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'The Earth is Crying Out in Pains of Childbirth': Bauxite Mining and Sustainable Rural Development in the Brazilian Atlantic Forest

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“The Earth is Crying Out in Pains of Childbirth:”¹ Bauxite Mining and Sustainable Rural Development in the Brazilian Atlantic Forest

Andrew W. Mellon Fellowship Research Project

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¹ See Quote in Appendix C, Interview #8. Alluding to *Romans 8:22*: “For we know that the whole creation groans and suffers the pains of childbirth together...”

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I. Abstract

In 2003, residents of the Serra do Brigadeiro Territory, a rural area of Southeastern Brazil in one of the few remaining patches of the Atlantic Forest, learned of a large number of bauxite concessions in their territory given by the federal government to the prominent *Companhia Brasileira de Alumínio* (CBA), Brazil's largest aluminum producer. Because the region prides itself on its small-scale agriculture and its lush natural environment, the mining has been the source of much contention in the community. Introduced to the topic by the international conservation NGO and research center, Iracambi, I spent two months in the territory this summer, exploring how the community perceives the mining. An exercise in anthropological research, this report tries to answer the question: How has the controversy surrounding the bauxite mining informed how the citizens of the Serra do Brigadeiro territory perceive their communal and individual identities in relationship to the development of their communities? Through formal and informal interviewing, participant observation, and fieldwork, I concluded that the mining has instigated community inquiry into many facets of the region's future, including: the fate of family agriculture; the value of ecological resources; globalization and its effect on economic and generational change; and the rhetoric used to express opinions on external forces such as bauxite mining.

II. Introduction and Statement of Question

Introduction

The Serra do Brigadeiro Territory is a small clump of rural municipalities in the mountainous depths of the state of Minas Gerais, itself considered the “heartland” of Brazil. It is a place of breathtaking beauty, a tropical Switzerland. Its patchwork landscapes of rainforest, cropland, and green pasture symbolize the lifestyle that the region’s farmers, and the native Purí Indians before them, have been weaving together for centuries, in search for an ecological balance that has not always been easy to attain.

Located in one of the few remaining patches of the once magnificent *Mata Atlântica* (Atlantic Forest), the territory not only houses thousands of subsistence farming families, but also some of the world’s most endangered species, including the largest known population of the famous Woolly Spider Monkey, the most endangered primate in the Americas. Accordingly, the region has been working for decades to implement a form of sustainable development that would nurture all of its inhabitants, human and non-human alike, with the help of local organizations as well as the international NGO, Iracambi Conservation and Research Center, the place I called home for two months this summer.

As if achieving ecological and agricultural harmony in a sensitive tropical environment was not enough of a struggle, in 2003, the territory learned of an added complexity. That year, the Brazilian federal government gave *Companhia Brasileira de Alumínio* (CBA), Brazil’s largest aluminum producer, over 6,700

hectares of bauxite mining concessions in the territory. The company had completed the initial prospecting of the area 25 years previously, so were primed to begin the mining process immediately.² The concessions, which encompass over 11,000 family farms and large sections of the Serra do Brigadeiro State Park Buffer Zone and the surrounding environmental protection areas (APAs), contain an estimated 73.7 million tons of bauxite, which will produce about USD\$3.5 billion worth of aluminum.³ In the eight years since CBA announced its plans, the company has been moving forward with the licensing process on the concession areas, has begun to mine in the southern corner of the territory, and has plans to proceed north. Meanwhile, the residents of Serra do Brigadeiro have been grappling with the reality of the situation and responding to the prospect of mining in a varied manner.

I became aware of the bauxite mining issue when, enamored of Iracambi's vision "to work with our community to make the conservation of the Atlantic Forest more attractive than its destruction," I probed Robin Le Breton, the organization's research director, for potential topics of study. As an Environmental Analysis and Politics major with a particular interest in Christian ecology and sustainable agriculture, the mining initially seemed outside my realm of expertise. Robin spoke of the dire need for ethnographic research on the subject in order to mitigate the effects of the mining on the community, so I signed up despite my lack of specialized knowledge. Yet, as I became immersed in the complexity of the issue, I discovered how very intertwined the region's mining controversy is with subjects I'm acutely

² Nicola Dugdale & Lena Connor, "Mining Briefing Document," *Iracambi Conservation and Research Center* (2011), 3-5.

³ Dugdale & Connor, 34.

familiar with. The mining comes at a critical time for the region's identity. In a period of ideological flux, the bauxite mining becomes a metaphor in a culture burgeoning with economic, environmental, religious and sociological change.

Statement of Question

Therefore, the purpose of this report is to examine how the discourse on mining has advanced so far, and to analyze the ways in which it has influenced visions for the future of the territory. I identified my primary research question as:

How has the controversy surrounding the bauxite mining informed how the citizens of the Serra do Brigadeiro territory perceive their communal and individual identities in relationship to the development of their communities?

In order to understand the controversy fully, I explored the necessary sub-questions, including:

- *What areas and which communities will be affected by the proposed mining?*
- *What are the tangible existing and potential economic, environmental, and sociological effects of bauxite mining?*
- *How do the citizens perceive the effects of the bauxite mining relative to their personal and communal identity? What components of their identity do citizens feel are being threatened or reinforced by the mining's existence?*
- *How does the community define sustainable development and how do they see mining in this context?*
- *What are the community's perceptions of the anti-mining and pro-mining advocacy? How would the community like to move forward in reconciling the mining with their regional identity?*

The Serra do Brigadeiro Territory

The Serra do Brigadeiro Territory is located in the northern section of the *Zona da Mata* of Minas Gerais, and contains the following counties: Serrecita, Divino, Araponga, Pedra Bonita, Fervedouro, Ervália, Muriaé, Miradouro, Rosário da Limeira.

It has a total area of 3,000 km², equivalent to the state of Rhode Island, and in 2000 had a population of 171,135 (see Appendix B for demographic information). Though the region's largest urban center, Muriaé, contains about 80,000 residents, the majority of the territory's population lives in rural areas (much higher than the national average), and most families' livelihoods remain in the agricultural and service sectors. As the economic table in Appendix shows, the industrial sector is moderate in Muriaé (at 28.62%), and claims only a small percentage of the economy in most counties (16.97% in Rosario da Limeira). And while other parts of Minas Gerais and Brazil have been shifting to commercial agricultural, the Serra do Brigadeiro have rejected large-scale agribusiness thus far, continuing with a family agriculture tradition.⁴

Iracambi's Role in the Area

Robin Le Breton, an agricultural economist and conservationist (and reformed World Bank specialist) and Binka Le Breton, a concert pianist and well-known author on environmental and human rights in the Amazon, founded Iracambi because they were drawn to the area's natural heritage. They wanted to work with local farmers to preserve the agricultural and lifestyle practices that allowed the native ecosystems to flourish. Along with local activists, Iracambi fought to have the Serra do Brigadeiro State Park and the buffer zone surrounding it established in order to protect the important patch of semi-deciduous Atlantic Forest located in the mountain range, a part of the UN Biosphere Reserve. The local forest ecosystem is rich in plant species such as bromeliads, orchids, and palms. It is also a refuge for

⁴ "Território da Serra do Brigadeiro – MG: Sistemização e análise dos dados secundários." *CTA-ZM: Centro de Tecnologias Alternativas da Zona da Mata de Minas Gerais* (Viçosa: 2004), 10-15.

endangered fauna such as the Masked Titi monkey, the Woolly Spider monkey, jaguar, ocelot, and various frog and bird species. They succeeded in 1996. The Brazilian federal government subsequently set up the Serra do Brigadeiro Rural Development Territory with a model of sustainable development for the 10-km buffer zone that was compatible with the conservation goals of the State Park. A progressive move on the part of the Brazilian government, the action established a precedent for sustainable development in the area.

Bauxite Mining Comes to the Territory

Consequently, it came as quite a surprise to Iracambi and local environmentalists when the federal government allowed CBA to select the protected area for its intended bauxite mining. CBA announced its plans quietly in 2003, in a small newspaper in Belo Horizonte, the state capital, and by doing so “started the entire process off on the wrong foot,” according to Robin Le Breton. The company’s dissimulation made the community suspicious and hostile. CBA failed initially to reach out to the community and explain what the mining would entail.⁵ According to Le Breton, the state environmental licensing authorities (*Fundação Estadual do Meio Ambiente*) did little to curtail the company’s choice of concessions and made the Environmental Impact Assessment (EIA) highly inaccessible to the public. Iracambi mobilized several concerned community groups and individuals and formed the “Commission of those Affected by Mining,” commonly referred to as the Mining Commission. The commission has been active in studying and discussing the mining since its formation in 2003 and meets monthly. It includes the Serra do Brigadeiro

⁵ Dugdale & Connor, 3-5.

State Park council, the Rural Workers' Union (*Sindicato de Trabalhadores Rurais*), the Center for Alternative Technology (CTA), the Catholic Pastoral Land Commission (CPT), the Federal Technical Institute of Muriaé, and Amigos de Iracambi.⁶

In 2006, the Mining Commission obtained a court order that blocked CBA from proceeding with mining within the buffer zone of the park, but Iracambi fears that the company has the political clout to get this order reversed and probably will do so, as the majority of the concessions are within the buffer boundary. However, at the moment, it appears that CBA is content to commence with the mining in the areas of least resistance, outside of the buffer zone in the south. The Mining Commission has been working for eight years to raise community awareness of the mining through public forums and published pamphlets. Iracambi received a \$195,000 grant from the Inter-American Foundation in 2007 to conduct research on the mining's affect on local farmers, design a community training program for local leaders in managing the mining, and to push through legislation in the territory for the establishment of environmental protection areas (APAs) within the buffer zone to provide further legal protection against the mining.⁷ However, recently, the commission work has come to standstill, as its members disagree on whether resistance or negotiation with CBA is the preferable strategy. Though Iracambi is in favour of wise negotiation, it refuses to move unilaterally, and therefore must wait until the Mining Commission comes to a conclusion on the issue.

⁶ Jessica Harper, "Confronting Corporate Development: Anti-Mining Advocacy in the Brazilian Atlantic Rainforest," *Masters Capstone Paper*, (School for International Training, 2007) 14.

⁷ Dugdale & Connor, 4.

Meanwhile, CBA responded to the court order and public meetings by becoming much more open with the community. It began to hire locals for construction work in its mining areas and newly-built washing facility and contracted out local companies for services like trucking and road construction. The company also hired Gaia in 2009, a PR firm with a speciality in corporate social and environmental responsibility, to work with the local municipalities to create a “30-year-vision” for sustainable development in the territory. Gaia hosted several public forums about mining and development and designed pilot social projects for the region. It also presented in local schools and churches and widely distributed pamphlets and radio commercials.

Since 2003, the bauxite mining has become an important fixture of the international research center at Iracambi, and several students have devoted their time in Brazil to studying the impact of mining. Many have focused on improving Iracambi bank of GIS information on the concessions and their placement in the region and added mapping layers depicting hydrology, forest areas, etc. Jessica Harper, a graduate student from the Vermont School of International Training, studied the advocacy efforts of the Mining Commission in 2006 and Lindsey Witthaus, an undergraduate student from Wisconsin on a Fulbright Scholarship, studied the same subject in 2008. However, since their research reports were written, much has changed in the territory, as the mining becomes a well-known reality and the opportunity for resistance fades away. The region stands at a precipice, and its inhabitants face a drastic change to their terrain and way of life.

III. Relevant Literature

The Destruction of the Atlantic Forest

In his book, *Broadax and Firebrand: The Destruction of the Atlantic Forest*, environmental historian Warren Dean describes South America as “the forest historian’s freshest battleground, where all the fallen still lie sprawled and unburied and where the victors still wander about, looting and burning the train.”⁸ And, from the standpoint of the forest, it is a tale of woe. The Atlantic Forest, which used to span the entire southeastern coast of Brazil, covering one million square kilometers, rivaled the Amazon in its lush beauty. Actually more bio-diverse than its famous neighbor, the virgin forest once contained such a large amount of wildlife, immense tropical trees, and medicinal and ornamental plants that the Portuguese settlers who first arrived on its shores gaped in awe.

Though the indigenous inhabitants lived on the land for over 10,000 years, their hunting-and-gathering and swidden agriculture made a light impact on the forest health, as their population was small enough to allow land to go fallow as they migrated throughout the region. But, in less than 500 years, European mercantilism (and later capitalism) incentivized rapid deforestation, through logging, intensified agriculture, and mining. Even after its independence from colonial rule, Brazil developed into a treasure trove for raw materials, minerals, and commodity crops like coffee, sugar cane, and rice. Supported by the surplus of slave labor (and later cheap European labor), these large-scale endeavors facilitated the swift expansion

⁸ Warren Dean, *Broadax and Firebrand: The Destruction of the Brazilian Atlantic Forest*, (Berkeley: University of California Press, 1997) 5.

inland to reap the greatest rewards for domestic and global markets. Today, no significant patches of virgin Atlantic Forest remain, and only 7% of the original area remains under forest. That which is left is heavily fragmented and unsuitable habitat for many migratory animals.⁹ Brazilian botanist, Auguste de Saint-Hilaire, predicted the forest's fate in the early 19th century, saying, "In a few years, a small number of men will have ravaged an immense province, and they will be able to say, 'It is a land that's finished.'"¹⁰

Many environmentalists, including Dean, see the Atlantic Forest as a lost cause, a warning cry to the Amazon basin: "The last service that the Atlantic Forest might serve, tragically and forlornly, is to demonstrate all the terrible consequence of destroying its immense western neighbor."¹¹ Yet, while I agree that Brazil, and all nations, should look to the Atlantic Forest for humility and foreboding, I think that it would be a mistake to treat the conservation of remaining patches of the Atlantic Forest as a fruitless task. Indeed, the fact that the Atlantic Forest is now a heavily humanized landscape can be its greatest asset. Unless Brazil intends to build walls around the precious Amazon, habitation of that great forest is inevitable; the Atlantic Forest has the potential to serve as a testing ground for sustainable resource use that might be applied to future behavior in the Amazon. For despite Dean's earlier metaphor, the battle is not over and the Atlantic Forest still lives, though heavily wounded. And there are many people in its borders fighting to keep it alive.

⁹ Dean, 17.

¹⁰ Dean, 117.

¹¹ Dean, 364.

Minas Gerais: A History of Mining

Minas Gerais has a telling role in the history of the Atlantic Forest. Encompassing an area larger than the state of Texas, Minas Gerais was once entirely forested and now contains only a few large patches of second growth forest, such as the habitat in the Serra do Brigadeiro. Though it is now known as a hub of family agriculture, famous for its good food and European influences, the state's origin is rooted in mining and much of its development and deforestation can be attributed to centuries of mining influence. Minas Gerais, or "General Mines" in Portuguese, was the center of the gold mining that fulfilled the Portuguese royalty's dreams and fueled settlement rushes inland.

Though the crown had lusted after gold since its arrival in Brazil, it was not until the late 17th centuries that prospectors found rich alluvial deposits in Minas Gerais. According to Machado and Figueiroa, "A new phase was then inaugurated for the Brazilian economy, labeled by historians as the Gold Cycle."¹² Soon diamonds, silver, and precious gemstones were also appearing in the earth beneath the forest. Some estimate that during the 17th and 18th centuries, Brazil provided 50% of the world's supplies of gold and diamonds.¹³ As Machado and Figueiroa continue, "Settlements were springing up overnight around the mine sites, transforming remote and wild places into lively towns in just 10 years or so." Diggers, masters, merchantmen, and crown representative followed the gold fever wherever it traveled, setting up wealthy colonial towns such as Ouro Preto (Black Gold), the gold

¹² Iran F. Machado, Silvia F. de M. Figueiroa, "500 Years of Mining in Brazil: A Brief Review." *Resources Policy* 27 (2001) 9-24, 12.

¹³ Machado & Figueiroa, 10.

capital of Minas Gerais, a place resplendent with baroque art and colonial grandiosity. Immigrants in search of gold poured into the state from Portugal, Europe, and Africa and the gold poured back the other way. Thomas E. Skidmore argues that the mining wealth went directly to British hands, as the Portuguese used much of it to pay debts, and that “Brazilian mining riches can be said to have helped capitalize the first industrial revolution.”¹⁴

Unfortunately, the mineral boom did not establish a firm foundation for Minas Gerais, as workers were enslaved or paid meager wages, and the wealth was concentrated in the hands of the crown and a few opportunistic mining overlords. During the early 18th century, the gold inspired what economists call “Dutch disease,” as settlers would abandon steady industry and farming for the chase for gold, and the culture surrounding the fever was full of avarice.¹⁵ And after the deposits began to dwindle after the 1750’s, Minas Gerais became a place of economic and societal stagnation. Even as early as 1711, the noted Italian Jesuit chronicler Antil quipped that “no prudent person can fail to admit that God permitted the discovery of so much gold in the mines so that he could punish Brazil with it.”¹⁶

Additionally, the mining left an ugly scar on the countryside of Minas Gerais. By the 19th century, the gold mining “replaced forest with pockmarked moors,” says Dean, and the hills were stripped of all but patchy grass and denuded by sheet

¹⁴ Thomas E. Skidmore, *Brazil: Five Centuries of Change*, (New York: Oxford University Press, 2010) 22.

