

Peasant Mining Production as a Development Strategy:

The Case of Women in Gold Mining in The Brazilian Amazon*

Jeannette Graulau

The purpose of this research is to establish the grounds for a critical social scientific analysis of mineral development based upon the case study of women in informal peasant gold mining or *garimpagem*¹ in the Brazilian Amazon. Situated at the local/regional level of analysis, this case study illustrates the main tensions of contemporary mineral development. First, the region's mineral development paths appear as a result of the application of liberal and neo-liberal economic policies of modernization and liberalization of primary export sectors and later on import substituting industrialization. Significant examples are the *Primeiro Plano de Desenvolvimento Nacional* and the *Segundo Plano de Desenvolvimento Nacional*, which created agro-mineral growth poles to alleviate the domestic economic problems triggered by the international oil shocks of 1973 and 1979. In the second place, intersecting and conflictive discourses of local, national and international mineral development drive regional production. Nationally owned mining companies, subsidiaries of multinational corporations, and formal and informal small-scale mining enterprises fight against each other for legitimate 'rights' over land management and mineral extraction. Although the recently privatized *Companhia Vale do Rio Doce* and its main subsidiary *DOCEGEO* lead regional gold production, they compete with major multinational corporations such as Canadian *Barrick Gold Corporation* and South African *Anglo Gold*. Third, historically dispossessed female peasantry of North, Centre, South Eastern Amazon and North East Brazil, compete against national and multinational mining firms in the extraction of minerals, mainly gold and semi-precious stones. These three factors shape particular mining dynamics in a geographic context already affected by bifurcated development policies directed at safeguarding national sovereignty and securing federal control over the natural resources. From the problematic entwine of the operations of corporatist mining capital and peasant small-scale mining, oppositional forms of organization of production surface embodied in women's labour and management of forest resources. The locally focused oppositional forms of mineral production, particularly the forms of women's labour and peasant technologies associated with mineral extraction, make the examination of this case study an imperative task for contemporary development studies.

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While the main task of the research is to define a critical contextual bottom up approach to mineral development, able to contest the development economics idea of 'the' mineral-production 'problem' of the developing world, it is far from being complete with the culmination of this project. Multiple questions continue to arise at every point, which open more challenging arenas of inquiry at theoretical, methodological and political levels: What kind of interaction labour/nature is encouraged by peasants' appropriation of resources in mining? What are the 'natural' limits or conditions to female labour in mining? What are the 'natural' limits to development of peasant technologies? How does peasants' knowledge on minerals transform the history of the geology and geography of the Brazilian Amazon? What are the resources needed to enhance peasants' knowledge on mineral resources? What are the implications of policies that encourage peasant production in a context of rapid industrialization and urbanization and accelerated technological transformation of rural extractive production? Between the lines of these questions, however, the original affirmation stands: a bottom up approach is the required starting point for the study of mineral development. It is an analytical step that calls the attention to the need for active fieldwork for gathering concrete empirical evidence for understanding the wealth gaps between developed, developing and underdeveloped mineral economies. It highlights potential avenues for exploring mineral production strategies capable of incorporating the work of the primary producers, peasant miners, and enhancing their livelihoods. More importantly, it encourages a face-to-face dialogue between the development scholar and his/her object of study that ultimately intends to define praxis for societal transformation.

This essay presents the preliminary conclusions of my research on women in garimpagem in the Brazilian Amazon, in an attempt to offer initial grounds for the exploration of the questions and issues exposed in the previous paragraphs. Specifically it seeks to: a) establish the relationship between the local, regional, national and international factors that push women towards the mining frontier and encourage the development of garimpagem; b) discuss the impact of women's labour and technological innovations for garimpagem as oppositional forms of appropriation of nature and their potential contribution to sustainable mineral extraction; c) explore policy avenues and lines of inquiry that derive from this case study and apply to other developing countries. The ultimate purpose of the essay is to challenge the traditional thinking on mineral development and advance in the process of building new understandings of the economic, social and political dimensions of mineral economies.

Peasant Technologies and Women's Labour in Gold Mining: Alternative Strategies for Sustainable Mineral Extraction

Approaches (or lack thereof) to the study of mineral development are firmly grounded on the research tradition of development economics. Although highly diverse and rich currents of thought are encompassed by this tradition, it is dominated by a strong orientation against mineral extraction and production. The formation and evolution of this anti-mining research and policy bias is related to the emergence of the critical school of structuralism in the mid-

twentieth century, and its rationalization of alternative paths of economic growth for Latin America.

In the early 1940s, Latin American economies, based on the primary-export model of development, experienced severe structural problems. The international crisis that originated with the Great Depression and intensified with the Second World War triggered stagnation of the economies of the region, increased dependency on foreign markets, and intensified disparities between centre and peripheral economies. An influential group of economists and social scientists identified the crisis with an outward-oriented development model (R. De Oliveira-Campos 1967; T. Dos Santos 1969; C. Furtado 1970; A. Gunder-Frank 1966; R. Prebisch 1949, 1971). According to these thinkers, given deterioration of terms of trade for primary products, the economic specialization of the periphery in primary commodities and of the centre in industrial commodities did not benefit peripheral economies. Evolution of agricultural and mining production inhibited the economic growth of the country. Contrary to what the conventional international trade theory established, income and technological gap between periphery and centre did not diminish, but widened. The argument identified deterioration of terms of trade as a long-term trend that needed to be reverted through rapid industrialization and technological innovations.

Later on, a strong intellectual and political movement emerged under the rubric of development economics, identified among Latin American intellectuals as *desarrollismo* (developmentalism). It emphasized the promotion of industrialization through import substitution and the provision of necessary protection to incipient industries. The scholarship of Argentinean economist Raúl Prebisch, in particular his work as Executive Secretary of the United Nations Economic Commission for Latin America (ECLA) set the pillars for *desarrollismo* (RIS 1987).² In its theoretical and policy efforts to change the historical pattern of development based on comparative advantages, this movement rapidly disguised mineral production as a path for achieving economic growth of developing countries. The study of the deterioration of terms of trade experienced by some of the most important primary exports during the latter nineteenth and early twentieth century led a strong reaction against all primary commodities. Albeit the historical data analysed by scholars contemporary to Prebisch showed that primary commodities of mineral origins had a highly elastic demand, the formulas for economic growth automatically disguised mineral economies as detrimental for development of peripheral countries (see, for example, B. Higgins 1959). The body of research that dealt with mining applied the instabilities reflected by some agricultural export products of many peripheral countries to all mineral export products. Hence, the study of mineral production limited itself to the reiteration of the conditions present for many agricultural export products, namely, price fluctuations, income inelasticities of supply and demand, subordination to the cycles of demand of developed countries, slow expansion of demand, and dependency of peripheral countries over primary exports (J. Matos-Mar, comp. 1968, 1969).

The critique of mineral production at the national level was limited to underline the 'ill' coexistence of a highly productive primary export sector with a low-productivity sector for the domestic market. This was fiercely criticized as an intrinsic condition of underdevelopment, more evident for mineral econo-

mies, given the foreign character of investments in their export sectors. Due to the historical existence of sectors of labour-intensive production, mineral economies were immediately linked to dualistic social structures. As such, they were identified with backwardness, inadequate growth, low productivity, lack of technical skills, lack of entrepreneurship, enclave-type of development, social inefficiency, and more recently, mismanagement of subsoil and forest resources and environmental degradation (A. N. Agarwala and S.P. Singh, eds. 1958; J. Banaji 1972; P. Baran 1957; E. Dore 2000; M. Farber and R. Brown 1980; R.P. Guimarães 1992, 1989; A. Warhurst ed., 1999).

The normative commitment of development theories to industrialization justified the absence of rigorous research on small-scale extractive production at national and regional levels of analysis. Earlier development theories, in particular Prebisch's exposition, identified a decline in the relative size of rural sectors (mainly agriculture and mining) as inherent to the process of industrial growth of Latin America. Ignited by increasing modernization, economic growth centred in expansion of urban productive capacities particularly manufactures over agriculture and mining production (R. Prebisch 1941). Absorption of labour was a unidirectional process: given increasing industrialization, labour would be absorbed into modern urban sectors, to generate labour market unification (A. Lewis 1954). Under the assumptions of unequal international relations and technological development for national peripheral economies, only reduction of production resources defined labour absorption back to rural areas. Then, the inquiry over small-scale extractive production centred necessarily in the analysis of one single variable, namely labour absorption, which translated into a preoccupation with declining production of the export and modern sectors, rather than productivity of small-scale extractive sectors. With the recent expansion of informal economies and growing number of workers in informal sectors, this discussion gained considerable attention among students of Latin American development. New schools of thought promptly emerged dedicated to the study of informal labour markets (see, for example, C.A. Rakowski ed., 1994; A. Portes et al., 1989; V. Tokman 1982). These, however, did not overcome the normative bias against small-scale extractive production; while bringing new methodological frameworks to the study of informal production, they have hold on to the idea that workers in this sector 'perform activities of easy entry, low capital and few skills [and] lack a clear division of labour or of ownership of the means of production' (O. Sunkel 1993: 133).

