the 1960s and early 1970s. Simultaneous to the inauguration of the National Integration Plan and Grand Carajás Project, the government created the Superintendency for Amazonian Development (SUDAM) and the Bank of the Amazon (BASA), both public companies that encouraged ranching through subsidies and direct financing (do Rêgo 2002). Santiago has called this strategy for Amazonian occupation “colonization by the hoof of the cow” (1972, in Piketty et al. 2003, 171).

The persistent hegemony of the “cattle mentality” in the rural areas today is likely reinforced by state technical agencies that promote peasant capitalization in ranching as a panacea for all production woes. As Miranda startlingly describes, the strategy of rural extension in the state of Pará has historically been to bring the peasant into the market and turn him into a small, medium, or large capitalist producer, generally encouraging ranching, regardless of the situation:

The extension agent is induced to deny this [peasant] reality, homogenizing the small producers, without identifying the specificities of each group...What becomes potentially damaging about this “induced blindness” is that the lack of knowledge about the specifics of the peasant way of production can contribute—and in practice do contribute—to the disaggregation of the peasant family, intensifying the rural exodus and consequently the growth of *favelas* in the urban peripheries. (1990, 389)¹²

Miranda notes the striking “hegemony of productivist thought” over any other considerations that might influence the extension agent’s recommendations to rural producers (1990, 383).¹³ Thus corporate and technical discourses of ranching circumscribe rural space in Pará such that cattle have become naturalized as income generators, their presence on the land deemed so ordinary and matter-of-course that some workers actually believe that cattle are the *only* viable option for income generation in this environment. Most workers spoke of ranching as if it were naturally inscribed onto and dictated by the landscape. “Agriculture here is a disaster,” one said,

¹² “[O] extensionista é induzido a negar esta realidade homogeneizando os pequenos produtores, sem lograr identificar as especificidades de cada grupo. ...O que torna potencialmente danosa esta “cegueira induzida” é que o não conhecimento das especificidades do modo camponês de produção pode contribuir – e na prática ocorre – para a desagregação da família camponesa intensificando o êxodo rural e conseqüentemente a favelização das periferias urbanas.”

¹³ “...hegemonização do pensamento produtivista...”

while another agreed, “the only thing that works here is cattle.” Their discourses, which imply that ranching is an environmentally determined requirement, ignore the opportunities for subsistence agriculture demonstrated by previous nucleo projects.

The supposedly environmentally determined relationship between the regional landscape and the organization of space into cattle ranches is in fact a highly strategic discourse produced by state technical agencies and public finance and development corporations in order to promulgate a particular occupation strategy for Amazonia. In a Lefebvrian sense, these institutions have assigned a specific social meaning and function to the rural landscape that depends upon the elision of polyvalent spatial meanings and practices (Lefebvre 1991; Harvey 1976; 1996). Nature has been remade to serve the interests of capital (Smith 1984).

The Logic of Capital in the Countryside

The dilemmas encountered by the Sem Terra in their efforts to create collective systems are manifestations of a defining modern collision—the conflict between the logic of markets and capital accumulation with the pre-modern logic of subsistence. Collectives in the two MST communities studied tend to fail when workers attempted to bring previously acquired concepts of individual labor, remuneration, and exchange values to bear on the organization of nucleos. The experience of *garimpo* at Serra Pelada created a semi-proletarian class of workers whose integration into—and eventual expulsion from—the market echoes what Emberson-Bain terms the “making and undoing of a working class” (1994, 1). As the ominous saying goes, however, it is much more difficult for a miner to turn back into a man (i.e., decapitalized peasant) than vice versa, and the *garimpo* logic that views the landscape as an enormous store of riches simply waiting to be capitalized upon persists. This vision is encouraged by the particular reorganization of Amazonian space into the divisions highway/*terra firme*/subsoil, propounded by the government since the 1960s, refashioning the traditional divisions of river/floodplain/forest into partitions that are more easily assimilated into the orbit of capital (Gonçalves 2001, 95-101).

This division of space, notable for its neglect of forest communities and their traditional means of subsistence (fishing, forest products extraction, hunting), continues to promote the prioritization of high-value commodities forty years after the first Amazonian development initiative. The state of Pará’s Executive Secretary of Industry, Commerce, and Mining, Aloíso

Lopes Chaves, claimed that a 1999 geological map issued by the state would assist people who were not aware of the wealth that they were “sitting on top of” (O Liberal 1999). The map revealed all mineral deposits in the area, and designated areas that had already been ceded to companies for research and exploration. The stated purpose of the mineral map was to suggest the “proper use” of all these lands, while the state also hoped that the map would attract new exploration and investors. The map’s purpose was clearly commercial, and as such, it did not depict human populations living above the mineral deposits, thus perpetuating the myth of an uninhabited Amazon full of unused wealth ready for extraction.