¹⁵ Machado and Figueiroa, 15.

¹⁶ Skidmore, 22.

erosion, giant gullies, and streambeds were silted. One botanist at the time called it a “bald and deserted region, whose terrain is entirely overturned by excavations.”¹⁷ Cattle ranchers and coffee farmers followed the mining and prevented the land from returning to forest, and all that remained of the original *mata* was tufts on the tops of hills to protect stream headwaters.

Consequently, although the bauxite mining is new to the area, the citizens of the Serra do Brigadeiro Territory are not unfamiliar with the concept of mining in their homeland, as it is entrenched in their land’s past. Even after the gold mining and the Portuguese rule subsided, the British heavily funded other iron mining in Minas Gerais in the 19th century, and the Brazilian and American investors then funded a diversity of mining endeavors in the 20th.¹⁸ Today, Brazil is one of the world’s top mineral producers, accounting for 83 different minerals and sales exceeding US\$14 billion. Because of its ancient Precambrian and Phanerozoic terrains, Brazil is currently endowed with surplus reserves of asbestos, bauxite, beryl, chromium, fluor spar, gold, quartz, graphite, iron ore, kaolin, lithium, magnesite, manganese, niobium, rare-earth, talc, tantalum, and tin.¹⁹ In 1995, the mining (extraction) sector, processing sector, and mineral exports accounted for 2%, 26% and 27% of Brazil’s GDP.²⁰ And Minas Gerais houses much of the country’s potential mineral wealth that Brazilian politicians hope will continue to fuel Brazil’s rise to a major economic player in the 21st century.

¹⁷ Dean, 97.

¹⁸ Machado and Figueiroa, 17-20.

¹⁹ Machado and Figueiroa, 21.

²⁰ T.J. Toy & J.J. Griffith, “Changing Surface-Mine Reclamation Practices in Minas Gerais, Brazil.” *International Journal of Surface Mining, Reclamation and Environment*. 15 (2001), 33-51, 34.

Bauxite Mining on a Global Scale

Bauxite is the principal ore for the production of aluminum metal via a two-stage process that involves, the refining of bauxite to alumina by a wet chemical caustic leach process (the Bayer process) and the electrolytic reduction of alumina to aluminum metal (the Hall-Heroult process).²¹ From a geologic point of view, bauxite is a residual rock that forms during periods of intense weathering, making it ubiquitous in tropical, rainforest environments.²² Australia is currently the largest producer, followed by Guinea, Brazil, and Jamaica.²³ As the world develops, demand for aluminum for transportation, construction, and technological purposes soars. (see Appendix B, Fig.3) Driven by this demand, bauxite production increased an average 5.7% yearly from 1900-2000, and projected rates for 2000-2025 suggest a greater increase. (see Appendix B, Fig. 2) Economist F.M. Meyer predicts that, even at a 5% growth rate, “the currently known reserves will be exhausted within the next 20 years and the reserve base will be adequate for not more than 25 years.” He states that it is unlikely that more reserves will not be discovered, but much of the added reserve base needed to supply the 21st century with aluminum might be in areas with externalized environmental and social costs.²⁴

Brazil’s bauxite capacity exceeds its current production, as it has some of the world’s largest reserves (see Appendix B, Fig.1). But, to illustrate Meyer’s point, if Brazil expands its bauxite production, most of the mining will have to be done in the Atlantic and Amazon Forest regions, where reserves are the most plentiful. Brazilian

²¹ F.M. Meyer, “Availability of Bauxite Reserves,” *Natural Resources Research* 13 (2004). 1.

²² Meyer, 1.

²³ Meyer, 2.

²⁴ Meyer, 1.

aluminum companies have increased production in both regions, due to the high profit incentive and relatively low production costs, and have proceeded with full government support, despite the environmental consequences. In a study done by the USDA Forestry Service on bauxite mining in virgin forests in the Amazon, in Porto Trombetas in western Pará, authors J.A. Parrotta and O.H. Knowles state that:

Surface mining in most tropical countries directly affects relatively small areas of forest compared with forest cleared for agriculture, logging, hydroelectric and transportation projects and other changes in land use. However, the off-site environmental impacts of surface mining can be very extensive, due to erosion and runoff resulting in siltation and deterioration of water quality in nearby rivers, lakes and reservoirs. To avoid these adverse environmental impacts, effective forest restoration on mined sites is required. This requires careful planning and the integration of mining and rehabilitation operations based on sound silvicultural and ecological knowledge.²⁵

Because of this concern, Brazil's federal and state governments have been much more rigorous about environmental legislation surrounding mining and the mining companies have greatly improved their reclamation processes.

However, in a second study on the same reclamation sites, Parrotta, Knowles, and Wunderle state:

Natural regeneration of secondary forests on degraded tropical lands

²⁵ John A. Parrotta and Oliver H. Knowles, "Restoring tropical forests on lands mined for bauxite." *Ecological Engineering* 17 (2001) 219 – 239, 220.

is often a slow and uncertain process, impeded by a combination of factors including human and livestock pressures, recurrent fires, persistence of dominant grasses and other non-woody species, unfavorable microclimatic conditions, soil infertility, exhaustion of soil seed banks and root-stocks and low rates of seed inputs from nearby surrounding forests. On surface-mined sites, these obstacles to natural regeneration are generally more acute than on other degraded landscapes due to the removal of topsoil (resulting in the elimination of soil seed bank and rootstocks) and soil profile disturbances (including compaction) that inevitably accompany the mining process.²⁶

The authors suggest that companies ameliorate the effects of mining on forested area by applying proper site preparation, especially topsoil handling, and investing in proper research to collect seeds from a wide variety of forest plants and propagating and planting them with proper care. They also state that several companies have improved in these practices, and now take time to establish native ecosystems, instead of planting large plantations of eucalyptus and other profitable logging trees.²⁷

Unfortunately, little investigation has been done on such equivalent reclamation in the Atlantic Forest region, where soils are more degraded, wildlife maintenance is more precarious, natural regeneration is more difficult due to

²⁶ John A. Parrotta, Oliver Henry Knowle, Joseph M. Wunderle Jr., "Development of floristic diversity in 10-year-old restoration forests on a bauxite mined site in Amazonia." *Forestry Ecology and Management* 99 (1997) 21 – 42, 22.

²⁷ Parrotta and Knowle, 238.

habitat fragmentation, and streams are highly susceptible to sedimentation.

Additionally, there is limited research on reclamation of farming land in the fragile tropical soils of both regions, though a few soil scientists at University of Viçosa in Minas Gerais are in the process of studying coffee field reclamation post-bauxite mining.

The Anthropology of Mining

On a global scale, the discourse on the social effects of mining has altered dramatically since the mining industry's boom in the 1970's and 1980's. As anthropologist Chris Ballard recounts, as mining companies began to develop in the "greenfield" or "frontier" territories, among "relatively remote or marginalized indigenous communities" that have long been the classic focus of ethnographic research, anthropologists became swept up in the contentious (and often dangerous) debate surrounding mining in the developing world. The positioning of anthropologists in these "resource wars" is far from simple, but because they have traditionally given preference to the "exotic" or unrepresented, anthropologists often choose to act as advocates on behalf of local communities and criticize mining at all costs as exploitation. As he explains, "One consequence of this focus is that the figure of 'the mining company' lurks monolithically and often menacingly in the background of many anthropological accounts of communities affected by mining operations." He continues that this simplistic characterization is counterproductive because "the dynamics of the corporations involved in mining are often at least as complex, revealing, and challenging as those of governments or local

communities.”²⁸ Consequently, there has been a move to reform the tone of anthropological research so that communities can be supported without the demonization of other stakeholders, a goal that I uphold in this report (explained later in my methodology section).

On the other hand, the benefit of the anthropological advocacy on behalf of indigenous communities at projects such as the Coronation Hill gold prospect in Northern Australia is that communities are getting a larger say in decisions about mining.²⁹ Whereas the old model of mining negotiation was a binary one between the state and the corporation, there is now a widespread adoption by industry of a three-legged stakeholder model, with the local community included as a vital participant. Granted, whether the model has been adequately applied to reality is a matter of debate, but Ballard argues that it is a step in the right direction.³⁰ The international media attention on mining practices and human rights has led many companies to subscribe to international environmental and social rights codes, such as the ISO-14001 regulation code that CBA voluntarily undergoes, and the controversial Mining Minerals and Sustainable Development project (MMSD), which outlines sustainable development principles for mining, though critics call it “corporate greenwash.”³¹

In essence, there is much fodder for anthropological research on corporate, state, and NGO behavior in relation to mining on a worldwide scale and in the Serra

²⁸ Chris Ballard, “Resource Wars: The Anthropology of Mining.” *Annual Review for Anthropology* 32 (2003) 287–313, 290.

²⁹ Ballard, 306.

³⁰ Ballard, 289.

³¹ Ballard, 291.

do Brigadeiro Territory and I will touch upon it to give weight to the complexity of the issue. But this report will primarily focus on the local community, which I feel has not had an equal voice in the discussion, partially because they are not “indigenous” or “marginalized” by definition and inhabit an ecosystem that does not get as much attention from international academics and media.

Ballard states that membership in the “mining community” often poses significant problems for local communities, in ways that it does not for governments and corporations, and is the source of much “internal and external competition and conflict.”³² Precisely because the mining is rarely the local community’s idea, it causes changes that the community does not anticipate and is forced to reconcile. He states:

The identity of local communities appears in most instances to be constituted largely through discourses of rights claimed (to land, to membership, to compensation, etc.) or rights abused (human rights, land rights, environmental rights, exclusion from membership, etc.)³³

Tanya M. Li, in her study on identity and mining in Indonesia, describes that self-identification by a group or tribe is oftentimes altered by the discussion surrounding mining. For example, the group she studied did not consider themselves “indigenous” until the mining conflict introduced them to the construct (or imposed it upon them) and the terminology was then adopted as an effect.³⁴ As

³² Ballard, 298.

³³ Ballard, 298.

³⁴ Murray Li, Tania, "Articulating Indigenous Identity in Indonesia: Resource Politics and the Tribal Slot". *Comparative Studies in Society and History*, 42 (2001), 149.

Ballard remarks, this change in positioning “draws upon historically sedimented practices, landscapes, and repertoires of meaning and emerges through particular patterns of engagement and struggle.”

Ballard continues that, “In the process of self-definition in order to represent their interests to government and corporate agencies, or to other local communities, communities in the vicinity of a mining project employ both traditional and novel strategies of inclusion and exclusion” such as using rhetoric of land, kinship, myth and cosmology.”³⁵ According to Connell and Howitt, “much of the fiercest opposition to mining from local communities has been generated as a consequence of dispossession of land, degradation of a community’s resources, and physical relocation of resident communities.”³⁶ Kinship and social organization is used as a means of expressing identity and describing a community’s flexibility to the change that mining brings. Many studies have been done on how myth and cosmology have informed the way indigenous people in Australia and Papua New Guinea approach the questions of sovereignty and rights inherent in questions of mining, as well as how cosmology can help communities account for disparities in power and circumstantial change.³⁷ Additionally, many anthropologists argue that mining is inherently marginalizing to certain groups on the basis of gender and race, due to accessibility to the economic benefits of mining and the selection of land to

³⁵ Ballard, 298.

³⁶ Connell J, Howitt R, *Mining and Indigenous Peoples in Australasia*, (Sydney: Sydney University Press, 1991), as cited by Ballard, 299.

³⁷ A. Rumsey and J. Weiner., *Mining and Indigenous Lifeworlds in Australia and Papua New Guinea*, (Adelaide: Crawford House, 2001), 31-673.

appropriate, and therefore the community often employs such language in their argumentation.³⁸

Lastly, there is some contention between anthropologists about the motivations for community protest over the environmental damage caused by mining. Some uphold that communities protest for the sake of the environment itself, for its inherent value,³⁹ while other theorists state that communities protest the degradation because it is a symbol of the community's lack of control over their own destinies and an affront to their livelihoods.⁴⁰

S. D. Handelsman argues that, throughout the world, indigenous communities have borne the brunt of mining-related grievances since the 1970s, a conclusion that is supported by a long record of abuses to basic human rights, including dispossession of land and livelihood, individual murder and mass killings in these communities.⁴¹ Brazilian indigenous activist, Ailton Krenak, states that in 1986, "77 indigenous areas out of 302 [in Amazonia] are affected in 34% of their extent by mineral claims."⁴² Consequently, much of the identity-based research on mining communities has been in indigenous areas. However, I would argue that many of principles applied in indigenous communities pertain to non-indigenous communities as well. Furthermore, such inquiry is important in order to tell the story of how mining affects *all* human communities.

³⁸ Ballard, 301.

³⁹ D. Hyndman, *Ancestral Rain Forests and the Mountain of Gold: Indigenous Peoples and Mining in New Guinea*. (Boulder, CO: Westview Press, 1994), 18, as cited in Ballard, 298-299.

⁴⁰ T. Wesley-Smith, "The politics of access: mining companies, the state, and landowners in Papua New Guinea." *Political Science*, 42 (1990), 1-19, as cited in Ballard, 299.

⁴¹ S.D. Handelsman. "Human rights in the minerals industry." *MMSD Work*. 2002. Paper No. 9. <http://www.iiied.org/mmsd/mmsd_pdfs/009_handelsman.pdf>.

⁴² Ailton Krenak, "Mining Companies on Indigenous Lands in Brazil," *Cultural Survival Quarterly*, 10 (1986) 46-47, 46.

IV. Methodology

When planning this research project, I wrestled with choosing the most effective methodology for approaching the question of mining. I knew from the beginning that I wanted to make the summer a practice in anthropological fieldwork, and chose my supervisor, anthropologist Jennifer Perry, accordingly. Chris Ballard states, “despite the potential of ethnographic studies of mining to address questions of considerable contemporary interest in anthropology, such as globalization, indigenous rights, and new social movements, the anthropology of mining remains largely under-researched and under-theorized.”⁴³ Although there exists a wealth of economic and environmental data on mining, it is my opinion that these methodologies give incomplete pictures by underemphasizing the human element in the analysis. As an environmental researcher, I am interested in the ecological impacts of an activity such as mining, and elements of that analysis were key to my research this summer. But I also believe that there are rich insights to be gained regarding how humans relate to their environment in the context of mining that can only come from employing an anthropological perspective.

Since I knew that I would be living at a research center that excelled at scientific inquiry and geo-spatial analysis, I added these dimensions to my research, not to detract from my participant observation, but to enhance it. As Ballard argues, because mining involves a host of stakeholders, including the traditional categories of corporation, state, and community, as well as the recent additions of international and domestic NGOs, legal agencies, and a globalizing media, “mining has the

⁴³ Ballard, 287.

potential to extend conventional lines of anthropological enquiry.” Ricardo Godoy, an anthropologist who transformed anthropological theory on this issue during the 1980’s mineral boom, calls for an “integrative” approach to the anthropological study of mining, which combines an understanding of the geological, biological, and economic as well as cultural and social dimensions of mining.⁴⁴

Additionally, I wanted to use this summer research to enhance my abilities in participant observation, in order to maximize the quality of my data collection and the subsequent analysis. As Kathleen and Billie Dewalt say about the advantage of such research:

“Living, working, laughing and crying with people whom one is trying to understand provides a sense of the self and the other that is not easily put into words. It is a tacit understanding that informs the form of research, the specific technique of a data collection, the recording of information, and the subsequent interpretation of materials collected.”⁴⁵

However, I recognized that as a researcher at Iracambi, an organization with a positive, but potent, identity in the community as a conservation NGO, it would be impossible for me to be seen as an impartial observer by the community. And, though complete participation in the culture of the territory would be ideal, my living situation at the research center and my lack of fluency in Portuguese would hamper such a method. Sensitive to these concerns, I adapted my fieldwork strategies accordingly.

⁴⁴ Ballard, 307.

⁴⁵ Kathleen M. Dewalt and Billie R. Dewalt, *Participant Observation* (Oxford: AltaMira Press, 2002), 8.

Therefore, my research life at Iracambi took a varied form. Throughout the two months, I lived in a rustic cabin with 16 other American and British students (though there was rarely more than 8 present at one time), who researched everything from tropical soil variation to sustainable coffee production. We woke every morning to the raucous cries of Caracara birds and the smell of fresh guava cake, made by our loving Brazilian cook, Carminha. A woman with a sweet smile, quick to laugh, she tended to us with her steaming soups and kindly manner and introduced us to the gentle lifestyle of the rural *Mineiros* (the name for those who hail from the state of Minas Gerais). Robin and Binka, the directors, were always available to give us direction and aid on our projects, but for the most part, we were free to conduct our research as we saw fit. I spent many of my days getting acquainted with the mission of the organization itself, participating in water and forest monitoring, reforestation, environmental education, and GIS efforts. We all became familiar with the local landscapes, taking long hikes through the pastured valleys, seed collecting in the native forest for Iracambi's nursery, climbing nearby mountains, and taking a trip to the state park, where we were blessed with an encounter with several *Muriqui* (Woolly Spider) and *Saqui* monkeys.