Drawing upon this rationalization, contemporary social science debates on developing countries have reproduced a strong normative and policy position against mineral production. Scholars interested in the study of centre and periphery relationships have argued that severe fluctuations in prices are inherent to mineral markets; hence, promotion of industrial mineral production is detrimental to economic growth of developing countries, regardless of their abundant mineral wealth or production capabilities (see, for example R. Auty 1993). According to this thesis, developing countries were being inefficient in articulating corporatist mineral projects, guaranteeing political and social stability for mineral investments, and managing their natural resources. Less-advanced countries that pursued rapid industrialization of their economies in the areas of capital, durable and non-durable consumer goods, have done

much better than countries with strong economies of mineral products. The normative argument has further emphasized that First World countries should meet the mineral demand of developing countries.

Other scholars favour what they see as the lesser of two evils: corporatist mineral development over small-scale mineral production. According to them, the experience of countries with big corporate projects shows that, besides being a source of private foreign capital and multinational financing, mineral investments enhance socio-economic national development (G.A. Davis 1995). For others, mineral investments improve the livelihood of peoples inhabiting mining regions mainly through the construction of infrastructure. By building roads and bridges, companies connect previously isolated populations with other regions of the country in question and in this way facilitate for these populations access to nearby urban centres (M.A. Maia, personal communication, 1999). International financial institutions such as the World Bank openly support this view (R. Ackerman 1998; World Bank 1994). Also, many researchers base their support on the positive impacts of environmental programs implemented recently by mineral industries, such as reforestation programs and training of local scientists in management of local flora and fauna (C. Lindhout 1990; for an example in Brazil, see CVRD 1999: *Environmental Program 1994-1999, SGQA, and Forestry*; 1987; 1985).

Few scholars, however, look critically at the political and economic dynamics of mineral extraction of peasant mining. Those who support it, see it as a battlefield against the expansion of corporatist capital to mineral-rich regions of developing countries, in particular rainforests (F. Figueiredo 1984). Others see it as a social force pivotal for the colonization and urbanization of mining frontiers, such as the Brazilian Amazon (R. Dall'Agnol 1995; A. Gómes 1984). Most researchers blame it for environmental damaging, including invasion of private lands, Indian lands, and mercury pollution, and for its supposedly violent pattern of settlement and management of mineral resources (J.F. Fonseca 1992; P.J. Lechler et al. 2000; D. Pasca 1994, C. Romano 1992).

The theoretical outlook exposed here, however, has many deep fissures when contrasted with current regional trends of the political economy of gold mining in the Brazilian Amazon. In this case, garimpagem expands due to the interplay of global, national and regional processes and develops into a solid political economy of small-scale mining with a strong participation of women and very efficient technologies for mineral extraction. These aspects suggest innovative ways for enhancing mineral extraction on a sustainable basis, to open avenues for cooperation with mineral industries, and bring to light potential solutions to some of the most pressing problems of mineral development in Brazil and other developing countries.

Sustainable Mineral Extraction: A Starting Point for a New Conceptual and Theoretical Approach to Peasant Mining

The notion of sustainable mineral extraction in this essay speaks less of ways of managing natural resources of the subsoil and directly calls the attention to an oppositional political economy of appropriation of nature. Drawing upon the theoretical debates on production and nature from critical neo-Marxist cur-

rents of thought represented mainly in the works of Ted Benton (1989, 1991, 1992), Noel Castree (2000) and David Harvey (1996), sustainability means a radical oppositional form of interaction between human beings and nature that, based upon the recognition of limits to human control of the resource base, strives for the transformation of mineral production and consumption patterns at all levels. Starting at the local level, it promotes concrete practices of specific spatial contexts that oppose the dominant capitalist notion of nature as subjected to the unlimited transformative capacity of human labour. By recognizing nature as the main productive agent in extractive economies, human labour has to redefine a new interaction with it based upon the recognition of liabilities, constraints and conditionalities of the productive processes of nature. This necessarily implies a break up of the dichotomy human beings/nature, given that nature assumes a dynamic political economy on its own. The organization (and disorganization) of production of nature is what imposes conditions on human labour and not vice versa. As such, formations of gold are not the end-product of historical geological processes over the long run, but are part of a complex, active productive dynamic whose final products are not necessarily defined by the appearance of the mineral.

The recognition of human labour as a set of forces intervening in active productive processes of nature is fundamental for defining horizons for human production, in particular for resource use and consumption. In the case of mining, human labour would be limited to appropriate resources and intervene with the productive processes of nature that have reached a mature stage. Resources that have reached a mature stage refer to those whose extraction and appropriation imply the least conflictive confrontation between the political and economic organization of a particular human settlement and that of nature. Along these lines, garimpo extraction in the Brazilian Amazon region of southern Pará, represents a form of appropriation less conflictive, less damaging and less violent to the political and economic organization of nature's production.

While this idea of sustainability might well share concerns of the scientific community over exhaustion of non-renewable resources, this is not the central point of the argument. Dominant scientific discussions on scarcity, carrying capacity, and fragility of ecosystems, far from informing us about the political and economic relationships in which resources emerge, profess variations of the view of nature as a passive actor along neo-Malthusian and neo-Darwinist influences. The argument for sustainability of mineral extraction neither shares the assumption of a harmonious local niche for the interaction human beings/nature that pervades much of the literature of the nature-nurture debate (particularly in the ecofeminist currents) (see, for example, M. Mies and V. Shiva 1993; V. Shiva 1989). By presupposing a devaluation of nature similar to a devaluation of women's work in a patriarchal society, the latter vision blatantly ignores violent forms of appropriation and transformation of nature that are ignited by groups of women in context-specific spheres of production (i.e., female organized prostitution networks).

Most of the arguments against small-scale informal mining, intentionally or not, share the dominant notion of nature as a passive social actor/producer. By condemning garimpagem for its disastrous environmental pollution, they focus on the transformative intention of this activity. This work does not deny this

negative aspect of small-scale mining. Indeed, it is a crucial issue that has to be addressed in the shortest time frame possible. However, by focusing only on the study of the transformative intentions of garimpo labour, i.e., the separation of quartz rocks from gold, from where mercury pollution derives, such a discussion completely neglects the study of the intention of appropriation of nature of the garimpo labour force, and its novel articulations of the relationship between human beings and the natural environment. By focusing on the transformation-of-nature aspect of peasant mining, such a perspective is unable to look at the complex dynamics of labour and production that operate in the appropriation-of-nature aspect of this activity, where women play a central role. Women's predominance in the activities of manual work over secondary deposits, where the manifest intention is that of appropriation of nature, as opposed to male miners who dominate the realm of mechanized mining, and women's practices of appropriation of other forest resources for the sustenance of their households, put women's labour at the centre of the efforts to build a critical oppositional political economy of peasant mining.

The Political Economy of Garimpagem in the Brazilian Amazon: Women, Peasant Technologies and Extraction of Gold

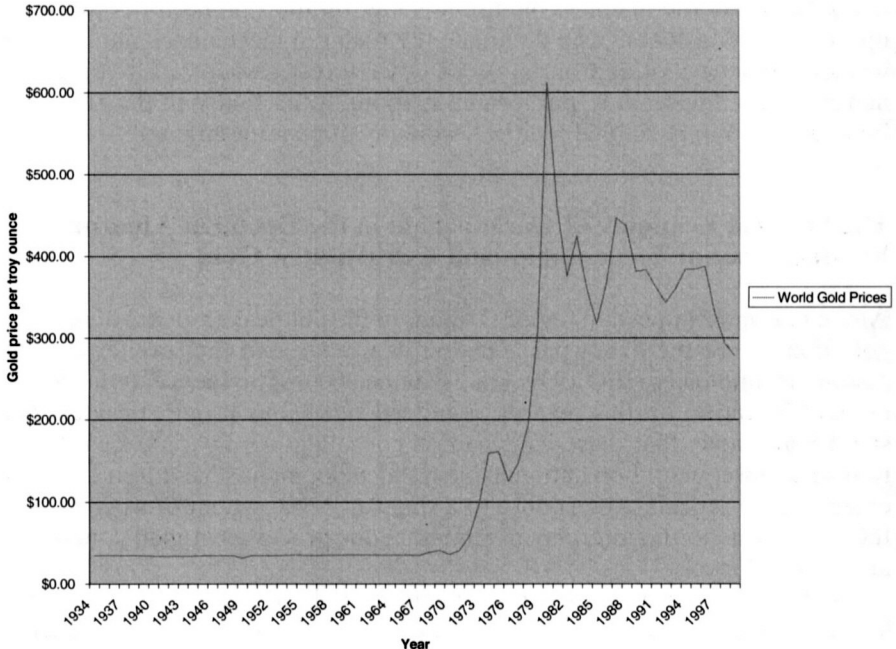
Among the most important regional trends of the political economy of peasant gold mining are the direct participation of women and the proliferation of peasant technologies (ILO 1999; I.A. Nyambe 2000). The silence of the development literature on this regards, is indeed suspicious if one considers the significant impact that these have had on consolidating a garimpagem tradition, and subsequently, on national mineral development. These trends do not emerge as an articulated response to a singular development process; rather, they occur due to the interplay of simultaneous processes at global, national and regional levels.