In reality, mining concessions often take the form of subsoil rights in populated areas. Such is the case in the Onalício Barros settlement, where CVRD retains exploration rights to all subsoil deeper than 40 centimeters below the village and its fields. In the neighboring municipality of Marabá CVRD owns 412,000 hectares of land allocated from public ownership in 1975. The company is suspected of obtaining the area by suspect means primarily because the law does not permit the allocation of public land areas greater than 3,000 hectares to a single corporation or individual (Câmara dos Deputados 2001, in Sayago and Machado 2003). The irony of the land tenure structure is not lost on the Sem Terra, who bitterly compare their own struggles to obtain twenty-five hectare plots with the fortune of CVRD, which owns subsoil concessions that total twenty million hectares in the state, including the very land upon which the Sem Terra of Onalício Barros live. The capitalist organization of the space, which denies and destabilizes peasants’ subsistence claims on the same area, has come to be embedded in the very earth itself.¹⁴

Conclusions: The Social Ramifications of Former Lives on the Collective Present

Former *garimpeiros* in the countryside are the products of an historical situation that has allowed them, like the gold miners and plantation laborers of Taussig’s (1980; 2004) work, a particular dual vision and simultaneous participation in cultures with divergent prioritizations of use value and exchange value. Their participation in, and expulsion from, the labor force has created a double contradiction in which they can neither continue as part of the proletariat, nor can they be reabsorbed into the peasantry. In this sense, prior lives and previous labor histories

¹⁴ One worker remarked, “We plant crops that they (CVRD) might dig all up tomorrow!” This may be yet another motivation for investment in cattle instead of agriculture (though it is rarely mentioned by the workers).

have created an overdetermined subject (Althusser 1969) that reveals the inherent contradiction of collective systems in the region.

This paper has worked to destabilize the notion that the success or failure of common property management can be understood in the economic or the ethnographic present. Instead, it has proposed that actors must be understood as refugees from other economic and social relations of production that have framed the ways in which they participate in present-day collectives. The details of the stark and desperate world of *garimpo* extraction provide a critical historicization of the nucleo's ethnographic context (Marcus and Fischer 1986) that sheds far more light on the complex negotiations of collective systems than would a simple economic analysis.

BIBLIOGRAPHY

- Althusser, L. 1969. *For Marx*. Trans. B. Brewster. New York: Verso
- Arima, E. and C. Uhl. 1997. "Ranching in the Brazilian Amazon in a National Context: Economics, Policy, and Practice," *Society & Natural Resources* 10:433-451.
- Ballard, C. and G. Banks. 2003. "Resource Wars: The Anthropology of Mining." *Annual Review of Anthropology* 32:287-313.
- Bennett, J. 1993. "Social Aspects of Sustainability and Common Property: Lessons from the History of the Hutterian Brethren," in *Human Ecology as Human Behavior*. New Brunswick, New Jersey: Transaction Publishers.
- Bergamasco, S., and V. Ferrante. 1998. "No reino da modernização: o que os números da reforma agrária (não) revelam." In: B. Schmidt, D. Marinho, & S. Rosa, eds., *Os Assentamentos de Reforma Agrária no Brasil*. Brasília: Editora UnB.
- Câmara dos Deputados. 2001. *Relatório da Comissão Parlamentar de Inquérito Destinada a Investigar a Ocupação de Terras Públicas na Região Amazônica*. Brasília.
- Chen, P. 1968. "Individual Farming after the Great Leap: As Revealed by the Lien Kiang Documents," *Asian Survey* (8)9:774-791.
- Corbucci, R. 1998. "Pequenas e médias propriedades rurais: estrutura fundiária e integração." In: B. Schmidt, D. Marinho, & S. Rosa, eds., *Os Assentamentos de Reforma Agrária no Brasil*. Brasília: Editora UnB.
- Dodds, K. 1993. "Geopolitics, cartography and the state in South America." *Political Geography* 12:4, 361-381.
- Emberson-Bain, A. 1994. *Labour and Gold in Fiji*. Cambridge: Cambridge University Press.
- Gerson, D. 1999. "Brazil's rural worker's movement," *Civreports* (3)4.
- Gonçalves, C. 2001. *Amazônia, Amazônias*. São Paulo: Editora Contexto.
- Harvey, D. 1973. *Social Justice and the City*. Baltimore: Johns Hopkins University Press.
- _____. 1996. *Justice, Nature and the Geography of Difference*. Oxford: Blackwell Publishers.
- Lara, F. 1987. "Reflexões sobre o impacto sócio-econômico do projeto ferro Carajás nas imediações da estrada de ferro Carajás-Itaquí." *Pará Desenvolvimento* 20/21: 43-45.