And we strived to remain equally as immersed in the cultural landscapes of the area, to become familiar with community values and lifestyle choices. We visited neighboring farms, attended local festivals and rodeos, made friends locals our age, picked and processed coffee during harvest season, initiated conversations whenever possible, and spent much time with the schoolchildren of the area because of our environmental education programs. We traveled to Rosario da

Limeira, Muriaé, and Viçosa often to witness and experience “city life” in rural Brazil, and asked as many questions as possible about local customs, foods, interests, humor, etc. Naturally, the more we spoke, the stronger our Portuguese became and the more comfortable in the community we were. I considered every day fieldwork, whether it was mining-related or not, as I felt that learning the rhythms and nuances of the place was vital to my study. I took extensive field notes and photographs daily, recording my experiences in detail and making notes of my perceptions and their evolution.

Because of my own spiritual faith and my interest in the religious customs of the region, I became particularly attached to the local base communities and the Franciscan order of monks that stewarded them. Each week, I would take the long, ambling walk with Carminha to her small blue church in the Graminha hills, or to the neighboring church in the valley, to take part in the mass and witness the baptisms, celebrations, and community meetings. And on Tuesday evenings, I would take part in the community bible study and social hour, a gathering of neighboring farmers for reflection and prayer led by a sweet-tempered man named Everaldo. I became well acquainted with the head Padre, Frei Gilberto, and spent time with he and his fellow Franciscans at their ecological retreats and on their spiritual pilgrimage up Mount Itajuru. Because religious life is so central to life in the Serra do Brigadeiro, the relationships I formed during this active participation were important for my personal integration with the culture.

As for my more formal fieldwork, I chose to conduct both informal and semi-structured interviews. I adopted what James P. Spradley, in his spectrum of

participant observation, would categorize as “moderate participation” or I had what Peter and Patricia Adler would call a “peripheral role” in the community.⁴⁶ As Dewalt and Dewalt state, “Moderate participation occurs when the ethnographer is present at the scene of the action, is identifiable as a researcher, but does not actively participate or only occasionally interacts, with people in it...in a semi-structured manner.”⁴⁷ Though my Portuguese was competent enough for casual conversation, my more involved interviews required a translator, and therefore “active participation” was difficult. Yet, in many instances, I felt that this distance worked to my advantage in data collection, because the people I interviewed often were drawn to discuss intercultural comparisons and put their thoughts in a global context because they were aware of my nationality.

In my sample selection, I tried to select a broad range of stakeholders, and to account for profession, class, leadership role, gender, age, and familiarity with the mining issue. Granted, my short time period and lack of perfect accessibility to people in the community limited my ability in this endeavor. In general, I focused on farmers, town dwellers, students, governmental officials, NGO leaders, church leaders and mining company representatives, evenly distributed between the three municipalities of Muriaé, Rosario da Limeira and Miradouro. I drew from these particular counties because they contain the lion’s share of the bauxite deposits, are all in close proximity to Iracambi, and are the center of the political mobilization for and against mining.

⁴⁶ Dewalt & Dewalt, 21.

⁴⁷ Dewalt & Dewalt, 20.

My sampling technique varied. Often, because of my lack of Portuguese skills and familiarity with the community, I relied upon Robin and Binka Le Breton's suggestions, an admittedly potential methodological weakness due to their defined role in the mining controversy. However, I feel that they tempered their own bias by arranging interviews for me from a wide spectrum of ideologies. Additionally, I supplemented their suggestions with choices of my own, from contacts I met in my community work, using a snowball sampling technique. Overall, I feel confident that while my sample was not perfect, it was adequate for the scale of my research and, by the end of the two months, my familiarity with the complexities and opinions involved in the issue was sufficiently thorough and fulfilling.

Most interviews were conducted with Binka acting as a paid interpreter, though a few I conducted by myself in Portuguese and translated afterward. I initiated the interviews only after receiving verbal informed consent and ended each interview with a request for permission to use the person's name and statements in any future publication or report. I chose this method over written informed consent because many farmers in the area are illiterate, a potential source of embarrassment for them. In every manner, I strived to abide by the Code of Ethics of the American Anthropological Association,⁴⁸ to minimize harm, to ask open and affirming questions, and to respect the human and non-humans that I worked with throughout the summer.

⁴⁸ "Code of Ethics of the American Anthropological Association," *American Anthropological Association*, Approved June 1998, <<http://www.aaanet.org/committees/ethics/ethicscode.pdf>>.

I conducted extended interviews with 15 people, which I recorded with digital voice recorder and later transcribed and coded (see Appendix D). The interviews normally lasted for one to three hours, and occasionally were in group format. Additionally, I conducted many unscheduled, shorter interviews in Portuguese during fieldwork that I did not record, but took notes on and included in my field notes. I had a rubric of prepared questions, but I only used these as guidelines and let the conversations flow naturally, in order to set the interviewees at ease and let them lead the conversation. I found that this yielded richer and more informative responses.

While my interviews allowed me to have conversations with opinionated members of the community on the mining, I felt that I also needed to visit the farming communities that I knew would be directly affected by the mining. I worked with Iracambi's GIS technicians to study the maps of the bauxite concessions and map how the deposits aligned with local communities. I focused on Santa Lucia, Pedra Alta, and Santa Catarina, the three sister villages that occupy adjacent valleys between Rosario da Limeira and Belasario, the two largest towns in the area. All three represent the stereotypical farming communities endemic to the area, comprised of 20-30 farming households, interrelated families, a primary school, a milk tank, and a single base community church (after which the village is named).

As part of Iracambi's existing community mapping project, I traveled around the communities, along with fellow researchers, and used a GPS device to map the homesteads, churches, schools, and other landmarks that various community members suggested were important to them. We would walk from house to house,

carrying a large paper map drawn by community members seven years prior, and would explain our project and ask the farmers to locate their house and tell us their names. We would often be invited in for coffee and cake or led on tour of their farm and we would ask questions about their farming, their family, their lifestyle and I would slip in questions about their thoughts on mining. In the section of this report where I present the data, I could not quote such conversations verbatim, due to lack of informed consent, and therefore I use my formal interviews as a sort of focus group, supplementing their quotes with opinions I gathered in my informal fieldwork.

The exercise was one of the most rewarding elements of my research, because I could put faces to the mountain farmers I knew would be disproportionately affected by the mining, due to their placement on sloped land. I used the community mapping data to construct satellite maps with bauxite deposit overlays for each community, which Iracambi leaders plan to use in the future for community education purposes (see Appendix A, Map 2- Map 5).

Finally, to get a sense of the real impacts of mining and to learn of CBA's processes and plans, I visited the existing mining sites in São Sebastião da Vargem Alegre, a community in the southern part of the region, and took photos and GPS points of the mined slopes, adjacent streams, deforestation, dust control, and truck traffic.

On another day, Robin also arranged a meeting for me with CBA representatives at the company's local washing facility and headquarters, in Miraí, outside of Muriaé. The company gave us a very professional two-hour presentation

of their mining processes, environmental and social ethics, and a summary of Gaia's social projects in the region. They then took us (myself and some other Iracambi researchers) on an hour-long guided bus tour of the facility and nearby mining and reclamation sites and answered any questions that we raised. Throughout my project, I strived to have an open mind about CBA and its motives, and not imbue my research with the stereotypical prejudices against corporate entities mentioned previously in this report.

V. Presentation of Data

Returning to the first two sub-questions in this report:

- *What areas and which communities will be affected by the proposed mining?*
- *What are the tangible existing and potential economic, environmental, and sociological effects of bauxite mining?*

To answer the first, my GIS project and fieldwork were essential (see maps and pictures in Appendices A and D). And, to answer the second, my discussions with experts in the community and at Iracambi were a necessity. The knowledge I gained through these pursuits was crucial to my understanding of the topic. However, because the two topics could comprise a paper of their own, I will leave them aside for now, and use this section of my report to focus on community perceptions, which is central to my primary research question:

How has the controversy surrounding the bauxite mining informed how the citizens of the Serra do Brigadeiro territory see their communal and individual identity in relationship with the development of their community?

Section 1:

To begin, I will address my third sub-question:

How do the citizens perceive the effects of the bauxite mining relative to their personal and communal identity? What components of their identity do citizens feel are being threatened or reinforced by the mining's existence?

Mining and the Environment:

One of the most predominant themes that arose in my interviews was the effect of mining on the natural environment; it was the subject that people tended to mention first in their list of concerns. To most of the farmers I spoke with, the resources they worried about most acutely were the forests and freshwater. I quickly learned that most farmers have the ecological knowledge, passed down from

generations of farming, to see the two entities as linked to one another, and linked to the health of their farms. As one middle-aged, female farmer named Marinha, from Pedra Alta, said:

[I think that mining] is horrible. Because it will destroy everything we spent such a long time building. Our little farm is small, but it is our dream. Our forests and our water. Our water which is pure. And because we're also part of the rural tourism group. And if they destroy everything, what will we have for our tourists? What are we going to live from? What are we going to live off? Because I think we'll have to adapt to another life. Because if people do come back here, there'll be nothing to come back for. There won't be any of the animals left, any of the forest. We'll have to make a new life.

Farmers spoke of the ecology of the area as integral to their survival, but their scale of reference was often wider than their own homesteads. Carlos, a farmer in his thirties from Belasario, stated that:

I'm not going to say that I agree with it if my survival is threatened. But I don't want to think just of me. I want to think about the environment as well. ... So when the mining comes and I stop farming, I'll be producing less oxygen, less water. So there are two water basins in this region. Rio do Sol e Rio Doce. This amount of water will diminish. So I'm not just producing agricultural products. I'm not worried about my beans, because those are just for my family. What I worry about is what I won't be producing: the water, the oxygen.

This type of altruism was frequently present in my interaction with farmers.

Many stressed the established the boundaries of environmental destruction that were socially acceptable, and resented the mining company for overstepping those boundaries. Also, they begrudged the governmental imposing external boundaries upon farmers, without holding the mining company to equal standards.

As Carlos described:

So the bauxite comes. She pays to get a license to start working. ... If you pay, you get a license to degrade. So there's a man who has a little forest and he asks the engineers if he could take a little section of the forest for

an orchard, they say, 'Absolutely not, because it is forest.' But if the mining company comes and they want to take the whole forest, now that they can do because they have the license. So the interest of the federation is superior to the interest of the individual.

To underscore Wesley-Smith's point, some of the protest against ecological destruction was due to this indignation at the mining company. The farmers feel that the company is an external force enacting unfair claims on the community's land. They also expressed grievances against the governmental officials, who they feel are not representing the average farmer's interest.

Though the language used to describe environmental issues differed, the message of the environment's value in the community was similar. Zezino, a feisty, intelligent male farmer from Belasario talked to me about how the forest was full of precious biology, medicinal plants, and a source of clean air. He continued:

So there is lots of stuff that is priceless in this forest. The most valuable substance in the world now is not to be mined. It is not in your earring. [Grabbing my gold earring.] It is water. Brazil has some of the largest water resources in the world and we're making holes in our water cup. We have enough water for the world. The meteorological health of Brazil is in the hands of these forests. ... The value of the aluminum will never be able to equal the value of the water.

Logically, NGO and governmental representatives were more likely to talk about the forest and water resources in terms of "sensitive hydrology" and "ecosystem services" and spoke about the failings of the Environmental Impact Assessment to fully account for the effects of the mining. The young people and students I spoke with also used rhetoric about environmentalism that was quite familiar to me as an American student, as they tended to put things in a global context. For example, Maria Carolina, a high school student from Muriaé, remarked:

[Young people] consider mining as scary, since the conversion of bauxite into aluminum is a process that consumes much energy, contributing to global warming. Besides that, extraction removes the vegetation and topsoil, producing harmful effects on fauna and flora. The soil, after mining, it loses its ability to retain water and becomes unsuitable for cultivation, preventing the restoration of forest biodiversity, a fact which worsens the impact on nature. It is absurd. Some types of development are synonymous with destruction.

I noted that the non-farming professionals were more likely to speak of environment as an aesthetic entity, to be protected for the sake of preserving beauty and promoting tourism and recreation. As Miriam, a retired psychologist who retired in Belasario from a large city expressed:

I'm afraid of the degradation. I'm also afraid that it will interfere with tourism. I love these beautiful mountains. They're what brought me back here, back home. So I'm really concerned.

They spoke of buffer zone boundaries and the importance of keeping the mining out of "wilderness areas," while the farmers mentioned these places rarely. To me, trends illustrate the different nature of the upper-class relationship to nature, one closer to America's conservation mentality.

But the professional class also had more trust that the mining company could effectively reclaim the land that it did mine. Miriam continued:

There are very simple things that they could do to recuperate the rivers where people go swimming and the waterfalls.

Her husband, Cleber, an attorney and engineer, stressed how pleased he was with the enhanced environmental regulations put on mining companies and cited examples of bauxite mining that had been done well in other parts of Brazil and had a minimal effect of water quality and forest cover. He stressed that the community

could not judge the company before CBA had a chance to show them how environmentally responsible it could be.

Mining and Society

Another predominant concern to community stakeholders was the direct effect the bauxite mining would have on the social wellbeing of individuals and communities. Because productive farming is essential to many community members' flourishing, a primary concern was with fertility of land post-mining. Carlos, who had particular interest in the mining, spoke of the trip he and 80 other local farmers had taken to Itamarati, to visit an area where CBA has been mining for 20 years. He described seeing ruined land and speaking to farmers who had abandoned their farms because of deep, gully erosion and dust problems. When he returned, Carlos began to do his own research on how the mining would impact his land:

The other day I was talking to an agronomist. And I asked him, "How do you recuperate the soil so that you can use it again [after mining]." He answered, "Well, I don't want to shock you, but I think it will take about 100 years for the soil to fully recover." And he explained how soil was structured. Because we who are small farmers. Our agriculture will be unviable. Seventy percent of the food on the table [in Brazil] comes from family agriculture.

Sebastian, an older male farmer from Pedra Alta, also expressed doubts about reclamation:

And they spoke and they say that they'll renew the land. And they say that they will put fertilizer on it, etc. But it is so difficult. It would take a long time, maybe never, to get the land back. You can't do what God does. You can't. You can't! You can try.

Similarly, Sergio, a 20-year-old chemistry student and son of a local farmer in Rosario da Limeira, stated:

Mining destroys everything. The earth, the chemical processes, it needs a long time to repair itself.

Others were more reassured by CBA's community presentations about reclamation, and expressed their gratitude that the company had been "professional" enough to explain their plans and show them pictures of refurbished land. This type of open corporate behavior is new in Brazil and I could tell it softened many people's opinions of the company. Cleber, the attorney, emphasized again how important it was for the community to resist the temptation to "pre-judge" the company's ability to refurbish the agricultural land.

A related anxiety amongst farmers was how to cope with displacement caused by the mining. Farmers doubted that the average small farmer would be able to stay on his land while a section it (or the whole of it) was being mined, though CBA says the opposite. Many cited dust problems due to truck traffic and the difficulty of supporting a family on a small piece of land. João Paulo, the president of the Rural Workers Union in Rosario da Limeira, echoed these worries. Carlos told the story of a farmer in Itamarati whose cows were poisoned by a mining retention dam that was leaking into his farm.

Consequently, many questioned whether farmers could survive without income for two or three years, even if they could come back to the land and it was in good condition. João Paulo explained:

The money, the numbers they've given us at the moment, for what the mining company would give the farmers, wouldn't give them enough to live on. They, the farmers, get a percentage of bauxite revenue and you get rent from the field. And a family couldn't live on it, no.

He explained that over 50% of the farmers in the area were sharecroppers, and therefore they would not receive any of this compensation. Furthermore, the “weekend farmers” or land-lords who lived in the city would be more likely to give the company permission to use their land because they would not be directly disrupted by the mining. Juliana, a young, newlywed farmer in São Pedro, expressed her fears:

We went about a year ago, we went down to the mining in Muriaé. All the farms have been abandoned. Even the weekend farmers sometimes didn't go back they took the money and left...It is difficult, because if people leave for a year or two, they aren't likely to come back. They'll start lives in the city.

My interview with Sebastian was particularly moving. Now 60, he worked for CBA for five years when they were initially prospecting the area, and spoke of the oppressive work conditions and the ill treatment of farmers by the company back in the 1970s. (The company's social responsibility has improved greatly since this time). He said he wished he could impart his reasoning for opposition to the younger generation, as a man who had seen its effects. He spoke with tears in his eyes:

There's going to be much destruction. Everything. The young people aren't really thinking about it. But if I was young, I would be the same. I think my grandchildren will have to cope with this. They will have to leave the land. ...I have a small piece of land. Most of my children and their family live on that land. But if I die, it will be all divided up. None of them have a lot of money. So they have a little piece of land. And the mining company comes. And they need the money. They'll probably accept it without understanding. This is what will happen with my neighbors as well. Because, from father to son, things change.