The historically high prices and demand for gold in the international markets have pushed women towards the Amazon mining frontier, and impacted the technological development of garimpagem. While the development economics literature has covered extensively the characteristics of international mineral price and demand (L.M. Gómes 1985; M.A.C. Maron and A.R.B. da Silva 1984; A.D. Mathis et al. 1997; A.C.L. Pereira 1992; R. Rolfe 1983), it has nonetheless overlooked the political economy processes they propel at various levels of analysis. In the last three decades, these factors have stimulated not only a tremendous expansion and spectacular growth of garimpo production in the Brazilian Amazon, but the direct intervention of women and rapid technological development of peasant mining.

Gold prices in the international markets have increased significantly since the second half of the 1960s from their historical fixed value of US\$ 35.00/troy ounce.³ The London Metal Exchange Market has registered high prices since then, being the most dramatic one the peak price of US \$850/troy ounce for the early part of the year 1980. Despite their subsequent fluctuations and declining trend after the later part of the 1980s, gold prices have remained at historically high levels (see Figure 1). High gold prices have correlated to high levels of global demand for gold. According to the data available for the period 1975-

1985, global demands have exceeded by 40 per cent the amount of gold supplied by mining companies (A.D. Mathis et al. 1997). For the period 1990-1999, the World Gold Council has estimated that total global demand exceeded by 100,000 metric tones the amount of gold in existing industrial mines (WGC 2000). It has estimated a continuing increasing trend in the international price and demand for gold, propitiated by the economic recovery of the region of South East Asia, changes in hedging practices of international mining companies, and success of South African mining corporations in developing novel industrial uses of gold (WGC 2000: 1-13).

Figure 1: Historical World Gold Prices, per troy ounce, 1934-1999.*



* Data compiled from the London Metal Exchange Internet Archive and personal archives of geologist Alberto Rogério B. Da Silva.

As many researchers document, high prices and levels of demand encourage migration of peasants towards the mining frontier (see J. Browder and B. Godfrey 1997; D. Cleary 1993, 1991; R. Dall'Agnol 1995; A.L.O. De Almeida 1992; G. Guerreiro 1992). Economic research conducted by the Brazilian federal agency Company for Research on Mineral Resources (CPRM, *Companhia de Pesquisa de Recursos Minerais*) and the National Department of Mineral Production (DNPM, *Departamento Nacional de Produção Mineral*) have established a strong relationship between the periods of intensification of peasant and small-scale mining activities in the states of Rondônia, Mato Grosso, Pará and Roraima of early 1970s, 1980-1985, and 1990, and the record periods of high gold prices of the same years (J. Gonçalo de Miranda et al. 1997).

While evidence shows that men migrated first to the mining areas of the Amazon, women have massively joined the garimpo labour force in response

to those trends. The first massive female migration is registered in the early 1980s, coinciding with the highest levels of prices. The need for generation of income to sustain their households, of which they were chiefs given earlier male migration to the mining frontier, coupled with the desire to venture into what was at the time a promising enterprise have explained female migration to garimpos (A. Lopes et al. 1997; R.M. Rodrigues 1994, 1993). That women contributed to the spectacular growth registered subsequently by garimpo production is strongly suggested by the fact that women were incorporated rapidly into gold-mining activities, and in many garimpos have dominated since then the manual mining techniques of *batear* and *requiar* (to wash gold in a conical pan and to collect gold-bearing gravel, respectively). My fieldwork in the mining communities of Serra Pelada, La Cutia, La Cruz and Miranda of southern Pará has revealed that an average 64 per cent of women inhabiting the garimpos worked as manual miners when they initially migrated to the garimpos, at a time when, as many expressed, 'gold used to pay'.

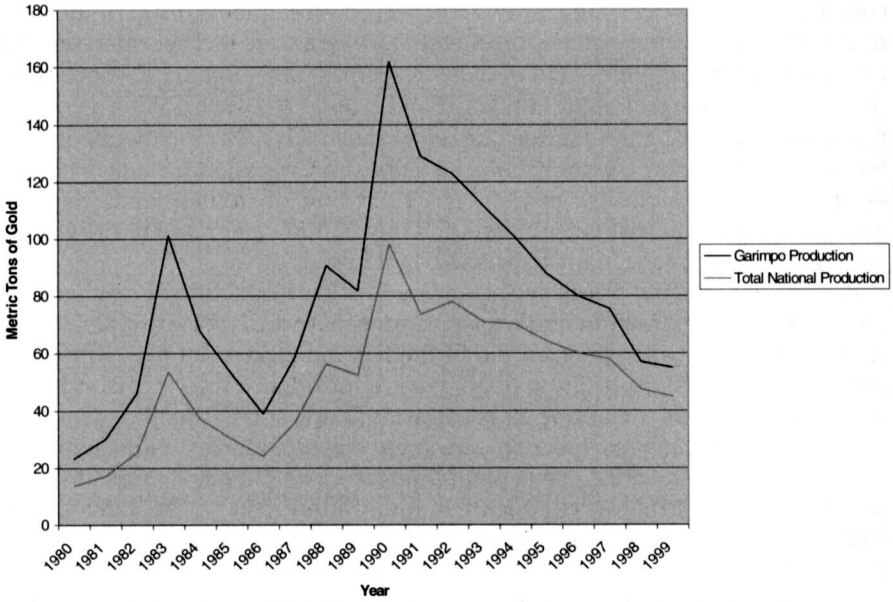
Periods of high gold prices have coincided with introduction of mechanized tools mainly for extraction and transportation purposes. For example, in the early 1980s, Caterpillar tractors, diesel-fuelled and electric motors, as well as airplanes for the transportation of gold, were introduced into the most lucrative garimpos by the emerging class of garimpo investors – small-scale entrepreneurs, cattle ranchers, local businessmen, state legislators, municipal officers, and even owners of cocaine plantations from neighbouring Ecuador and Colombia (D. J. Ribeiro, personal communication, 2000; R.N. Dos Santos 1998). Mechanized rafts for extraction of under-water deposits were introduced into one of the richest garimpos, that of Tapajós in the state of Pará. By mid-1980s, they already dominated river mining in this region. Most garimpos by that time were transformed from relatively disarticulated centres of production into a highly integrated economy, connecting local, regional and national sellers and buyers of machines with new investors, local businessmen, and garimpeiro/as.

These factors have undoubtedly contributed to garimpagem success. This is confirmed by the statistics on informal gold production compiled by the DNPM. The federal Brazilian government has estimated garimpo production at 7.5 times that of mining companies for the 1980s decade (DNPM 1990). As Figure 2 illustrates, garimpo production reached impressive levels, surpassing formal production at least until 1993. Some researchers have noted, however, that after mid-1990s, industrial and peasant mining productions reached equilibrium. Mathis et al. (1997) have observed that such equilibrium came later on in the Brazilian Amazon, where most garimpos are located.

At the national level, the formal discovery of extensive gold deposits that could be mined with very rudimentary technology has encouraged women's manual mining labour in garimpos (M. Lima 1996; M. Ximenes 1992). Unable to contain their operations within a relatively small sphere of influence, government and private geological expeditions have awakened garimpeiro/as' interests in potential mining areas of the Brazilian Amazon. The land clearing, the transportation of geological equipment, the aerial surveys, and even the temporary installation of geologists in nearby towns have awakened garimpeiros' interest in exploring for themselves the areas surrounding the installations of geological workstations. In most cases, male garimpeiros have taken the

primary role in the geological exploration of land and migrate to the new potential sites for mineral extraction, while women have stayed in the garimpos manually working the secondary deposits.

Figure 2: Small-Scale Mining and Industrial Production, Metric Tons of Gold, 1980-1999.*



* Data compiled from DNPM/MME statistics and personal archives of geologist Alberto Rogério B. Da Silva.