- Lefebvre, H. 1991. *The production of space*. (first publication: 1974). Trans. by D. Nicholson-Smith. Oxford: Blackwell Publishers.
- O Liberal*. 2002. "Estado faz mapa de ocorrências minerais." May 17. Belém, Pará, Brazil.
- Little, P. 2001. *Amazonia: Territorial Struggles on Perennial Frontiers*. Baltimore: Johns Hopkins University Press.
- Marcus, G. and M. Fischer. 1986. *Anthropology as Cultural Critique: An Experimental Moment in the Human Sciences*. Chicago: University of Chicago Press.
- Margolis, M. 2002. "A Plot of Their Own", *Newsweek International*, January 21. <www.mstbrazil.org/newsweek012102.html> Last accessed May 10, 2004.
- Mattos, M. and C. Uhl. 1994. "Economic and Ecological Perspectives on Ranching in the Eastern Amazon," *World Development* (22)2:145-158.
- Miranda, P.S. 1990. "O 'pensar' extensionista um case de 'cegueira induzida' (Preâmbulo para um estudo crítico da extensão rural no Estado do Pará.)" In: C. Flores & T. Mitschein, eds., *Realidades amazônicas no fim do século XX*. Belém: Co-Edição UNAMAZ-UFPA.
- Movimento Sem Terra. nd. "The Economic Model". <<http://www.mstbrazil.org/EconomicModel.html>> Last accessed May 10, 2004.
- Muchagata, M. 2003. "O papel das organizações de agricultores nas transformações recentes do uso do espaço em região de fronteira amazônica: o caso da região de Marabá." In: D. Sayago, J.F. Tourrand & M. Bursztyn, eds., *Amazônia: Cenas e Cenários*. Brasília: Editora UnB.
- Nash, J. 1979. *We Eat the Mines and the Mines Eat Us: Dependency and Exploitation in Bolivian Tin Mines*. New York: Columbia University Press.
- O'Leary, G. and A. Watson. 1982a. "The Production Responsibility System and the Future of Collective Farming," *Australian Journal of Chinese Affairs* 8: 1-34.
- O'Leary, G. and A. Watson. 1982b. "The Role of the People's Commune in Rural Development in China," *Pacific Affairs* (55)4:593-612.
- Piketty, M., et al. 2003. "Por que a pecuária está avançando na Amazônia Oriental?" In: D. Sayago, J.F. Tourrand & M. Bursztyn, eds., *Amazônia: Cenas e Cenários*. Brasília: Editora UnB.
- Pinto, J. 1990. "Impactos Sócio-Ecológicos da Mineração e da Garimpagem na Amazônia Oriental (Estado do Pará)." In: C. Flores & T. Mitschein, eds., *Realidades amazônicas no fim do século XX*. Belém: Co-Edição UNAMAZ-UFPA.

- Poccard-Chapuis, R., et al. 2003. "A cadeia produtiva do leite: uma alternativa para consolidar a agricultura familiar nas frentes pioneiras da Amazônia?" In: D. Sayago, J.F. Tourrand & M. Bursztyn, eds., *Amazônia: Cenas e Cenários*. Brasília: Editora UnB.
- Quamina, O. 1987. *Mineworkers of Guyana: The Making of a Working Class*. London: Zed Books.
- do Rêgo, J. 2002. *Estado e Políticas Públicas: a reocupação econômica da Amazônia durante o regime militar*. São Luís: EDUFAMA, Rio Branco: UFAC.
- Sayago, D. and L. Machado. 2003. "O pulo do grilo: o Incra e a questão fundiária na Amazônia." In: D. Sayago, J.F. Tourrand & M. Bursztyn, eds., *Amazônia: Cenas e Cenários*. Brasília: Editora UnB.
- Santiago, A. 1972. *O zebu na Índia, no Brasil e no mundo*. Campinas: Instituto Campineiro de Ensino Agrícola.
- Schmink, M. 1988. "Big Business in the Amazon." In: J. Denslow and C. Padoch, eds. *People of the Tropical Rainforest*, Berkeley: University of California Press.
- Slater, C. 2000. "Justice for Whom? Contemporary Images of Amazonia." In: C. Zerner, ed., *People, Plants, & Justice: The Politics of Nature Conservation*. New York: Columbia University Press.
- Smith, N. 1984. *Uneven Development: Nature, Capital, and the Production of Space*. Oxford: Basil Blackwell.
- Sparovek, G. 2003. *A Qualidade dos Assentamentos da Reforma Agrária Brasileira*. São Paulo: Páginas & Letras Editora.
- Taussig, M. 1980. *The Devil and Commodity Fetishism in South America*. Chapel Hill: University of North Carolina Press.
- _____. 2004. *My Cocaine Museum*. Chicago: University of Chicago Press.
- Trocate, C. 2002. Personal communication, April 26.
- Valaverde, O. 1988. "Conflitos e equilíbrio ecológico no povoamento em expansão da faixa próxima à estrada de ferro Carajás." *Pará Desenvolvimento* 23, jan/jun.
- Veiga, A. 1999. "A geodiversidade e o uso dos recursos minerais da Amazônia." *Terra das Águas: Revista de Estudos Amazônicos* 1:1, 88-107.