His despair emphasized the feelings of many older members of the community, who expressed the fear that family agriculture would be abandoned in the future, by choice or consequence. He continued:

The little guys will have to live with it. If he sells, he can't go to the city, because he doesn't have a profession. What's he going to do? His place is in the country. So he's just going to have to face it. If mining comes, I won't let them in. But if the judge makes me, and the law says it, then what can I do?

His feelings of powerlessness underline how some farmers feel that they have little choice in the matter of mining. Some women voiced apprehension about the effect of mining on social and familial structures. Juliana stated:

It will create conflict between families, those who are making money and those who are not. And also within families, between brothers and sisters, depending on who receives the payment from the company...

And Marinha revealed:

I'm worried my family will split up because we'll have to leave and find work. I have a very large family.

But those for the mining emphasized that the social projects that Gaia was bringing, particularly the project on community coordination and education could enhance quality of life and nourish the relationships within communities, as advertised. Miriam spoke of her hopes that the mining company could help develop education and provide jobs so that the young people could stay in the community, and not flee to the city. Marcia, a local representative from Gaia, spoke of how much she has loved working on the projects, that it is "very human work," and that she has hopes that they will effect positive change in a place she cares very much about.

Mining and Religion

In the Serra do Brigadeiro Territory, one of the most influential sources of identity and values are the local Catholic base communities, which are run by a group of ecologically-minded Franciscan monks who travel around the country to 30 churches in the diocese to hold masses, lead religious festivals, and speak to their church members about social, political, and environmental issues. Descended from a long tradition of leftist liberation theology, the Catholic church leaders are decidedly anti-mining. As head priest, Frei Gilberto, explains:

You have to understand, in the Franciscan vision, everything is created by God, and every thing is created equally. We have a relationship with everything. ... The reason I'm against mining is because it is aggressive to the world. It attacking the whole system. When I'm attacking mother Nature, I'm attacking all of her children. ...When we talk about mining, my view is that we need to preserve the earth. But also, we need to preserve economic integrity for the people who live on the earth, and the quality of life here, etc. [Mining] affects the whole ecosystem, and it tends to have the greatest effect on the simpler people. There is a Franciscan [mission statement]= Justice, Peace, and Ecology, also known as the Integration of Creation. We actually have representation at the UN. We set up groups [with this mission] all over the world. There is one that is very active against the mining in Belo Horizonte.

Although they are not as overtly political as their predecessors were in the region during the military dictatorship, and certainly not as militant (quite the opposite, in fact), the Franciscans play a pivotal role in the discourse on mining. In late July, the diocese hosted a *Romaria*, a procession with several hundred people through the town of Belasario, with the theme of “Preserving Nature and Life: Creation Cries Out For Help” (see Appendix D, Sec. 3, Image 2). The event had six small stations, each with short masses. At one stop, the crowd asked God for forgiveness of environmental sins, including mining, deforestation, and fertilizer and pesticide use.

At other stops, they celebrated the rural workers, family agriculture, and the rights of women and children.

Because of my fascination with the monks and their mission, I paid special attention in my interviews to how their stance on the mining affected the views of their parishioners. Some church members, like Juliana, explicitly stated the connection:

Frei Gilberto fell like a present from heaven, because he actually has the power of speaking. ... (D)uring the mass...he talks about the environment, he talks about the mining. He's good at explaining things to people, at inspiring them. He's very good.

Others, like Miriam, did not mention whether the church leaders influenced their thoughts on the mining, but did use their religious conviction to support their opinions:

Religion teaches us to preserve things. Things that Mother Nature has given us. So, my head is already against mining. My religion helps to reinforce it. My religion helps me to be more opposed to it. That's what I think.

Tellingly, Sebastian used religion to justify the credibility of his views:

But they don't listen to me. They think I'm stupid. As the Bible says, many things are not revealed to the smart. They're revealed to the humble. There are many things that you can't pass on. 'Aw,' they say, 'He's just a silly old fool.'

His faith allows him to believe that, even as 'lowly farmer,' he has the authority to stand up to the more powerful pro-mining voices in the community.

Separate from the Franciscan order, but still an integral part of the Catholic society in the area, the Church Lands Pastoral (CPT- *Comissão Pastoral da Terra*), is a highly politically active branch of the church that is connected to Brazil's Landless Workers' Movement (MST-*Movimento dos Trabalhadores Rurais Sem*

Terra) that, for decades, has lobbied for land reform and Afro-Brazilian rights, and against capitalist, foreign interests in Brazil. Winner of the “Right Livelihood Award,” the CPT is famously active in some areas of Brazil for forcibly taking land from wealthy landowners and establishing squatter colonies of landless farmers from city *favelas*.⁴⁹ However, because small-scale agriculture is already well established in the Serra do Brigadeiro Territory, the local CPT is mostly involved in rural workers’ rights and the protection of family agriculture. As Carlos commented:

... There is the Land Pastoral. ... It looks after ... people in the countryside. ... When one of the [mining] dams burst [in 2006 in Muriaé], and it affected people not only in the countryside but also in the city, it was the Land Pastoral that was helping people out. ...In this moment, I see the Catholic Church as the one that really went to bat for the rural workers. The Protestant churches did not.

As Carlos mentions, there exists a wave of evangelical, Protestant churches in the area that are not vocally opposed to mining. More focused on a doctrine of salvation than political action, or a “theology of prosperity” as Frei Gilberto calls it, they are more conservative and are in favor of capitalism. Cleber, a member of the local Methodist church, told me while he was interested in making the Methodist domination more socially active, he did not believe an anti-mining stance was necessarily in society’s best interest.

Mining and the Economy

Cleber, and others with pro-mining stances, defined the economic health of a community as key component of its identity and stressed its importance in evaluating the bauxite mining:

⁴⁹ Wendy Wolford, “Families, Fields, and Fighting for Land: The Spatial Contention of Fighting for Land in Rural Brazil,” *Mobilization: An International Journal*: 8(2): 201-215.

In Minas Gerais, we live on mining. This state was founded on mineral wealth. This country has its own potential. For example, the United States, it produces arms. I can't imagine being opposed to mining. It brings economic potential to Brazil... It is a question of the national economy.

And Miriam agreed, stating:

We're concerned about the lack of work. Our young people don't stay on the land. They leave for the cities. But they aren't happy once they are there. Dreaming of coming home. If you haven't got some sort of economic source, it is difficult to keep them at home. So it is interesting that the mining company has the possibility to keep the boys and girls here.

The proponents of mining argue that it is difficult it is to make a living from family agriculture now that global markets have decreased coffee prices and large-scale agricultural enterprises in Brazil make small farmers less competitive. They assert that the territory cannot get stuck in the past, but must look for opportunities for industrialized economic employment in the region.

Even those opposed to the mining, such as Sergio, the 20-year-old student, admit its appeal:

The majority of young people are against ... the mining. But if they need work, it is money. People need money to live. ... I don't want this area to be destroyed by mining... but capitalism is strong. For example, this here, [points at recorder], is aluminum. [Laughs]. The whole world uses it. For cars, for motorcycles, [points at fork], it all is aluminum. And people... And because of capitalism, people will use it, have it. It is interesting... But I don't know [how to reconcile it.]

Juliana explained to me that while she and her husband had left the city to come home and start a farm, for a better quality of life, they were a rarity. She stated that many people her age want the capital to move to one of Brazil's large cities, to get a job and start a life not tied to the land:

I'm not sure how many families there are in this community, we did count them once, but I'm guessing about 80% of them would be more interested in the money than the land. Most people will allow [the mining] to happen. In fact, you can't prevent it. We can put as many stones [obstacles] in the way as we'd like.

Ze Maria, the Secretary of Agriculture and the Environment for the county of Rosario da Limeira, said that while he is personally opposed to mining, he recognizes its inevitability and therefore wants the community to adjust its mindset to make the best of the situation:

I think that with the mining company, we must go often to make sure they contribute to the economic health of the region. It could be in agriculture or it could be in some other type of professional training, but that's the only way that I think we can work effectively with them. I'm not sure if they're interested in this, but we need to mobilize the community to get the community to go after them and ask for these things.

He criticized those who were naively blinded by the company's economic promises but also those who adopted an anti-mining position that was so strong that it crippled their ability to actively engage with the company.

Those staunchly opposed argue that they will continue to speak out against the mining, as they cannot abandon their deep-seated principles about what's truly best for the community in the long term. Julio Monnerat, a professor of Agro-Ecology at the Federal Institute of Muriaé and a member of the Mining Commission, stated:

I look it as a territorial aspect. A territory, in the sense of a place where people live, where they belong. Where people have a sense that this is their land. But their territory, their homeland becomes threatened by the invasion of large-scale capitalist interests. Mining, which represents the capitalist model, versus family agriculture, which represents more accurately people's feelings for their own land, their own livelihoods. The feelings of every person as their own lord and master, not beholden to outside influences... And this is not just a local thing. It is related to other similar movements going on in other parts of the world that are coming to the same conclusions.

To Julio and those of similar ideology in the region, many of whom are of the prominent National Worker's Party (PT – *Partido dos Trabalhadores*), it is essential that opponents of neoliberal economic policies stand strong, especially as the political left in Brazil weakens. As Reinaldo, the local CPT representative, states,

In the 1980s, we had a lot going for us, because there were many people thinking along the same lines. But now, with globalization, and capitalist interests, it is much more difficult. These influences co-opt local interests and this is the way in which they gain power. And this is exactly what the CPT is trying to work against. This governmental policy about mining, they give the impression that they are creating something for the community, but then they come and take it away with the other hand.

Other opponents I interacted with, who did not speak with such political charge, used simpler argumentative frameworks. Dear Sebastian, with a puckish grin and eyes still glistening with emotion, said simply:

And lots of people think [mining] will be the thing. Because they'll get money. But there's not point eating a lot today, if you can't eat tomorrow. So, when it comes, there will be some instant gratification, but none in the future.

Section 2

To tie these varied thoughts together, we must move to my fourth sub-question:

How does the community define sustainable development and how do they see mining in this context?

It amazed me how quick many stakeholders in the community, from coffee farmers to CBA representatives, were to bring up the term sustainable development or at least describe a development paradigm that struck me as the textbook definition of sustainability. Part of me believes it is a testament to the work of groups like Iracambi and other sustainability organizations in the Serra do

Brigadeiro Territory. But after living for two months among these people, another side of me thinks that it is also inherent to their perceptions of the world, at least to a greater extent than it is in my home community in the United States.

First and foremost, many stakeholders from the community described sustainable development as long-term prosperity (as implied in the term). Juliana spoke in inter-generational terms about the mining:

Well, I'm very much against it. [People] don't think about how much this is going to affect us in our future. Not only us, but our children and our grandchildren. It is really going to damage our families. And we're afraid, not only for environmental reasons.

In accord, Frei Gilberto explained one of his key reasons for opposing the mining:

...(A)nother fact is that mining has just expanded very rapidly, due to global market factors and the prominence of companies here. You see, in the earlier history of Minas, the mining (for gold, silver, etc.) took so long that towns [sprung up] around the mining. The towns were very connected to the mining industry, for hundreds of years. But now, the mining can happen so rapidly [and with little labor], that she [mining] arrives and exploits and then leaves.

Those in agreement with Frei Gilberto worry that the mining company will not be around long enough to establish a true industrially-based community, and will instead leave an economic void when it leaves and the land is left too damaged for old farming practices, or the farmers are no longer present to farm it.

João Paulo, the Rural Workers' Union president, explained his reasoning:

I know [mining is] going to degrade the environment; it is going to concentrate money. And I believe in sustainable development and strengthening family agriculture. And I don't think its possible to reconcile these goals with mining.

His emphasis that sustainable development must be tied to family agriculture was a dominant theme amongst the members of the Mining Commission and other anti-

mining advocates. Ze Maria, the Secretary of Agriculture and the Environment spoke passionately on the subject:

So, most of the food that's eaten in Brazil is produced by family farmers, but our great challenge is to make sure that these small farmers get to live a decent life. I've been to Europe, to Germany, to Italy, and seen that viable small farming with decent standards of living is possible. Why can't we do it in Brazil? Because our legislation doesn't allow it. So yes, I won't stand for it when people say that this technology doesn't exist, because I say: make it exist!

He told me about programs his office was sponsoring to keep family agriculture profitable for farmers, including technological innovation programs, bank financing for rural workers, free agriculture education programs, etc.

I was captivated by this commitment to family agriculture, especially in light of the so-called “rural exodus” and industrialization of Brazil and urged stakeholders to explain to me why family agriculture was such a large part of their identity. One coffee farmer named Valdeli explained that his life on the land was hard work, but more fulfilling than any life in the city. I witnessed a squabble between two brothers in Santa Catarina, where the farmer brother defended the farming lifestyle as “full of harmony” and the brother from Rio de Janeiro scoffed at his brother’s old-fashioned ways.

Carlos explained to me, in stunning lyrical form, how he came to farm in Belasario. His father had worked the land as a sharecropper in the time where there was little rural development and education in the countryside, so he moved to Rio de Janeiro, hoping to give his children a better life, though the slums and favelas had little to offer their family. Carlos paused in the middle of his story and looked me in the eye and said:

My father is called Adam. My father used to live in paradise and he ate the apple and was thrown out. And I said, 'I'll try to go back to the land and live like you used to live.'

Earlier in the story, he explained:

When I came back to Minas Gerais, when I found an opportunity, I couldn't imagine living anywhere else. I bought the farm, and my father came to live here, living with me and making baskets. So I know about the rural exodus because I'm a result of that exodus. So we know what will happen to those who choose to leave and go to the city. They'll go and live in the slums and the favelas. It might take two hours to get to work, two hours to come home. So, it is the great illusion of development. We know there are very few people living in the countryside in your country, in the United States.

His story struck me with such force that I was at a loss for words, realizing how important the symbolism of the rural exodus, farming, mining and industrial development was to his personal narrative, how metaphorical it was to his perceptions of what was evil and what was blessed in the world.

Other community stakeholders who opposed the mining nevertheless accepted it as an inevitable part of the future of the territory, and emphasized the importance of incorporating the mining into the region's sustainability platform. In disagreement with João Paulo, Ze Maria contended that family agriculture and mining did not have to be incompatible:

I believe in working with the community to get the community ready for the transformations that will take place, and will resist [the mining] to the point of possibility. In this resistance, what I feel is that we need to help families prepare themselves for what they are going to face. As well as helping them increase their possibilities ...to raise the standard of living [as farmers]. ... I don't feel we have any alternatives to this [method]. We're thrown into a new world [with the mining] and we have to figure out how to make do. And we need information.

He stated that while he would always be against mining in principle, as a governmental official working for the long-term good of the community, working

with the mining was a necessity for sustainable development after the mining had departed:

Some places, family agriculture has managed to seize the hour, even with the mining. I don't think that the mining has to finish everything off. They don't need to eliminate everything. They just need to come in, make their mining, and move on.

Those for the mining conveyed their confidence in Gaia and CBA's ability to help the region with sustainable development, to provide resources for economic vision and educational reform that the community could never access itself. Additionally, many are adopting the idea of eco-tourism as one of the best hopes for the area's future. They hope to see the picturesque countryside start to attract wilderness recreation and agro-tourism business (of the Tuscan variety) that would bring life to the little towns. And since eco-tourism is one of Gaia's pilot projects, many think CBA could aid the counties in achieving this ambition. As Miriam stated:

There's lots of things that we can think about that the mining company could do for us. To help develop our tourism.

Eliab, the young ecotourism coordinator for the region, explained how Gaia was working with the local tourism leaders in the territory:

So, [Gaia is] helping us evaluate our strengths and weaknesses in not only infrastructure, but also in terms of identifying our places of value, our natural high points.

But he also spoke with reservation at points, acknowledging the complexity of development:

So if the mining company is going to come and train people how to work, the same people who if they don't get a job will be in the city tomorrow, then I'm in favor of it. It is very much more complex, though. It is not just that they'll come here and pay someone to train these young kids how to become guides and work in tourism. It is not as easy as that.

Cleber's summary of the spectrum of opinion on development is revealing:

So, there are two types of people, one type that's willing to sacrifice everything for mining and another, like me, who live in the countryside, who are trying to conciliate the arrival of progress with preservation. And we also have to have people who say, "No, no, no. We don't want progress. Let's preserve."

In an era when industrial and the commercial development in the "first-world" style is identified as progress, it is hard not find this categorization accurate by global standards.

Section 3

This ideological quagmire brings us to my final sub-question:

What are the community's perceptions of the anti-mining and pro-mining advocacy and the contention between them? How would the community like to move forward in reconciling the mining with their regional identity?