Historically, federal programs for the integration of the Amazon into the national economy also promoted the direct incorporation of women into garimpagem (SEE 1992). Mainly as a response to the international oil crisis, but also to serve geopolitical military purposes, the federal government created in mid-1970s agro-mineral growth poles in the Amazon region that have attracted since then massive influxes of people towards the mining frontier (W.A. Chaffee 1998). The plan originating this tendency, and arguably the most encompassing one so far, is the Second National Development Plan (PDN-II, *Segundo Plano de Desenvolvimento Nacional*). Framed in the economic model of import substitution, it concentrates on expanding infrastructure for the exploitation of the tropical frontier to alleviate the problems caused by the first oil crisis of 1973. The government attacked the deep recession, fiscal crisis, inflation and unemployment affecting many sectors of metropolitan economies with a program for expanding primary productive capacity of the country for the export market. Resources of comparative advantage mainly in the mineral sector were the main focus of this initial plan, although it included timber, beef, crops, and private colonization schemes in selected areas of the Amazon region (M. Pomper Mayer 1982). An almost exclusive emphasis on mineral development occurred later on by the end of the decade with the Third National Development Plan, which coincided with the second oil shock of 1979 (L.C.

Bresser 1997). The federal government established a comprehensive mineral development plan for the state of Pará, with the financial assistance of international institutions and banks, such as the World Bank, Japanese Exim Bank, Japanese Commercial Bank Syndication, the US Exim Bank and the European Coal and Steel Community. At the time, the mining sector was responsible for more than 10 per cent of Brazil's exports, or 1.3 per cent of GNP. Besides the potential for growth of the corporatist mineral sector, the government saw in peasant and small-scale mining a short-term mechanism to alleviate the economic crisis and generate the needed foreign exchange (A.R. Mathis et al. 1997; L.F. Pinto 2000b). As a case in point, César Cals, serving as director of the Ministry of Mines and Energy in the first years of the eighties decade, openly encouraged a policy of expansion of garimpagem in the Brazilian Amazon. The strategy officially promoted population movements to the gold-rich areas of the Brazilian Amazon, particularly to the gold garimpos of southern Pará (J.A. Pinto 1993).⁴ Male peasants mainly of the Northeast escaped the ongoing urban crisis by migrating towards the mining regions, leaving their families behind, but attracting an influx of women from other regions who sought incorporation in garimpagem through the flourishing sexual service sector, preparation of food, and manual mining.

During the early years of these programs, women of the central Amazon region, given the critical situation of the urban economies, attempted initially at sustaining their households by entering the service economies of the urban Amazon towns. The immediate result was the further impoverishment of women's livelihoods. Nonetheless, with the intensification of male migration to gold-mining regions and the subsequent boom in gold production, other economic activities emerged in the mining frontier: the building of houses, of roads to connect garimpos with nearby towns, transportation and production of food on a permanent basis. Women who had taken on temporarily the roles of chiefs of households after men migrated to the garimpos saw a worsening of their living and working conditions in the regional urban informal economies, and migrated then to the gold mining settlements of the Amazon (R. Rodrigues 1994).

Mineral industries' attempts at diversifying production have also pushed women towards the Amazon garimpos. Mineral industries have invested in 'integrated' forms of development for mineral regions, such as agro-business and cattle ranching. The greater Carajás Program, encompassing the geographical area of my fieldwork, is based not only on industrial production of iron-ore, copper, gold, manganese, nickel, chrome, cassiterite, aluminum and tungsten, but comprises a US\$ 11 billion investment plan for cattle ranching, large-scale rice cultivation, sugar, manioc and eucalyptus plantations, and ethanol distilleries (P. Fortes 1994). As with infrastructure development, peasant families are targeted as labour force for agro-industries. Experience has shown that women employed in these projects have complemented their incomes with seasonal mining (De Britto, Former Municipal Chief of Parauapebas, personal communication, 1999). As Browder and Godfrey (1997) have documented, large-scale agriculture and cattle ranching operations of these programs indeed dominate vast amounts of land, but peasant and small-scale gold mining activities hold control over vast areas surrounding the projects.

The creation of agro-mineral development programs for the Amazon region

has encouraged a boom in small-scale technologies for mineral extraction. By encouraging migration to mineral-rich lands, they have propagated peasant and small-scale mining techniques throughout the region (M. MacMillan 1995). With this propagation, many rich combinations of garimpo practices have arisen, mixing garimpo cultures of different regions of the Amazon. For example, garimpeiro/as from the Northeast, coming to central Amazon with a long established tradition on ornamental stone mining, have paid attention in the gold mining regions to special geological formations of ornamental stones. Overlooked by other garimpeiro/as with no experience in stone mining, peasants from the Northeast have worked consistently upon the possibility of extracting gold as primary product, and stones as a complementary product in the same mines. They have developed stone-mining ventures parallel to gold mining work, introducing novel techniques of extraction and processing in gold garimpos.

At the regional level, some factors have contributed to invigorate women's labour and peasants' technological innovations. The demographic explosion of mining settlements, giving way to formation of new towns and municipalities in the mining frontier, has certainly been the most important (De Britto, personal communication, 2000). Particularly for women, the urban or peri-urban development of peasant mining settlements has been a strong incentive to migrate to the Amazon frontier, as the majority of women expressed in interviews during my fieldwork. The development of mining towns have put women into contact with a richer realm of economic activities from manual mining to service sectors, giving access to many women for the first time to an income (salary) paid in hard currency.

With the development of towns, peasants have had easier access to mining technologies. With stable garimpo settlements, local businessmen have invested in establishing stores for garimpeiro/as (called *casas do garimpeiros*) in nearby areas, where garimpeiro/as can buy almost anything they need for mining operations. They have also opened lines of credits for garimpeiro/as. This phenomenon has transformed to some extent the traditional garimpo-mining venture. While in the early 1970s garimpeiro/as had to migrate towards the mining frontier already equipped either with their own tools, today a whole network has evolved which brings to the garimpo area the tools needed for garimpagem.

Other regional factors have impacted upon women's insertion into garimpagem and influenced peasants' access to mining technologies. The geography of the mining frontier of the Brazilian Amazon, generally characterized by a lack of paved roads far from urban towns and lack of regular transportation services, to some extent has made it difficult for women to move in and out of garimpos. Generally, men have endured the periods of declining productivity and stagnation of mining activities by moving in and out of garimpos and joining the seasonal labour force for agriculture and cattle ranching of nearby regions. Women have had to stay in the garimpos, and while in charge of households, sustain these with the scarce resources available to them. On the other hand, the geography of the mining frontier has made it easier for peasants to bring into mining ventures tools that, while efficient, have high environmental costs. The use of mercury for the recuperation of gold, a practice spread throughout the whole Amazon region, has put the inhabitants of garimpo com-

munities in a high socio-environmental risk (SEE 1992). Government agencies have not been able to contain the expansion of the illegal mercury market or police it on a regular basis.

The propagation of many stories of *bamburro* (enrichment in garimpagem) has also encouraged women to sustain households while their husbands have ventured into garimpagem. The experience of some garimpeiro/as who found rich gold deposits has sustained the dreams of peasants of *bamburrar* to improve their economic livelihoods. Following such a dream has meant a continuous investment in mining technologies, even in garimpos facing declining productivity, such as that of Serra Pelada (where I contacted a garimpeiro from the state of Paraná who had recently invested R\$ 35.000,00, or the approximate equivalent to US\$ 19,444.00).

More recently, many municipal governments have supported the lawful recognition of garimpagem as a small-scale mining enterprise. While this is still debated in federal political circles, municipal governments have expressed the need to insert garimpagem in local and regional development plans to ensure a more orderly pattern of development for the mining communities. While it is too early to discern the effects of this upon women and the technological sector of garimpagem, it has been evident so far that for these proposals women are not active workers in the economy of garimpagem. Proponents of this idea have excluded women from the incipient political bargaining around garimpagem, as reflected in commentaries of the former director of the Ministry of Mines and Energy, Augusto B. dos Santos (in L.F. Pinto 2000a). With respect to the potential impact of this measure upon peasants' mining technologies, many geologists and economists have expressed the need to introduce cleaner technologies in garimpos and enforce the legal prohibition on the use of mercury (R.A. Santha 2000).

Garimpagem and National Mineral Production

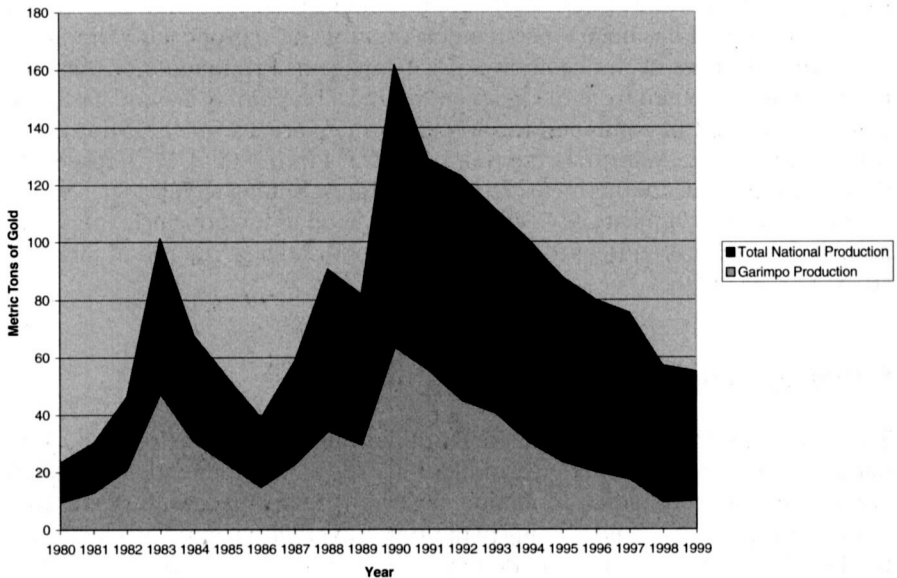
The importance of garimpagem for national mineral production is beyond question. Data collected by government agencies and independent research point to high levels of gold production in garimpagem. Figure 2 illustrates that despite the declining trend starting in the 1990s, average garimpo production in the last three decades has exceeded average industrial gold production. The graphic representation of the share of the contribution of informal mining to national gold production is equally astonishing (see Figure 3). In a relatively short period since the explosive increase in garimpagem production, an efficient allocation of labour and technological resources has occurred within garimpos that indeed impacts positively on mineral production in this sector.

Many specialists attribute success of garimpos to the nature of geological formations in the Brazilian Amazon (for a political science view, see Mathis, in A.R. Mathis et al. 1997; for a geology perspective, C. Romano 1992). This is undoubtedly an important condition influencing gold production. But to think that garimpagem success is impacted only by a single variable is to overlook the broadest socio-economic aspects of garimpo production. The 'geological argument' assumes that garimpagem exists in the abstract, isolated from the intricate labour relationships and technological processes that keep this kind of

production alive. Since it does not see garimpagem as another economy in the Brazilian Amazon, this perspective is unable to include the knowledge, abilities and technical skills of garimpo populations in their proposals for sustainable mineral development.

My research reveals, on the contrary, that garimpagem is embedded in political and economic relationships that have given way to a strong and stable economy of garimpagem. As such, garimpo production is not only characterized by its record of tons of gold produced, but by the labour dynamics it encompasses, its technological innovations, its rich knowledge of mineral resources, the cultural values it carries, and the ideological visions it sustains. The two main aspects pivotal in maintaining garimpagem are women's participation and peasants' technological innovations. A closer look at these two aspects shows new avenues for advancing policies of sustainable mineral extraction in the Brazilian Amazon.

Figure 3: Share of the Contribution of Garimpo Production to Total National Production, Metric Tons of Gold, 1980-1999.*



* Data compiled from DNP/MME statistics and personal archives of geologist Alberto Rogério B. Da Silva.

Women's Labour in the Economy of Garimpagem: Female Contribution to Sustainable Mineral Extraction

Women's work in gold mining has been intrinsic to the evolution and growth of the economy of garimpagem. Contrary to the development thinking that assumes mineral production as a male-dominated activity, women have been pivotal in sustaining garimpo production. The roles women play have kept the informal gold-mining economy bustling. This trend of the political economy of gold mining in the Brazilian Amazon, while revealing female labour forms of

extraction and management of resources of the rainforest, has highlighted avenues for strengthening women's participation in sustainable mineral extraction.

First, as observed in the long-established gold garimpo of Serra Pelada, women have joined the labour force directly employed in mining production. Their insertion into manual mining activities has increased the amount of labour force directly employed in mineral extraction in as much as it has enhanced mining production. Although the data collected by governmental agencies disagree as to the number of women directly employed in mining activities, some researchers have estimated that 20 per cent of the labour force corresponds to female population (R.M. Rodrigues 1994). My fieldwork in the mining communities of southern Pará has revealed that a total average of 37 per cent of women have worked (or still work) as miners, mostly employed in manual mining, with few exceptions. In the same communities, around 6 per cent of women have administrated (or still do) a barranco or mineshaft and worked as buyers of gold in the gold-buying houses of the garimpo. In the garimpo Miranda, where ornamental stone production dominates over gold mining, the number of women engaged directly in mining production is elevated to 74 per cent (out of 113 women interviewed in the community). In the gold garimpos, women have dominated the manual technique of *requear*, or to collect and refine the gold-bearing gravel. Once male miners work on the prospecting and extraction of the gold-bearing gravel from a mineshaft, part of the *curimã* (name given to the soil containing gold-bearing gravel) is claimed by women for further processing in a *bateia* (conical pan for washing of gold). Women refer it as the *fofoca dentro do garimpo* ('gold effervescence' within the garimpo). The decision to distribute part of the gold-bearing gravel among the women who come close to the *fofoca* is influenced by the relationship between women and the male miners working the deposit (i.e., husbands, relatives, friends, etc.) or, as many women said, by the ability of women to fight over the soil.

While women's work has raised garimpo production, it has not been accounted separately from male miners' productivity. Local associations in charge of garimpagem accounts, where they exist, like in Serra Pelada, have not been attentive to such matters. For my research, evidence of women's economic contribution to this economy has been collected from structured surveys conducted to women miners, women's life stories, unstructured conversations with male miners, and many hours of conversation with different members of the mining communities. That women are used to walking long distances (in some instances, longer than men, due to the demands of household work), that they know better how to economize resources (since they are to a great extent in charge of the economy of the household), that they, while working in the fofoca, take their children with them for collecting gravel, and that they easily establish a network of production involving all members of the household have all been repeatedly mentioned as the conditions explaining the importance of women's work for garimpagem.

Second, women support economically and otherwise their husbands' venture into garimpagem. As mentioned before, they take upon themselves the task of supporting households in the absence of men. My fieldwork reveals that the majority of women who take on the roles of chiefs of households on a

temporary basis have no guarantee of return of their husbands or of regular remittances from their work. Interestingly, and despite the lack of quantitative evidence to track productivity of women chief of households outside the garimpos, almost all male miners contacted in Serra Pelada openly recognized their wives' efforts in raising incomes with which to support their children in their absence and even to help them to migrate to the mining frontier. While this condition imposes a heavy socio-economic burden upon women, they manage to survive by being very creative and thoughtful with the scarce resources available to them.

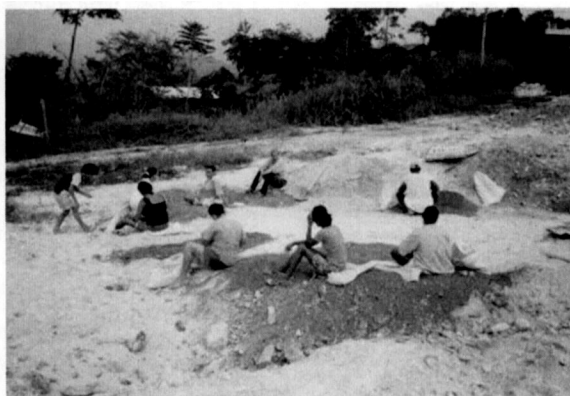
Working with a limited array of social and natural resources, women have developed innovative ways of managing those to cope with scarcity. In this sense, undertaking the roles of chiefs of households has pressed women to expand the realm of economic activities that are pivotal for the sustenance of mining communities in the region of southern Pará. Many women of Serra Pelada, for example, have started informal small-scale enterprises of charcoal making, very important for the community since charcoal is a highly valuable and needed solid fuel. By themselves, they have developed a process of gathering, cutting and burning of wood supplied from nearby plantations of mango trees. Women engaged in this activity have gained a stable source of income that gives them enough money to support their children and even send money to their husbands temporarily working in nearby cattle ranches. More importantly, they have supplied the community with one of its most needed commodities. A small number of women have also initiated a rice-making enterprise, simply based on the grinding of rice plants either for own consumption or for friends and relatives. Women have also developed other products very much needed in the garimpos, such as remedies from forest roots for the most common diseases affecting people inhabiting mining communities (i.e., flu, malaria, and dengue fever).

Third, women dominate the service economy of mining communities. Interestingly, this seems an established fact among women who live in the garimpos, since the majority of them in unstructured group conversations expressed that they had always been harder workers as compared to men. Observing the activities people do in the garimpos for several months certainly confirms that women dominate service sectors, in particular the activities of food preparation and selling, selling of clothing and household products, selling of personal care products, and even bar and restaurant owners. While difficult to measure quantitatively, the extent to which garimpo production depends on this set of activities is indeed significant. For example, for many male miners in the garimpos of Serra Pelada and La Cutia, women were fundamental in the opening of the garimpo, since they were the cooks of garimpeiros. For many younger women and men contacted in the garimpos of Serra Pelada and Miranda, the decision to migrate was heavily influenced by the existence of a stable service economy in these garimpos. For some women, their insertion into the most prosperous sectors of the service economy is the first step to help other family members or friends to find a stable job in the mining communities. In my own fieldwork, a small but significant number of independent women entrepreneurs (14 per cent out a total number of 57) indicated that thanks to their successful work in the service economy, they could bring to the communities

the people temporarily left behind (i.e., their mothers, sisters, cousins and other relatives, and friends).