Both sides of the eight-year battle about the merits and pitfalls of mining are now in an intriguing position. Stakeholders in the community, the mining company, and the government realize that the mining will proceed regardless of the protest or support of the community. For CBA, this means that they can proceed with their mining site expansion, at least outside the buffer zone, with few legal boundaries.

Certain members of the Mining Commission express remorse that the resistance movement failed and that the community is so ill-equipped to approach negotiation with the mining company, the logical next step. As João Paulo expressed:

We're not very well prepared yet. We know the day is going to come. We're not sure what we're going to do. We're not going to be able to stop it. And we've lost a lot our strength in this resistance. I don't know how to... We've learned how to resist, but we haven't learned how to negotiate.

Ze Maria, also on the Mining Commission, remarked:

Those people who say, "No, no, no we can't negotiate, we have to resist," I compare them to the father of the adolescent child who keeps saying no and the child gets more rebellious. You have to keep the balance between knowing when to loosen the reins and knowing when to tighten them.

He used the example of those who have resisted various dams in Brazil for 30 years, to no avail. He commented that the mining company has a lot of money to be put to good use, if the community had the wisdom to demand it and the fortitude to take control over how it would be used.

This opinion is becoming more prominent within the Mining Commission and in the community, as anti-mining activists prepare for how to best negotiate with CBA to ensure the best possible treatment of rural workers, their lands, and the forests that provide for them. Cleber, not on the Mining Commission but a prominent leader in the community, stated:

Since mining has to be done, let's make sure that the law is obeyed. We need a big mobilization for this. It is a rigorous law, but many times it is not respected. People are bribed, etc. and the legislation doesn't work. But we can't say "Well, this a corrupt country, so this is normal..." But we also cannot say, "You can't come in here, you can't touch it." So it is important that the community is mobilized.

Robin Le Breton, Research Director at Iracambi and very active on the Mining Commission had hopes that the commission could move forward, with such goals in mind:

Hopefully, soon we can get to a point where we can agree to disagree [about resistance vs. negotiation within the commission] and we can move forward from there with the company. [Iracambi] propose(s) that there be established a commission of three parties, the mining company, the government, and the affected people. We suggest that each of those interest groups should appoint one person and there should be a commission of those three people who would meet regularly.

Iracambi hopes that the proposed negotiation strategy, a reflection of the three-legged model of mining negotiation, will be an effective compromise that will soon be accepted by all parties.

When I asked Lilian, a head representative from CBA, whether CBA would be open to such an arrangement, she stated that such collaboration was exactly what CBA has been hoping to achieve with its work with Gaia. She explained to me that many of the employees of CBA's local mining branch were young and progressive, and wanted to make sure that the mining was done in an optimally sustainable way. Additionally, she mentioned that CBA prides itself on its international reputation as a socially and environmentally ethical company and would never risk harming its reputation by overtly ostracizing a community it was working with. Marcia do Vale, another female representative from Gaia explained that her organization strives to align their methodology with rigorous standards about social projects and listen intently to what a community wants before acting.

When I asked farmers what they thought about negotiation with the company, some gave me blank stares and vague answers, as if unused to the rhetoric when dealing with subjects like mining in Brazil. Professor Julio Monnerat explained the phenomenon:

It is a shame really. There's a tradition in this area of the little guys getting pushed around by the big interests. They often get taken advantage of. So we're trying to get people to understand that they can stand up to these companies, to [demand that they act in the community's] interests.

Those farmers who had comments usually upheld negotiation as a sound idea.

Juliana spoke forcefully on the subject:

We can't be completely idiotic about this. We have to know what's going on. ... [Otherwise], the truth is, when the mining company comes, [the farmers] won't know how to react. They haven't been preparing. Even though we've had warning, it will come suddenly.

Professor Monnerat continued that he hopes that during the process of negotiation, the community can learn to articulate what about its society it values preserving and what parts of the landscape it wishes to protect:

We are bringing this pessimism to the rural areas. [We have to] move to a different rhetoric. We have to get people to develop an appreciation for their own lands, to retain an appreciation, to have pride in their lifestyle, to have faith in their own abilities and build up self-esteem. That's the thing that this commission should begin doing. We should be working on getting people to appreciate the value of their own traditions and lands and not going around saying "Oh well, the countryside's had it and everyone is going to move to the cities." And that's really going to be the measure of our success, whether we can succeed in doing that.

VI. Conclusions

Revisiting the Research Questions

It is not an easy task to weave these many themes and opinions together to answer my research question with one concise thesis about how the mining discourse has influenced identity in the territory writ large. For mining has brought a myriad of issues to the table. And it has highlighted the differing opinions *within* the community stakeholders. However, in my reflections on my data, six main themes emerged.

1) The mining has accelerated dialogue on the future of family agriculture in the region as Brazil (and the Serra do Brigadeiro territory with it) becomes more engaged in a capitalist model. For some, this instills fear of an unknown destiny and grief over a changing culture, while for others this incentivizes a pragmatic outlook on mining and industrialism as the economic drivers of the future. Others seize the chance to fight to save family agriculture and make it compatible in a modern Brazilian economy.

2) The threat of mining on natural entities like forests and water has enabled people to articulate why these resources are important to their livelihoods and why they must be protected. Moreover, because an external force is threatening these ecological forces, it propels many members of the community to take pride and ownership in them.

3) As people work to articulate why they do or do not value family agriculture and the natural environment in light of the mining, religion is identified

as a key way of expressing these opinions. For those against the mining, the Catholic Church is an organizational tool for expressing opinions as a group. And the language of Christianity is used to convey emotion about the mining and place it in a larger, philosophical framework. For those who support the mining, different Christian theologies are used to justify the acceptance of economic forces like mining.

4) The mining, and the swift economic change that it represents, unearths insecurities about cultural change in the community, particularly in terms of the shift from the older to younger generations. Some members of the older generation see the younger people as not valuing the land as much as they should and unwisely fleeing to “the city,” a metaphorical place imbued with symbolism of both danger and opportunity. The younger generation seems to be of mixed opinion, disliking the practical ramifications of mining, but compelled by the type of development (and lifestyle) it represents.

5) The mining demonstrates to the people of the territory that, while the outside world may seem far away in the cozy valleys of the mountains, globalization already has a strong presence in these communities. Many see this globalization as positive, as a source of information and progress, while others see it as a hostile force that is threatening their way of life. Some see both sides.

6) After eight years of grappling with the issue, many stakeholders state a need for a different type of language in resisting and/or negotiation with external forces like mining. Regardless of their opinion on the value of mining, stakeholders seem to think that the current, polarized approach to the mining (bitter resistance

versus blind acceptance) is ineffectual in the long term. Many speak of a need to learn how to articulate their vision of ideal development in a way that effects positive change and cooperation.

Limitations

Frankly, my two months at Iracambi demonstrated that I would need many more to satiate my desire for a full comprehension of development in the territory. Ideally, I would like to have many more formal interviews to pull data from, as well as months of fieldwork speaking to locals in Portuguese and living with them as an active participant for a longer period of time. I do hope to return to Iracambi to do thesis work on this subject, or a related one, and become fluent enough in Portuguese that I could understand more nuances. Ideally, I would like to return to look further into the role of the base communities in the dialogue about mining and development and to live with the monks in the Christian ecological commune they hope to start.

Final Thoughts:

As a student much more accustomed to political position papers than ethnographic studies, I often found myself searching for concrete answers to the dilemmas facing the Serra do Brigadeiro Territory, wanting to adopt a stance to fight for. At the beginning, when my knowledge of the mining situation was from secondary sources, a mental conglomeration of academic research and dramatic pictures of barren hilltops and empty houses, it was far too easy to slip into simplistic categorization. When I stepped on the plane in Miami to head off on my adventure, a part of me had visions of a summer spent romantically battling

industrial giants with a pen as my sword, waxing poetic about great extortion and injustice.

Fortunately, my time spent in the *Zona Da Mata* cooled my righteous indignation and forced me to delve deeper into the questions I was trying to answer. In fact, the more time I spent exploring the issue, the fewer conclusions I had and the more questions. It would have been a more straightforward project if CBA had been an unethical monstrosity of a company (which it is not), but I doubt I would have learned half as much about the complexity of mining's effect on a society. The process taught me to place aside my need to be a warrior and embrace the role of a listener.

This is not to say that I resisted any positionality, because that would have been an impossibility for me. As I grew to love the people of the mountains, to love their grounded lifestyle and tender manner of speaking, I could not help but mourn for them, for the changes they will have to undergo in the upcoming years. There is no denying that the already fragile natural environment will have to undergo a large amount of stress, that trees will be ripped from their roots and fields will be stripped naked. Even with the best reclamation possible, it will take many seasons to fully repair the damage. I fret for the farmers who will have to leave their homes; who will watch their children leave for far-off opportunities; who might watch their grandchildren have little familiarity with family agriculture, as my grandparents experience my generation in the United States.

During my interviews, I could not help being drawn to the sentiment of those opposed to the mining. When Carlos spoke of his love of the land and his belief that

family agriculture was the bedrock of any firm society, I was mesmerized. And when he looked me in the eye and spoke about the lack of rural life in the United States, I squirmed in my chair, with visions of factory animal farms, obesity, and other symbols of our broken food system. And soon after arriving back from my trip, on a trip home to Iowa, the endless miles of corn and soybean fields engulfing abandoned farm houses reminded me that once Iowa had teemed with small farmers and had a rich culture similar to the Serra do Brigadeiro. Now the emptiness of it echoes, a land of high yields, not people.

But during my time in Brazil, I found it difficult to become angry at the mining company as the agent of the change in the community. In my estimation, the company, though not perfect, is doing an admirable job of trying to mitigate the effects of the mining, though I believe their compensation for farmers should be higher and they should not be allowed to enter the buffer zone. In the economic development model that is driving Brazil at the moment, one it surely did not invent, the mining company sees itself as revolutionizing the area, of bringing innovation and financial opportunity, of helping to raise GRI indexes and to increase the standard of living, so that every resident of the Serra do Brigadeiro Territory might one day hope to have American conveniences. So that they might have houses with multiple televisions, refrigerators, cars, running water, I-pads, and laptops: The essentials to a happy life, or so we demonstrate to them. All of which, by the way, require a steady supply of aluminum.

So I realized the hypocrisy of me becoming irate at CBA for its endeavors to pull metal out of the ground. Until I have the strength to abandon all of the above-

mentioned items, to go and buy a house on a hill somewhere and grow my own food and subsist without electricity, kitchen mixers, or tin foil (as Iracambi's nursery manager, Tony, does in his cabin in the woods) I have no authority to object to bauxite mining on principle. I have no right to harbor hatred for a company that is simply fulfilling its duty to a world order I still live in.

So when Zezino, a man with the wisdom of ages, charged me to go back and spread the word about the injustice, I balked. In a dramatic gesture, he raised his hands toward me, gestured to the mountainside ahead of us, and exclaimed:

And we're counting on people like you. So you have to go and tell people what's happening here. Tell them about the mining. What's happening here is going to happen to the whole world!

Who am I to speak for these people, I thought, when my own hands are bloody? In my opinion, it is these farmers themselves whose voices need to be heard. It is these humble people whose lives are being attacked, not by a single company or industry, but by a global hunger for resources. It is *they* who have the entitlement to cry out to the world, to their country, and demand a different vision for the planet and its peoples.

So, in my opinion, the best thing I can do for the Serra do Brigadeiro is to provide a medium for these community members to speak out, to tell their story. For they tell it well. All I can emphasize is how much the society of this small pocket of Brazil taught me. Robin and Binka showed me what it looks like to go forth in life without fear, to stubbornly pursue the reality you wish existed. Carminha and Everaldo demonstrated to me how gentleness and warmth knit together strong families and communities. Tony preached the gospel of simplicity, while Carlos,

Zezero, Ze Maria and all the leaders of the territory signified to me the power of active convictions.

And finally, Frei Gilberto taught me to always inform my ecological ethic with a great deal of love and compassion. In the words of one of his heroes, liberation theologian, Leonardo Boff:

Caring implies a loving, respectful and non-aggressive, and therefore non-destructive, relationship with reality. It assumes that humans are part of nature and members of the biotic and cosmic community, with the responsibility to protect, regenerate and care for it. More than a technique, caring is an art, a new paradigm of relationship with nature, Earth and human beings.

I have so much faith in the character of the people of the Serra do Brigadeiro Territory, in their ability to withstand any challenges that mining might bring and find opportunities for *real* growth in the situation. I pray that they are blessed in their development and that when I return, which I know I will, I will find them still prospering. As Carlos proclaimed:

We damage the earth, even as farmers. But she still looks after us. We make mistakes and she still gives us another chance. "The earth is crying out in pains of childbirth."⁵⁰ But after she gives birth, there is something beautiful.

⁵⁰ An allusion to the Romaria theme and to Romans 8:22: "For we know that the whole creation groans and suffers the pains of childbirth together..."

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VII. Appendices

Appendix A: Maps of the Serra Do Brigadeiro Territory

Map 1. Changes to the Atlantic Forest, Brazil

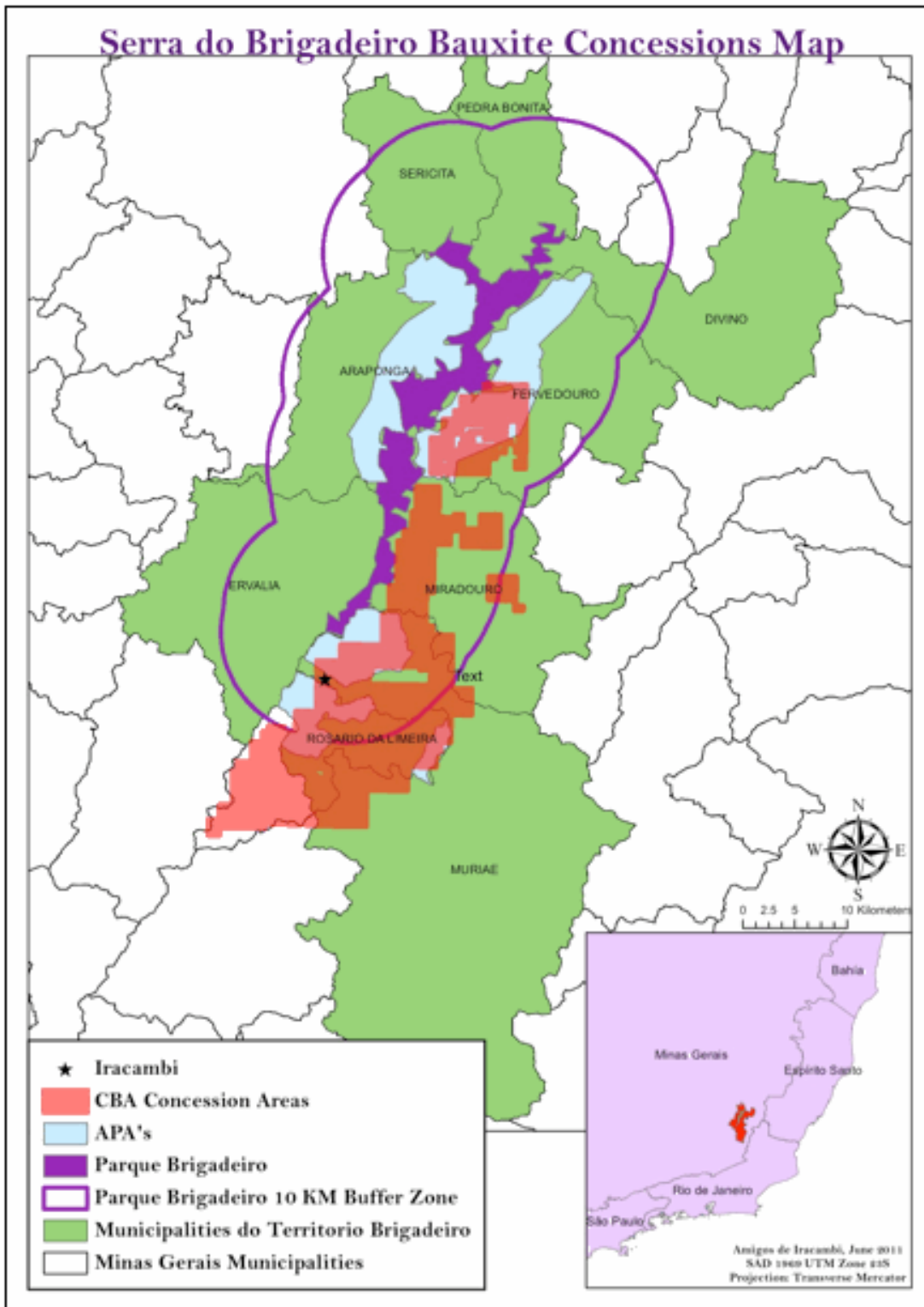
Source: S.O.S. Mata Atlântica Foundation



Appendix A., (continued):