Fourth, women who migrate to mining regions following husbands or other family members provide a safety network that translates, as many women expressed, in *boa vida de família* (good family life) – i.e., affection, sense of family, companionship, clean house, etc. While the quantitative impacts of this provision are almost impossible to define, there are unequivocal signs of its qualitative impacts. Consider, for example, that poor infrastructural development of most garimpos makes them suitable for the easy propagation of plagues, such as yellow fever, malaria, leprosy and others. Besides that, the hardships of work in mines many times cause temporary lesions, and in some cases permanent disabilities to miners. Women take care of the ill and injured, and when their husbands suffer serious illness or accident, they take on the roles of household chiefs on a temporary and even permanent basis.

Fifth, women have historically encouraged labour absorption to garimpagem by facilitating the incorporation of other segments of the labour force into this economy, especially child labour. Although this tendency has been more evident in garimpos with a long-established mining tradition, like those of ornamental stones and diamonds, it has also been apparent in some gold garimpos. In fact, many women interviewed in the garimpo of Serra Pelada referred to their children as natives of Serra Pelada, or *serrapeladenses*, in whom the tradition of gold mining ought to continue.



Former gold-garimpeiras working in ornamental-stones garimpo. Photo: J. Graulau (1999).



Woman preparing to collect stones. Photo: J. Graulau (1999).

While further exploration is needed to determine the medium- and long-term impacts of women's participation into garimpagem, the data collected in my fieldwork and by other researchers unquestionably lead to the conclusion that the forms of extraction of resources and the multiple activities women do in the mining communities has enriched the economic life of garimpos (see, also A. Lopes da Silva et al. 1997; R.M. Rodrigues 1994). Women's manual work as *requedoras* and *bateadoras* has historically enhanced the productive capacity of the mineral economy. Women have not only developed valuable knowledge and skills on gold production, but, as many male miners openly recognized, they have mastered the use of *bateias*. They have developed

mining skills that have allowed them to complement their incomes with extraction of other minerals, particularly emeralds and ornamental stones. While this is determined by other socio-economic factors, certainly the experience with gold garimpagem has facilitated women's entry into a broad political and economic realm of mineral production. This is confirmed in interviews with women miners of ornamental stones. Of 113 women interviewed in garimpo Miranda, 34 per cent had previous experience with gold mining and stated that they were in better shape to move to this garimpo due to their previous experience with gold mining.⁵



Woman burning amethyst stones. Photo: J. Graulau (1999).

Technological Innovations of Garimpagem: Enhancing Peasant Technologies for Sustainable Mineral Extraction

While development theories hold garimpagem as rudimentary and technically inferior, it has rested upon highly creative and dynamic techniques for extraction of minerals. There is such a vast array of names, tools, procedures, decision-making processes and cost-benefit analyses characterizing this aspect of garimpo production, that no one has defined and compiled them all in a single paper on mineral development. However, for many geologists garimpo technologies, while revolutionizing the traditional formal method for extraction of secondary gold deposits, have threatened geological and environmental landscapes of the Amazon region (A.N. Rossette and A.M. Cassiano 2000). Among many social scientists, garimpo technologies, while contributing to development of the mining frontier, have nonetheless widened the economic gap between peasant populations of the Amazon and urban populations (R. Dall'Agno 1995). For many Brazilian government officials, garimpo technologies, though giving peasants a form of income, have endangered the State political

control of rainforest (economic) resources and its authority for defining 'correct' management of those (A. Monteiro 1993). Among these groups, a common view is shared that peasants' techniques represent high economic, political and environmental costs at the expense of current national mineral interests (even when national mineral interests are yet to be defined). As stated earlier, this view is ingrained in the intellectual and political bias of development economics against peasant extractive production, manifested at the level of research in a strong distrust of peasants' knowledge, and disregard of peasants' lifetime experiences with rainforest mineral resources.

My research and that of Dos Santos (1998), DNPM/MME (2000,1993), Mathis (et al 1997) and Mining Survey Editors (1990), reveal that garimpo technologies are a rich pool of knowledge and resources for mineral extraction, given garimpagem high production records and linkages to other regional activities. For these reasons, this is a 'strategic opportunity', as Stear refers with respect to small-scale mining in South Africa (1990), for the State and private industries to assess and enhance its contribution to sustainable mineral extraction.

The effectiveness of garimpo technologies is intimately linked to garimpeiro/as knowledge on mineral resources, in particular to the changing nature of mineral deposits. What geologists have learned through formal academic training and practice, garimpeiro/as know by living in the forest. The 'ethnogeology' of garimpagem has centred on the idea that there are two kinds of gold deposits: gold deposited in riverbanks (open-sky and underground mining) and gold formed and concentrated in superheated water and soil (magma) deep underground. This knowledge has indeed matched what geologists know about gold deposits of the Brazilian Amazon. According to the latter, gold deposits are divided in two main categories: primary and secondary. The name of primary, colluvial, or lode deposit is given to gold fixed within a rock, usually quartz. With erosion over time of quartz rocks, the gold embedded within them is washed away and deposited along watercourses. These new formations of gold are called secondary or alluvial deposits. Also known as placer deposits, these are easily found and extracted by garimpeiro/as. Various forms of secondary deposits are known among garimpeiro/as: gold grain dust (either fine or coarse), gold nuggets mixed with soil, gravel, pebbles and earth, and fragments of gold-bearing rock in which gold is not always visible. Garimpeiro/as have named the gold deposits depending on specific characteristics, namely, the colour of the gold grain dust, the colour and composition of the soil in which it is found, and the depth of the deposit. They have developed a rich lexicon to classify different deposits: *ouro vermelho* (red gold), *ouro amarelo* (yellow gold), *ouro preto* (black gold), *ouro do boi* (bull gold), *ourinho* (little gold), and *boi preto* (black bull), among others.

Garimpeiro/as confront, however, two main problems with respect to the nature of gold deposits. First, there is no clear indication of the presence of gold by the presence (or absence) of other minerals. That is, a rich quartz deposit does not necessarily lead the garimpeiro/a towards a rich gold deposit. Second, continuous changes in watercourses over time provoke changes in the characteristics of gold deposits: colluvial gold may end up deposited in watercourses, but alluvial gold can end up deep underground covered by more re-

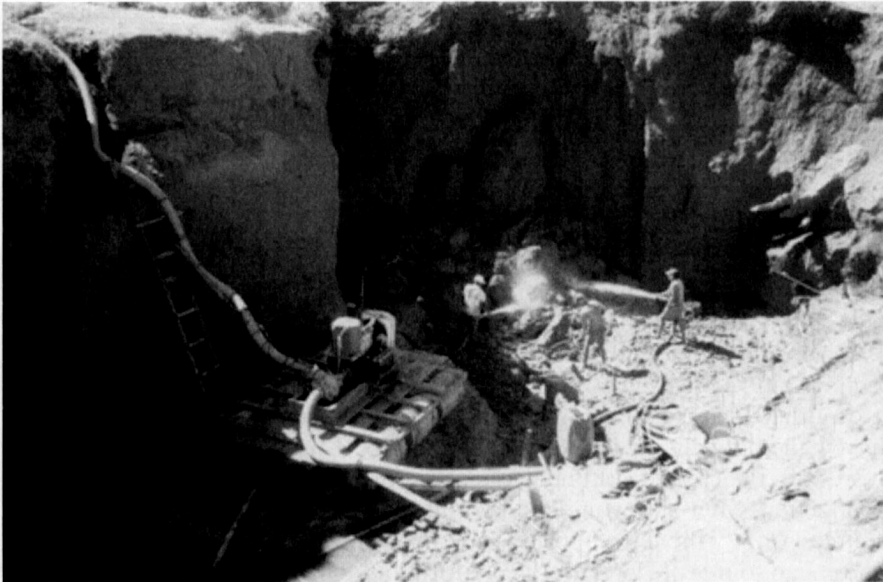
cent geological formations. Indeed, *garimpeiro/as* constantly change and adapt their technologies to overcome the geological circumstances mentioned above.

Garimpagem mostly refers to extraction of secondary deposits. Whether manual or mechanized, it consists of four phases: exploration (*exploração*), prospecting (*prospecção*), extraction (*lavra*) and processing (*beneficiamento*). The initial phase is exploration of the areas thought to have gold deposits. Done almost exclusively by men, it involves the previous definition of a deal among a private investor or speculator and the *garimpeiros*. The basic condition of the deal is that the investor pays for the supplies and equipment needed, and *garimpeiros* venture into the forest in search of gold. This deal includes a salaried agreement, which applies only if *garimpeiros* find the mineral. Investors are not always former *garimpeiros*, but include, as I was repeatedly told, lawyers, state legislators and senators, powerful cattle ranchers of nearby regions, and even cocaine producers from neighbouring countries (mainly, Ecuador and Colombia). The tools employed in this phase are metal shovels (*pá*) and picks (*picareta*); the equipment includes oil lamps, oil, matches, and basic food supplies (rice, beans, flour, coffee) for at least two months, depending on the remoteness and accessibility of the area to be explored. *Garimpeiros* migrate to the Amazon in teams of three to eight members, depending on the deal previously arranged. Their decision to explore certain areas and disregard others is indeed incomprehensible for people with no *garimpo* experience. As many expressed in unstructured interviews, they ‘just know’ which area is better for exploration, depending on the colour of the soil, its composition, colour and pureness of water, and the direction of water streams. Experience shows that once a team finds gold, the news spreads and attracts other teams to the same area. This, called by *garimpeiro/as* the formation of *fofoca*, certainly reduces the costs of exploration for other investors. With the intensification of migration and proliferation of mining throughout the Amazon, exploration is less necessary for initiating a mining venture (although it is still in practice in upper Amazon lands, near the Venezuelan and French Guyana borderlands).

Through prospecting, the *garimpeiro/a* determines the amount of gold to be found in the area explored. Prospecting refers to the analysis of the deposit of gold-bearing gravel. Many consider it the most effective phase of *garimpo* production (S.R.B. Hühn, personal communication, 2000). Prospecting in the formal mineral sector involves the location of a promising area through the analysis of samples collected on a grid pattern. Then core sampling is taken, for which drills are sunk to various depths and sections of the shaft are brought up for analysis, building a cross-sectional map of the subsoil. In *garimpagem*, prospecting starts with the opening of small mineshafts (*pranchetas*) of approximately one square meter. The *garimpeiro/a* collects the gold-bearing gravel in a *cuiá* (conical pan, smaller than the *bateia*). Based on the number of gold nuggets collected in the sample, the *garimpeiro/a* calculates the amount of gold in the entire shaft. The *garimpeiro/a* calculates the amount of time to be invested in mining operations, based on the depth in which the gold-bearing gravel is found, the composition of the shaft walls (stones, argillite, etc.), and the depth of the water table. A cost-benefit analysis is made to decide whether to pursue further mining operations, taking into account the price of gold in and outside the community, accessibility of the shaft in the river bank, infrastructural costs, and investment returns. If the intention is to open a new *garim-*

po, that is, several shafts, the analysis includes the costs not just of one steep bank, but the entire riverbank (*grota*) or the entire site (*baixão*).

The third phase is *lavra*, or mineral extraction per se. It starts with clearing the land. The relatively small size of shafts in manual mining and their well-known composition allow *garimpeiro/as* to do *lavra* while doing prospecting. *Lavra* in manual mining involves the collection of gold-bearing gravel in a *bateia*. The *garimpeiro/a* moves the *bateia* in a circular motion to wash sand and water away and retain the gold-bearing gravel. In mechanized mining, *garimpeiro/as* commonly start by burning the vegetation and transporting the remainder to a nearby area. In the most mechanized *garimpos*, the tools used include chainsaws and Caterpillar tractors. As mentioned before, access to these machines is possible through an ample net of socio-economic relationships linking local investors and *garimpeiro/as* with regional, state and even national suppliers. Once land is cleared, *lavra* involves breaking up the soil with water using a pressure pump. A diesel-fuelled motor called *bico jato* produces water pressure. Water dissolves the sand and argillite, and forms a pulp. Another pump attached to the *bico jato*, called *chupadeira*, sucks this pulp. This second pump has a rubber hose that the *garimpeiro/a* fixes inside a small plank opened near the shaft to receive the pulp. From there, the pulp goes to a machine located near the bank, for the first process to recover the gold.



Garimpeiros working with a *bico jato*. Notice the two suction pumps attached to the motor. One absorbs the pulp (water + gold-bearing gravel), removing it from the mineshaft, and the other carries it to a *caixa concentradora* (concentrating box) located outside the shaft, for the first recovery of gold. Photo: J. Graulau (2000).

The final phase, *beneficiamento*, has started when the first recovery of gold occurs. Two related processes are used for concentrating the gold: gravimetry and amalgamation. For amalgamation in manual mining, which is done by men and women alike, mercury is added to the *bateia* containing the gold-bearing

gravel. Generally, the amount of mercury is less than half a gram. The *bateia* is then moved in clockwise rotation to wash sand and water away and to concentrate the heavier metal, mercury mixed with gold, in the centre. The material is then collected and burned in a *cuia* to vaporize the mercury. Gold is then recovered and is ready for the market.

Concentration of gold in mechanized mining is more elaborate, and involves, besides amalgamation, a process called gravimetry. Once the pulp reaches the *caixa concentradora* (concentrating box), the mixture goes through a chain of boxes for the recovery of gold. The amount of pulp to be processed determines the size and length of the cages. The main tool employed is the concentrating box called *cobra fumando* (which literally translates into 'smoking snake'). Made of wood from forest trees, it has an angle of inclination of approximately forty-five degrees and an approximate length of fifty centimetres for each box. The length of the entire chain of cages is between one to two meters. To achieve an efficient recovery of gold, garimpeiro/as place wooden hurdles inside each box to serve as barriers for the flux of the pulp. Each hurdle allows for the passage of the mixture, but traps the gold nuggets. Also to facilitate recovery of gold, garimpeiro/as cover each box with woven jute to trap gold nuggets. The material collected in the hurdles and in the woven jute goes to a *bateia* for amalgamation. After the work with the *bateia* is done, garimpeiro/as squeeze the mixture in a cotton cloth. As in manual mining, they burn the mixture of gold and mercury in a *cuia*; the mercury vaporizes and gold remains, ready for the market.

Garimpo technologies have been highly effective in the extraction of secondary gold deposits, as revealed by garimpagem's historical record of production. Ample evidence collected by government agencies and private researchers has shown that at its peak, garimpagem was responsible for almost half of the total national gold production. Furthermore, many researchers have argued that garimpagem dominated prospecting and extraction activities until 1990s, when its levels of productivity contributed to place Brazil among the leading five gold-producing countries (DNPM/MME 1997, 1996; A.R. Mathis et al. 1997). Recently the CPRM has estimated that garimpagem in the state of Pará account for more than half of the state's gold production over the last ten years (DNPM/MME 2000).

Another factor explaining efficiency of garimpagem is that garimpeiro/as have had relatively easy access to technologies. This has a positive impact with respect to the capacity of the artisanal sector to attract labour and expand its production. Men and women alike build tools and machines with forest resources, or buy them from local or regional suppliers. Forest trees are a good and cheap source of wood for the platforms used in the *cobra fumando* and the *bico jato*. The *bateia*, *cuia*, shovels, and rubber hoses have a relatively low cost in nearby locations. In the *casas do garimpeiros*, they find new and used diesel-fuelled motors for the *bico jato* and the *cobra fumando*. They buy mercury produced in Rio de Janeiro from local and regional suppliers. These economic transactions between garimpeiro/as, local investors and suppliers have definitely inserted garimpagem into the broader political and economic realm of production (E.D.S. Gaspar 1990).



A *cobra fumando* used for underground mineshafts (of about 200 feet in depth). The pulp is suctioned by a pump, and goes through a system of wooden boxes for the recovery of gold. Photo: J. Graulau (2000).

Policy Recommendations

Several measures should be taken to enhance women's participation in garimpegem and strengthen their contribution to sustainable mineral extraction. Manual mining work, for example, should be promoted in the most environmentally fragile areas of the Brazilian Amazon. Once a fragile but mineral-rich area is discovered either through geological survey or garimpeiro/as' exploration, women should be entitled to manually work the deposit under a just compensation agreement with mineral companies and local or state governments. Mineral companies should establish incentives, in cooperation with local and/or state governments, for women to sell primary mineral products. In areas currently disputed by industries or by the government, mineral companies should work out an agreement with women to buy the gravel extracted for further industrial processing.

Appropriate investments in technology for the incipient small-scale industries of charcoal- and rice production represent another way of enhancing women's contribution to mineral development. Charcoal is not only a vital commodity for the survival of mining peasant communities, but is increasingly becoming a highly valuable commodity for industrial mineral production. Mining industries find in charcoal a cheap solid fuel very useful as a reducing agent in steel mills and for the manufacture of iron alloys and pig iron. By assisting women in the transportation of wood, building safer places for the burning of wood, and even testing with other native trees, mining industries would surely gain access to charcoal at a low price. For this to happen, it is necessary that mining companies and local or state government elaborate, with the assistance of forestry experts, a mineral development program that puts in its forefront women's knowledge and experience with native forest trees.

Mineral companies should learn and incorporate in their social environmental program women's knowledge and experience with forest resources. The Vale Do Rio Doce Company (CVRD, *Companhia Vale do Rio Doce*), currently operating the biggest industrial gold mine in Brazil (ELO 2000), has several reforestation programs for the 'stressed' areas surrounding its industrial projects. Instead of relying exclusively upon forestry experts from São Paulo and Rio de Janeiro, mineral companies should incorporate women in their forestry teams. Local and/or state governments should promote this through legislation enforcing mining companies to include local peasants in their environmental programs in a more active social policy. State governments should establish for this purpose institutional mechanisms and incentives to facilitate and attract mineral companies towards this kind of policy.