Map 2. Bauxite Concessions in the Serra do Brigadeiro Territory, MG, Brazil

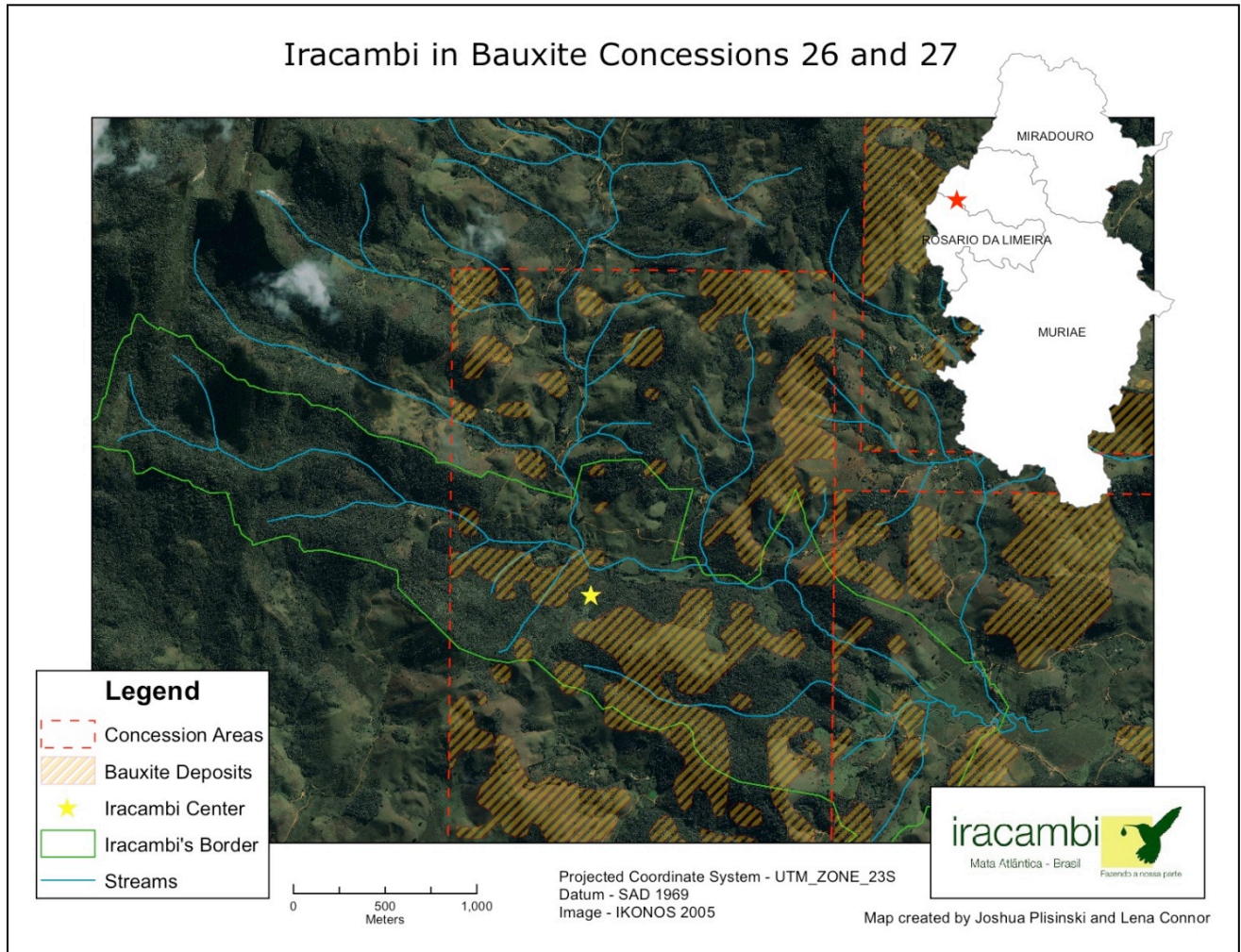
Source: Lena Connor and Devin Dworkin, Iracambi GIS Lab



Appendix A., (continued):

Map 3. Iracambi in Bauxite Concessions, MG, Brazil

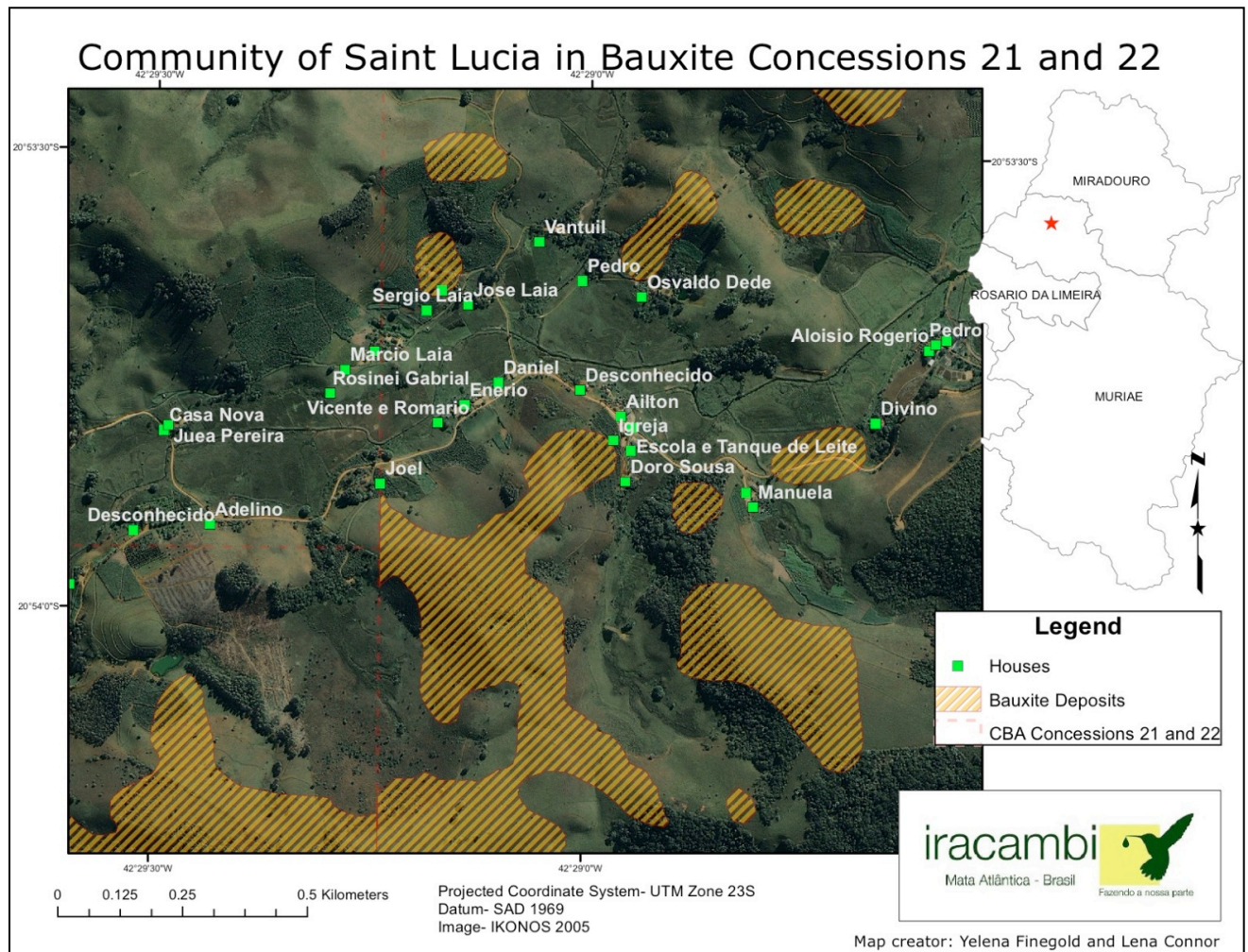
Source: Lena Connor and Joshua Plisinski, Iracambi GIS Lab



Appendix A., (continued):

Map 4. Community of Santa Lucia in Bauxite Concessions, MG, Brazil

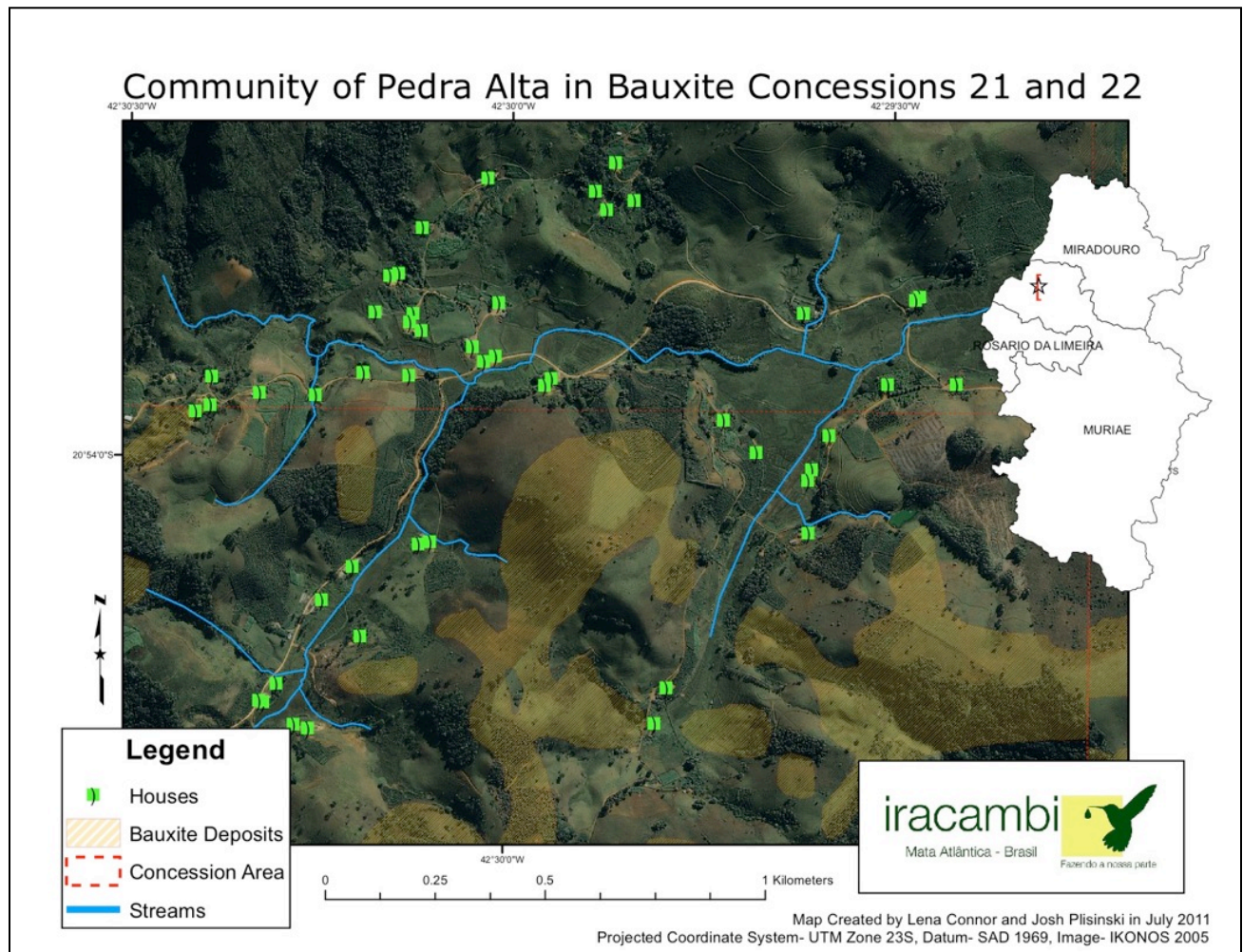
Source: Lena Connor and Yelena Finegold, Iracambi GIS Lab



Appendix A., (continued):

Map 5. Community of Pedra Alta in Bauxite Concessions, MG, Brazil

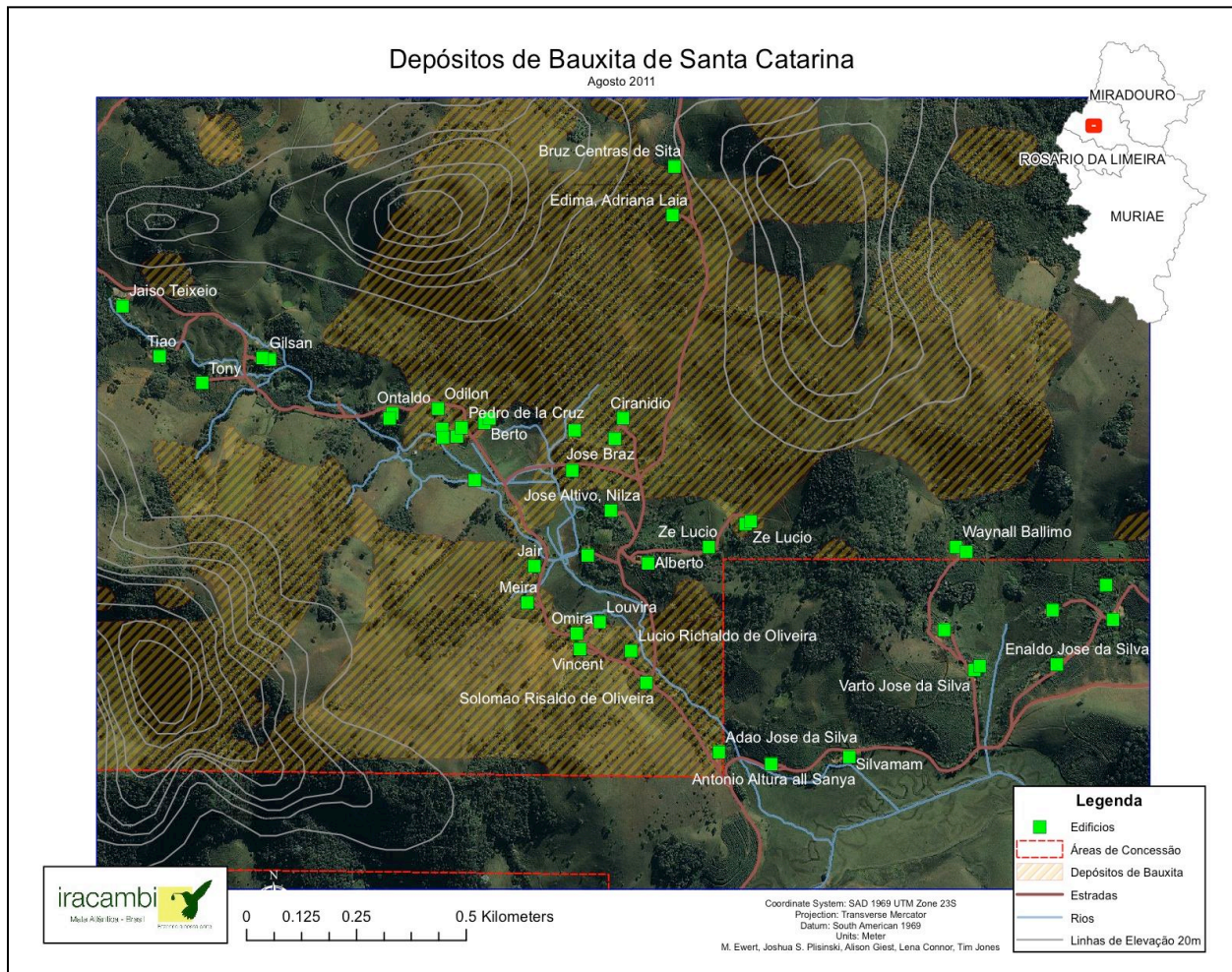
Source: Lena Connor and Joshua Plisinski, Iracambi GIS Lab



Appendix A., (continued):

Map 6. Community of Santa Catarina in Bauxite Concessions, (Example of Portuguese version for community).

Source: Lena Connor and Dani Ewert, Iracambi GIS Lab



Appendix A., (continued):

Map 6. Existing Mining Expedition Map and Images, São Sebastião da Vargem Alegre, MG, Brazil

Source: Lena Connor and Yelena Finegold, Iracambi GIS Lab

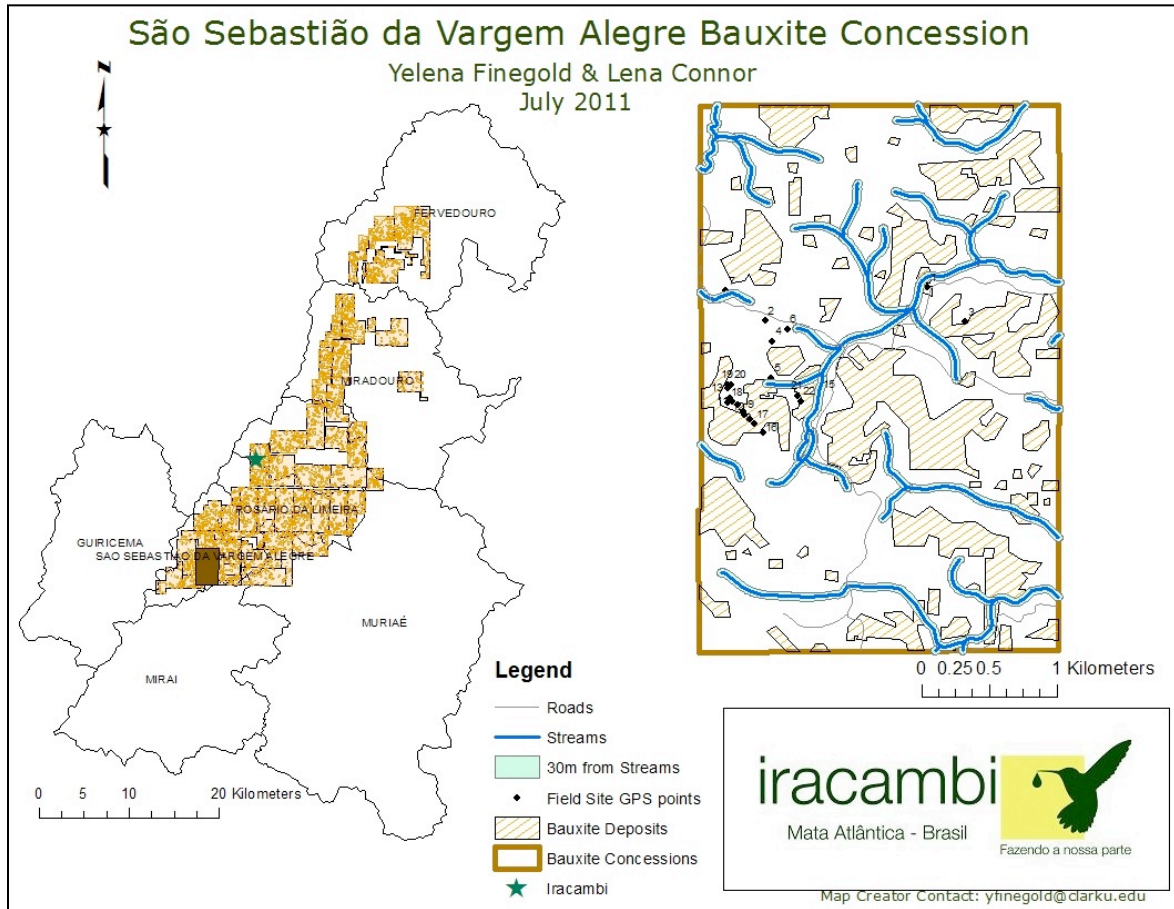


Image from Google Earth, GeoEye satellite- 24/08/2010
Existing Mining; GPS Location 21° 02'24.79" S,42° 36'12.62" W



Pictures taken by Lena Connor on Mining Investigation on 6/9/11 near
Sao Sebastian at GPS Location 21° 02'24.79" S, 42° 36'12.62" W

Appendix B.

Figure 1. World distribution of bauxite reserves according to tonnages of recoverable alumina (rec. Al₂O₃). Data from CRC 525 database.

Source: F.M. Meyer, 2004.

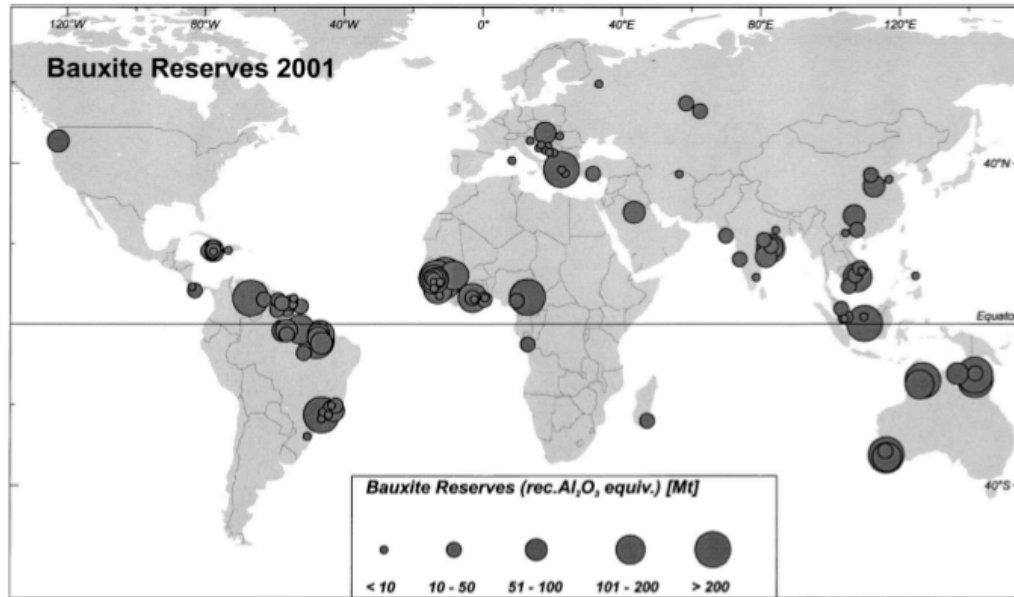
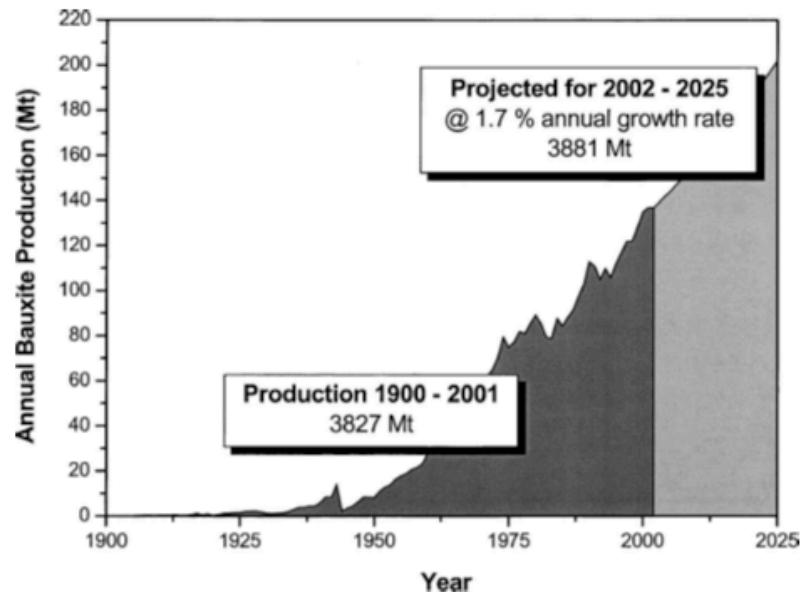


Figure 2. Time trends in bauxite production from 1900 to 2001 and projected for period 2002 to 2025 assuming an annual increase of 1.7% for future bauxite production.

Source: F.M. Meyer, 2004.



Appendix B., (continued):

Figure 3. World bauxite per capita consumption, 1990 to 2001.

Source: F.M. Meyer, 2004.

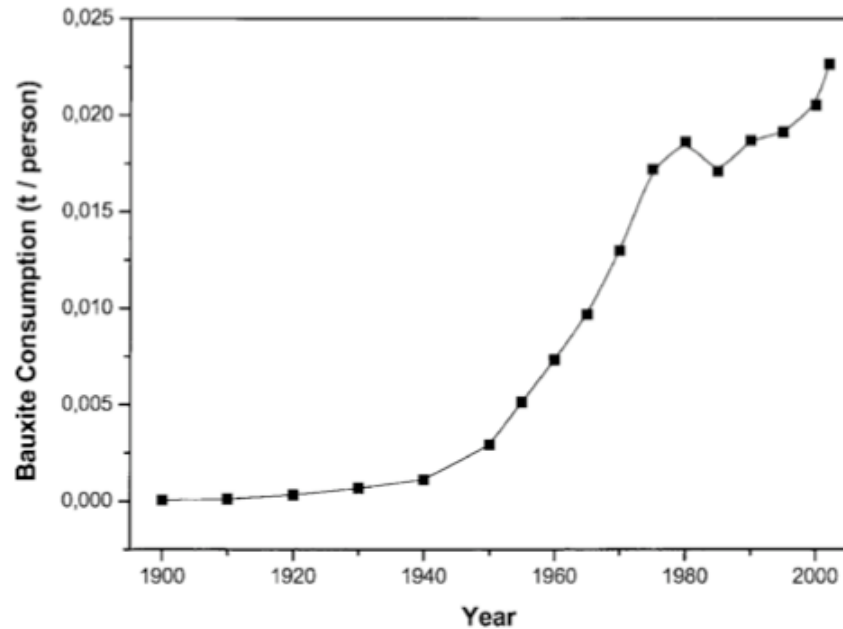


Figure 4. Territory Municipalities Employment Categorization

Source: Center of Alternative Technology- Zona da Mata, 2004

Tabela 04: Produto Interno Bruto (PIB) dos municípios do Território
Ano 2000 - Unidade R\$ 1.000,00

Municípios	Agropecuário	%	Industrial	%	Serviços	%	Total
Araponga	6.933	49	466	3,32	6.619	47	14.018
Divino	17.527	35	7.259	14,65	24.773	50	49.559
Ervália	10.892	29	6.069	16,38	20.083	54	37.044
Fervedouro	7.476	34	2.402	10,83	12.292	55	22.170
Miradouro	6.518	16	15.247	38,34	18.003	45	39.768
Muriaé	19.679	6	95.642	28,62	218.879	65	334.200
Pedra Bonita	10.274	49	514	2,44	10.312	49	21.100
Rosário de Limeira	3.231	31	1.796	16,97	5.559	53	10.586
Sericita	5.598	40	798	5,71	7.587	54	13.983
TOTAL	88.128		130.193		324.107		542.428

Fontes: Fundação João Pinheiro (FJP) Centro de Estatística e Informações (CEI)

Appendix B. (continued):

Figure 5. Population variance between 1970 and 2000 in Territory

Source: Center of Alternative Technology- Zona da Mata, 2004

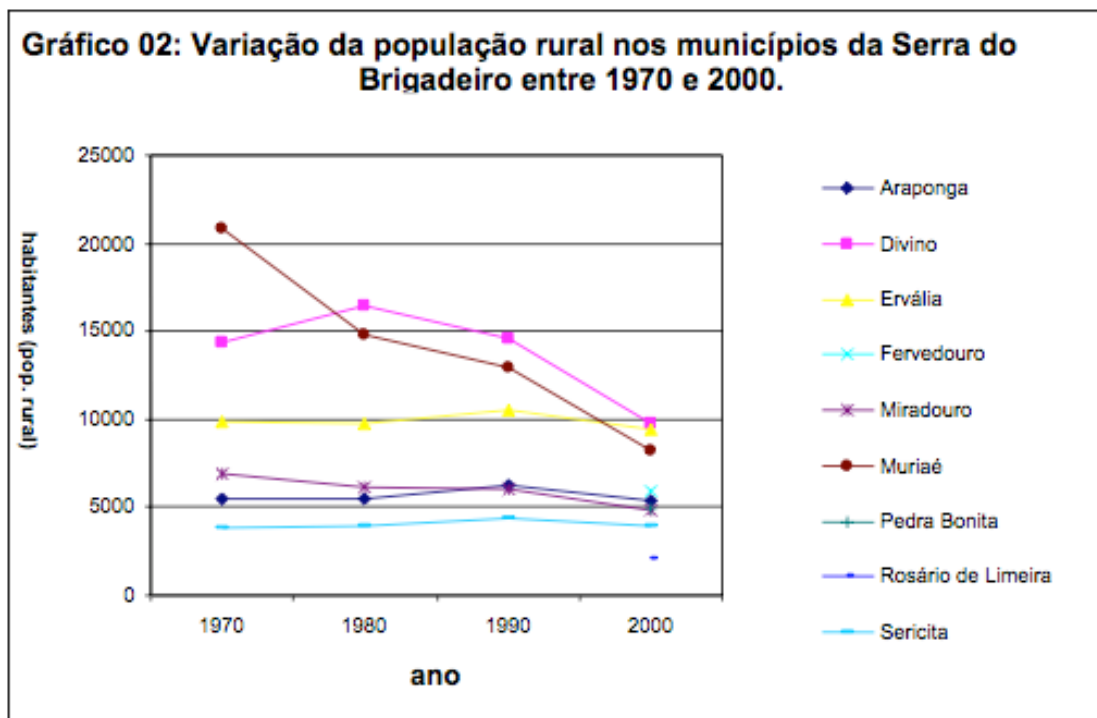
Tabela 03: Variação da população do Território entre 1970 e 2000

Municípios	1970				1980				1990				2000			
	Urbana	Rural	%	TOTAL	Urbana	Rural	%	TOTAL	Urbana	Rural	%	TOTAL	Urbana	Rural	%	TOTAL
ARAPONGA	925	5.429	85	6.354	1.081	5.488	84	6.569	1.631	6.243	79	7.874	2.537	5.374	68	7.911
DIVINO	3.751	14.378	79	18.129	4.763	16.493	78	21.256	7.127	14.630	67	21.757	8.668	9.757	53	18.425
ERVÁLIA	3.264	9.919	75	13.183	3.548	9.791	73	13.339	5.034	10.517	68	15.551	7.555	9.455	56	17.010
FERVEDOURO	-	-	-	-	-	-	-	-	-	-	-	-	3.714	5.956	62	9.670
MIRADOURO	2.305	6.927	75	9.232	3.201	6.156	66	9.357	4.228	5.999	59	10.227	4.915	4.852	50	9.767
MURIAÉ	37.316	20.837	36	58.153	55.161	14.829	21	69.990	71.651	12.934	15	84.585	83.245	8.173	9	91.418
PEDRA BONITA	-	-	-	-	-	-	-	-	-	-	-	-	1.303	4.934	79	6.237
ROSÁRIO DE LIMEIRA	-	-	-	-	-	-	-	-	-	-	-	-	1.645	2.062	56	3.707
SERICITA	1.094	3.849	78	4.943	1.451	3.956	73	5.407	2.003	4.379	69	6.382	3.020	3.970	57	6.990
TOTAL	48.655	61.339		109.994	69.205	56.713		125.918	91.674	54.702		146.376	116.602	54.533		171.135

Fonte: IBGE / Assembléia Legislativa de Minas Gerais

Figure 6. Rural Population Graph of Territory from 1970-2000

Source: Center of Alternative Technology- Zona da Mata, 2004



Appendix C:

Section 1: Formal Interviews:

***Note:** For many of the stakeholders I interviewed, only first names were recorded, for privacy purposes and because last names are not commonly used in the culture of the Serra do Brigadeiro Territory.*

Interview #1:

Frei Gilberto, Male, Head Franciscan Priest for the Diocese in the Territory, Rosario da Limeira and surrounding counties

Date: 6/16/11, 2:30 p.m.-5:30 p.m.

Location: Binka and Robin's dining room

Interview #2:

Robin Le Breton, Male, Research Director, Iracambi, Rosario da Limeira

Date: 6/18/11, 2:30 p.m.-5:00 p.m.

Location: Garage at Iracambi Center

Interview #3:

João Paulo, Male, President of Rural Workers Union, Rosario da Limeira

Date: 6/27/11, 9:00 a.m.-9:45 a.m.

Location: Rural Workers Union Office

Interview #4:

Ze Maria, Male, Secretary of Agriculture and the Environment, Rosario da Limeira

Date: 6/29/11, 8:00 a.m.-9:15 a.m.

Location: Secretary of Agriculture and the Environment Office, Rosario da Limeira

Interview #5:

Marinha, Female, Farmer, Pedra Alta

Date: 7/1/11, 9:00 p.m.-9:25 p.m.

Location: Farmer Festival, Stable Room of Community Center, Pedra Alta

Interview #6:

Sebastian, Male, Farmer, Pedra Alta

Date: 7/1/11: 9:30-10:15 p.m.

Location: Farmer Festival, Stable Room of Community Center, Pedra Alta

Interview #7: (Group Interview)

Julio Monnerat, Male, Professor of Agro-Ecology, Federal Institute of Muriaé, Muriaé
Reinaldo, CPT representative, Muriaé

Date: 7/6/11: 10 a.m.- 11:45 a.m.

Location: Federal Institute of Muriaé Office

Interview #8: (Group Interview)

Cleber, Male, Attorney and Engineer, Belasario
Miriam, Female, Retired Psychologist, Belasario
Eliab, Male, Eco-Tourism Coordination, Belasario
Carlos, Male, Farmer, Belasario
Date: 7/12/11, 9:30 a.m.- 11:45 a.m.
Location: Cleber and Miriam's Home, Belasario

Interview #9:

Zezero, Male Farmer, Belasario
Date: 7/12/11, 12:00 p.m.-12:45 p.m.
Location: Hillside outside of Belasario, parked on the side of a main road, facing the mountain range.

Interview #10:

Sergio, Male College Student and Farmer
Date: 7/13/11, 9:00 a.m.-10:00 a.m.,
Location: Iracambi Center

Interview #11:

Juliana, Female Farmer, São Pedro
Date: 7/28/11, 4:30 p.m.- 6:30 p.m.
Location: Her house in São Pedro, 4:30 p.m.- 6:30 p.m.

Interview #12:

Maria Carolina, Female, High School Student, Muriaé
Date: 7/29/11, 9:00 a.m.-10:00 a.m.
Location: Iracambi Center

Section 2: Additional Interview Quotes

The reason I'm against mining is because it's aggressive to the world. It is attacking the whole system. When I'm attacking Mother Nature, I'm attacking all of her children.

-Frei Gilberto, Head Priest for Catholic Diocese

Well, we've been suffering for the last 500 years from mining of all sorts. Most of Minas has lost its forest. Brazil has always suffered from the riches leaving the country.

-Frei Gilberto, Head Priest for Catholic Diocese

Of course, the mining is an important part of progress, economic and technological. It has a very immediate return, but often we don't take into account the damage mining causes to nature and to life itself. It's a very aggressive pursuit, mining.

-Frei Gilberto, Head Priest for Catholic Diocese

These days, the mining company participates in a lot of green-wash, but that doesn't really make it any less aggressive. It's still degrading and exploitative.

-Frei Gilberto, Head Priest for Catholic Diocese

This hydrology is very sensitive and complex and they would have to be very careful not to disrupt any of these water sources with sedimentation. It's probably impossible, to not affect them. Yet the EIS doesn't even mention these water resources. They haven't evaluated the hydrology in this region. It needs to be done. And these springs are the sole source of water for people in this area. They use it for washing, drinking, watering their cows, etc. We can't afford to block these springs.

-Robin Le Breton, Research Director, Iracambi

As you know, there have been a lot of people in Rosario da Limeira who have been captured by the mining company. To start with, in Rosario da Limeira, we were all united against it. But since then, when we have meetings, some people are a little nervous, because maybe they owe a favor to the mining company, or they work for the mining company, or they hope to work for the mining company. It's weakened our stance.

- João Paulo, Rosario da Limeira Rural Workers Union

What I see is that the mining company has very clear options of offer of benefits for them, and we have been remiss in not creating a really strong alternative in favor of family agriculture.

- João Paulo, Rosario da Limeira Rural Workers Union

In the next county, of Miraf, a lot of people have been affected by the mining, the dust, and have left the countryside.

- João Paulo, Rosario da Limeira Rural Workers Union

Now, what I don't support is the mining company bringing into the city, so they build a soccer field or they do something to the church. That's bringing people into the city and taking them out of the countryside.

- João Paulo, Rosario da Limeira Rural Workers Union

The older generation was raised with the land and the land to them is more than just the economic benefits of it. It's a whole different relationship. Whereas the younger generation tends to see it as only in terms of economic benefits, and those are the ones who are in favor of mining and tend to leave the area as well.

- João Paulo, Rosario da Limeira Rural Workers Union

In this state, miners and those connected to mining have enormous political power. Particularly in this state. And so with this, they can easily achieve their objectives.

-Ze Maria, Secretary of Agriculture and the Environment, Rosario da Limeira

I don't feel we have any alternatives to this [method]. We're thrown into a new world [with the mining] and we have to figure out how to make do. And we need information. One of the things, this is a region with very strong culture, a very strong traditional culture, and that's very beautiful in some ways, but in others it makes it difficult for them to understand that people need time for education. It's difficult for them to face these changes [mining included].
-Ze Maria, Secretary of Agriculture and the Environment, Rosario da Limeira

If you say to the community: "If you go after the mining company, you can help get an education for your child or you can get, you know, different types of professional development," they'll listen. Whereas, if you go to the community and say, "You have to resist to the last drop of your blood," they'll abandon you and go with the mining company blindly.
-Ze Maria, Secretary of Agriculture and the Environment, Rosario da Limeira

I've been to some places in Steel Valley, on the Rio Doce, in the north. They had an agricultural reform, and some of these families, in the face of mining, have taken hold of new technology, and gone ahead, managed to survive, though many didn't. It's very different in different parts of the state. Some places, family agriculture has managed to seize the hour, even with the mining.
-Ze Maria, Secretary of Agriculture and the Environment, Rosario da Limeira

No, they've got their agenda. It doesn't have a lot to do with ours. So, what's possible.. I think what we can do, is that we can make sure they abide by the law and ensuring they don't throw too many people off the land. And the retribution will be in teaching people, in generating information and money.
-Ze Maria, Secretary of Agriculture and the Environment, Rosario da Limeira

Well, I don't have illusions. I can't pretend it's not going to happen. It's going to last for many decades. And it's going to have a big impact on the landscape. First, we have to recognize that. So how are we going to cope with it? It's going to be a challenge. I'm going to insist that we have knowledge. There's no other way except for them [the community] to understand what's going on, and then they have to decide which areas of the environment they want to protect, and they'll have to work towards preserving these.
-Ze Maria, Secretary of Agriculture and the Environment, Rosario da Limeira

About mining: I worked for 5 years and 1 day for the mining company. And I was the last person to be fired. So I really know about mining because I worked for 5 years. I think its going to be really hard to stop the mining. So, we were big groups of us working. There were about 60 of us and we'd go from one property to another, looking for the mineral. So the miners would come in and they asked the farmers, "Is it all right if we looked at your land." And if the people said no, then the judge would come after them. So if people didn't want it, the judge sent a message, they didn't even have to send the police, and they'd have to let the miners in. And there was an order from the ministry of mines and this gave permission for Antonio Emilio do Moraes to carry out any research on your property. So we found minerals on Graminha, Ermanha, which is behind the telephone tower. We were only workers, so they didn't, of course, tell us the whole inside story, but what I do know is that from the Serras das Aranas, there were going to be 500 truckloads everyday for 15 years. There was enough mineral in there.
-Sebastian, Male Farmer, Pedra Alta

I've always been a farmer. But at that time, I didn't have any land. It was my father's land. I lived here and I was very small. I took a job [with the mining company] because I had debts. I earned one salary. So my father allowed them to research on his property. So my father authorized this on what is now my land, because my father is dead. So, I bought part of the land. If it was today, I probably wouldn't go and work for the mining company. Because it was very bad for my health. When I was 46, I couldn't work anymore. I had high blood pressure, I had heart problems. I worked very deep. I

sweated a lot. All sweaty, and it rained, and it was very bad for you. So, when I was 47, I had to retire for health. I'm now just coming up on 60.

-Sebastian, Male Farmer, Pedra Alta

I won't be around. There's going to be much destruction. Everything. They young people aren't really thinking about it. But if I was young, I would be the same. Maybe my grandchildren. I think my grandchildren will have to cope with this. They will have to leave the land. I feel this. They make lots of promises, but I'm pretty sure our water will never come back. Don't you think it's true?

-Sebastian, Male Farmer, Pedra Alta

We want to encourage solidarity between those who will be affected and others in the community who will not be directly impacted but who still take interest in the issue. Real solidarity, not just that warm, fuzzy feeling, but effective solidarity that will enable them to take a stand against the mining.

-Julio Monnerat, Federal Institute of Muriaé

We have this program that insists that local schools buy food locally, but then you have openings for activities for the mining and so on, which will come and take all that localism away again. So, on one hand, you have this governmental project to support sustainable agriculture, but then, on the other, you support mining which has the exact opposite effect.

-Reinaldo, CPT Representative, Muriaé

So, where mining should be done, I have seen examples where mining has been done quite well. Where counties are pleased with the results. And I've also seen disasters; where they have degraded the land. So we can't say, well let's just let them degrade. So it's a risk we just have to take. Now, in the buffer zone, that's a protected area, so the mining should not take place there. People need to mobilize around this point. But if there's mineral to be taken out of areas that are less critical, then let it be done.

-Cleber, Attorney and Engineer, Belasario

I've been talking to Gaia and it seems that in the areas that they've had mining, people are satisfied afterwards. Now, I'm not naïve enough to believe that this is necessarily true. It's possible some people are making lots of money, and prejudicing others. So this is what I hear from the counties: that the compensation from the company has been quite good. So we're just going to have to see. We're trying to figure out what is true.

-Cleber, Attorney and Engineer, Belasario

It seems that they won't be here for another 5-10 years. So we're in the process of understanding where they are going to mine. I don't think it's intelligent to judge before we really know.

-Cleber, Attorney and Engineer, Belasario

So, mining is a question that won't go away. The question doesn't go away: How can we possibly develop our tourism with these machines everywhere? So we're trying to figure out how we can balance the two.

-Eliab, Eco-Tourism Director, Belasario

So I can't really agree, because I'm a farmer, that if the mining came and even if tourism increased, that everything would be fine. Until the mining company can prove to me that they can fully reoperate my land, because I'm a farmer. Eliab is a tourism director, so he's working with the natural beauties, but I need to work with the land. They have not managed to convince me.

-Carlos, Male Farmer, Belasario

I'm not going to say that I agree with it if my survival is threatened. But I don't want to think just of me. I want to think about the environment as well. If they really do come, because we really aren't sure yet... So this mountain, for example has 6,7,8 families on it. There is one spring that furnishes all these six farms.

-Carlos, Male Farmer, Belasario

People here haven't woken up. To realize what this place is. So its really the rural people who haven't woken up and realized that the mining company will come in, will use his land, that he'll loose his crops, his little corral...But this is a place that has the potential to become a tourist-opolis, a big center. But people here don't really value what they've got. The reason that I'm resisting is that I want to ensure that we leave something worth having.

-Carlos, Male Farmer, Belasario

One of the problems is that it is hard for us to go see where mining is being done at the moment. And we only notice when there is big damage. And I don't trust the environmental agencies. Because they are easily bought. So there's risk of this.

-Carlos, Male Farmer, Belasario

Well, they hope to find ways to reduce the impacts of farmers. If it takes 100 years for the coffee to come back, can we find some alternative? We can work with mushrooms. We can use hydroponics. So this money they are going to give us...He'll have to think what he's going to do it when he comes back to the farm.

- Miriam, Retired Psychologist, Belasario

There is a lot of bauxite here. But it's deep. The bauxite is under the soil which is the fruit of the forests that have been here for centuries, all of the detritus that has been building up and recycling and storing nutrients. Understand? It's the sponge which absorbs humidity. This helps to regulate water. If there's water in the river, it's because there is water in the forests, in the gaps in the rocks, in the decomposed forest soil. If I take off this top layer, everything will fall down and silt the rivers. The valleys will dry up. Bauxite, which is along the sides of the mountains, it doesn't dissolve in water. It holds the organic layer above itself. So that the organic matter doesn't pass through to the water. It acts as an impermeable layer. If you take the bauxite out, all the soil will just slide away.

-Zezino, Male Farmer, Belasario

There are 200,000 people in the county of Muriaé. They all rely on this water. So the water comes from here, so there will be no water there to flush their drains, to wash their dishes.

-Zezino, Male Farmer, Belasario

I see that [mining] is destroying everything we know. It is very sad.

-Sergio, Young Male Student (20 years old), Rosario da Limeira (grew up on farm)

People are looking at the money they are going to make but they aren't looking at actually making money in the long term, when they have to return to farming. It's such a shame that most people are just looking at the financial benefits. ... I think if we had some really good meetings to explain [to the farmers], I think that they would be less likely to give in so easily to the money.

-Juliana, Female Farmer, São Pedro

I worked as a social worker for several years. We had an election and I was re-elected. They wanted me to work in health. And this is when we decided not to go in town. We talked a lot. Because I had a nice salary. But then we bought the land and started working with milk and coffee, and we could make the same amount of money. And we're much happier. Because we're free.

-Juliana, Female Farmer, São Pedro

Yes, it's sad really. Like when the dam burst in 2006, people were so upset about it and were really emotional about the mining. But it faded and people went back to their day to day lives and don't like to think about it. It hasn't hit home that it's really going to happen here.

-Juliana, Female Farmer, São Pedro

Appendix D:

Section 1: Mining Picture, Source: Lena Connor

Image 1. Bauxite in Earth, São Sebastião da Vargem Alegre



Image 2. Mining near forested ridge, Mirai



Image 3. Abandoned house, São Sebastião da Vargem Alegre



Appendix D., (continued):

Section 1: Mining Pictures, (continued):

Image 4. Mining by Homesteads, São Sebastião da Vargem Alegre



Image 4. Tour of Mining with CBA Representatives, Mirai



Image 5. Meeting and Tour with CBA, Mirai



Appendix D., (continued):
Section 1: Mining Pictures, (continued):
Image 7. Tailings Dam, Mirai



Image 8. Washing Plant Facility, Mirai



Image 9. Meeting with CBA, Mirai



Appendix D., (continued):

Section 2: Community Mapping Pictures

Image 1. Typical Farm House, Graminha Valley



Image 2. Base Community Church, Graminha Valley



Image 3. Coffee Farmer and Son, Santa Lucia



Appendix D., (continued):

Section 2: Community Mapping Pictures

Image 4. Dairy Farmer and Daughter, Santa Lucia



Image 5. Farmer, brother from Rio, and family, Santa Catarina



Image 6. Farmer points to important natural landmark, Santa Catarina



Appendix D., (continued):

Section 2: Community Mapping Picture

Image 7. Farming couple in front of their forest patch, Santa Catarina



Image 8: Young farming family, Santa Catarina



Image 9: Farmer and father make press sugar cane, Santa Catarina



Appendix D., (continued):

Section 3: Iracambi Pictures

Image 1. Lena and Alison, Community Mapping, Santa Catarina



Image 2. Charlotte and Lena planting in the nursery, Iracambi



Image 3. Iracambi Center



**Appendix D., (continued):
Section 3: Iracambi Pictures**

Image 4. Lena and Laura touring Valdeli's coffee farm, Sao Pedro



Image 5. Lena, Yelena, Laura, and Curtis hiking, Mt. Itajuru



Image 6. Iracambi Researchers on Junior Scientist Day, Iracambi

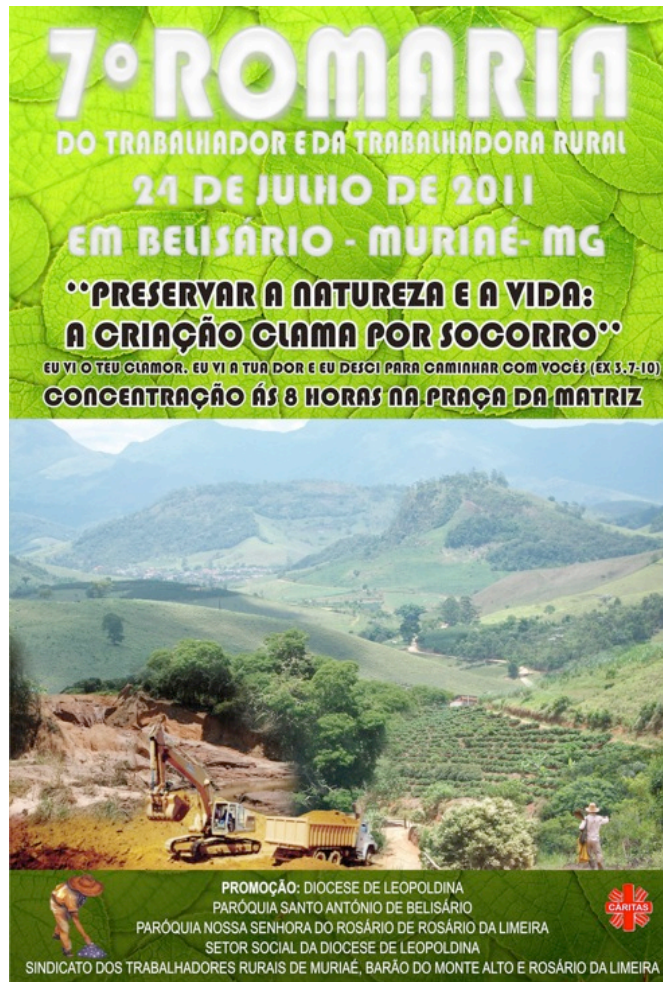


Appendix D., (continued):
Section 3: Event Pictures

Image 1. Square-dancing at Festival of São João, Pedra Alta



Image 2. Poster for Romaria, Belasario



Appendix D., (continued):

Section 3: Event Pictures

Image 3. Romaria procession through the countryside, Belasario



Image 4. Frei Gilberto at Romaria station, asking God for forgiveness for environmental sin and mining, Belasario



Image 5. Romaria family agriculture station, Belasario. The sign reads “Family Agriculture: Those who don’t practice it depend on it.”



Appendix D., (continued):
Section 3: Interview Pictures
Image 1. Carlos, Farmer, Belasario



Image 2. Zezino, farmer and CPT representative, Belasario



Image 3. Cleber, Eliab, Binka, Zezino, and Lena, Interview at Cleber's House, Belasario