Given that garimpos surround big corporate mineral projects, and that companies' geological workstations are usually located nearby garimpo communities, mineral companies should focus on women's activities to complement the safety network for their geological workstations. These activities should include food preparation and selling, preparation of natural remedies, and room accommodation. The policy should link the economic activities women do in the garimpos with the services demanded by the people working for mineral companies near garimpo areas. It should reduce operation costs for mineral companies, or the costs associated with transportation of food and other services to the geological workstations. Local and/or state governments, in collab-

oration with national and even international financial institutions, should extend credit to women entrepreneurs for investments in the infrastructure of their businesses. Mineral companies should work together with women in designing an inventory of forest products that can be used and in the elaboration of a plan for quality control. This measure should offer a stable source of income for women and their households, enhance the living conditions of garimpos, and contribute to economic prosperity of the communities.

To enhance the contribution of peasant technologies to sustainable mineral development, several measures should be taken by government and mineral industries. Local and/or state governments should start by using the knowledge of garimpeiro/as in geological maps. They should offer incentives to garimpeiro/as to create some form of exploration diaries where garimpeiro/as collect information about the minerals explored, the regions in which they are found, and the characteristics of the region. Also, garimpeiro/as should cooperate with researchers in identifying not only actual deposits, but in giving an account of historical deposits, based on their own explorations of the mining frontier. State governments should designate and create mechanisms to assist garimpeiro/as in gathering such information, by encouraging students of geology from state universities to join garimpo expeditions, or garimpo exploration teams from the DNPM or CPRM.

Mining companies, in collaboration with local and/or state governments should train garimpeiro/as in the use of geological equipment that would allow them to know immediately the expected amount of gold in the deposit. This measure should seek to achieve a better utilization of time and money by garimpeiro/as. After reducing the amount of time needed to estimate the gold reserves of a garimpo, garimpeiro/as should concentrate on working the known reserves. In the area of extraction, mineral companies should offer garimpeiro/as training for the mining of sub-product minerals of gold (probably cooper and silver, but also ornamental stones).

Mining industries should also assist garimpeiro/as in the construction of machines to process higher quantities of material, or to achieve a cleaner recovery of gold. To assist garimpeiro/as in achieving a cleaner recovery of gold, state government should create incentives for garimpeiro/as, mineral companies and research institutions to test alternative ways for amalgamation and gravimetry in garimpagem. After failing to stop illegal mercury markets, the government should now seek the cooperation of research institutions not merely to teach garimpeiro/as about the fatal and disastrous effects of mercury consumption (which they certainly know), but to support garimpeiro/as, financially and otherwise, in innovating other techniques for the separation of gold. This may include the development of safe personal equipment (protective lenses, gloves, etc.) for handling mercury, closed rooms where garimpeiro/as can work with mercury, and of a disposable process for the polluted materials. Also, mineral industries should also offer inputs such as tractors, GIS services, and construction of small-scale processing plants in garimpos. State governments should offer incentives to mineral companies to invest in this kind of services for garimpos.

The most important measure that needs to be taken is the recognition of garimpagem as a small-scale mining enterprise. The high confidence garimpeiro/as have in the efficiency of their technologies, coupled with the long-stand-

ing tradition of garimpagem, would make of this juncture a strategic opportunity for governments and mineral industries to assess garimpo production and incorporate it into policies for mineral development. The legal recognition of peasant mining enterprises would put garimpeiro/as in a better position to negotiate political goods with the State, such as labour regulations, granting of land rights, mining licenses, and provision of subsidies and incentives. It would also open the door to important economic bargaining with state and private mineral industries, such as the possibility of joint ventures between garimpeiro/a enterprises and mineral industries.

The author has no information as to whether these initiatives are currently being promoted by mineral companies (including other regions of the developing world). But this does not imply that mineral industries have nothing to win by adopting these policies. In a context where minerals promise to be a top priority of the international and national development agendas, mining industries have strong incentives to incorporate the suggestions made in this paper. First, they would be actively working to put an end to the hostilities and deep conflicts that have characterized relationships between industries and garimpo populations – which have cost corporations and federal government high amounts of money, and technical and human resources. Second, companies can take advantage of programs of the World Bank and United Nations for the enhancement of peasant women's livelihoods in developing regions. The institutional frameworks of many of these programs would provide technical support for establishing and monitoring the policies mentioned above. The many years of experience of these institutions with poverty alleviation programs would immensely reduce the operational and logistic costs of these policies. Third, seeking financial support from international development agencies would reduce costs for mineral industries and put them in a better position to negotiate with the host government on issues such as infrastructural development and tax incentives. It would be more to their advantage to negotiate contract agreements with state and federal governments. Fourth, buying women's produce would also reduce the production costs of mineral companies. Fifth, by contributing to the formation of skilled female peasant miners, mineral industries would be reducing in the long run the high costs that importation of human resources represents. The fact that a strong consensus exists among the women interviewed in the garimpos of southern Pará as to the need for intervention of either government agencies or private industries to strengthen economic life of garimpos is telling mineral companies that the time to discuss proposals for incorporating peasant mining in overall plans for mineral production is here.

These recommendations call the attention to the areas for intervention that garimpeiro/as themselves have repeatedly discussed in their communal associations, and the few times they have had the opportunity to do so with DNPM staff. As such, this implies that garimpeiro/as are fully aware of the potentialities and problems of their technologies, and want to move forward in developing their productive capacities. The challenge is not for government and private bureaucrats to go to the garimpos and 'teach' peasants about the advantages and disadvantages of small-scale mining, but is to sit down and listen to the peasants themselves about their problems and solutions to small-scale mining. While this approach requires investing more human and social capital,

it would nonetheless represent a further step in the process of building sustainable mineral extraction.

Re-thinking Strategies for Mineral Development: From Mineral Extraction to Development

For a thoughtful mineral development agenda, attuned with regional and national socio-economic needs, three major steps must be followed. First and foremost is the elaboration of a coherent long-term mineral development policy responsive to the needs of the country and the peoples involved. For this to take place, the government should define clear objectives of mineral development, in terms of production, projections of investment by government and private stakeholders, time framework, foreign exchange earnings, increasing international and national supplies, decreasing mineral imports, etc. The definition of goals necessarily implies that stakeholders need to be less reactive to specific international conditions for minerals or commodities of mineral origins, and assume a more pro-active role in identifying known and estimated national resources with which to meet the country's mineral needs.

Second, the government should define the mechanisms through which those objectives can be achieved. Some examples are expansion of national corporatist sector, attracting foreign investments, national and international loans, provision of subsidies to mineral companies, provision of infrastructure, investments in garimpo technologies, investments in infrastructure for artisanal mining communities, recognition of garimpagem as small-scale mining enterprise, formation of joint ventures between national and transnational companies, opening of new mines, introduction of new technologies in already existing mines, etc. In defining the mechanisms, government officials in charge of mineral policy should take advantage of the work developed by independent and academic researchers in the areas of peasant mining in Brazil and other developing countries. From the ample experience of peasant mining in many developing regions, government officials should learn about the strategies, forms of investment, geological testing, and environmental regulations applied (or suggested) by other countries and the socio-economic impacts of those for peasants (see, for example, W. Dongboo et al. 2000; P. Guj and D. Blight 2000; S.V. Solar and D.J. Shields 2000; F.W. Welmer 2000).

Finally, the government should define the role of relevant stakeholders. These should include garimpeiro/as, national and transnational mineral companies, construction companies, national and foreign banks, international financial institutions, inhabitants of the lands in question, and national and foreign buyers.

In the case of Brazil, which has a long and rich tradition of peasant small-scale mining, a mineral development agenda must entail the involvement of local peoples. It must achieve an active participation of peasants in defining the goals and strategies with respect to mineral production and development. The Brazilian government must create institutional and financial mechanisms to facilitate peasants' cooperation in mineral development, such as recognizing garimpagem as a small-scale enterprise. This measure must be accompanied by the legal recognition of peasant women as workers of the mining industry, and

extend to them the services currently provided to male *garimpeiros*. Also, it must assess the efficiency of peasant mining technologies and give technical and financial support for enhancing technical capabilities of *garimpagem*.

New Questions on Mineral Development

The case of women and gold mining opens three central lines of inquiry on mineral development. First, a new avenue for analyzing the roles of women in extractive production emerges not only in the development field, but also in economics, environmental and forestry fields. For development, the central question is the extent to which mining has a gender identity that sustains (mineral) development. Other questions emerge that challenge the dominant development theories and practices. How do patriarchal arrangements of global capitalism relate to organization of mining production? Is it accurate to talk about gendered small-scale production? Is it a form of production not neutral to the social complexities of gender? What are the best tools to measure women's contribution to mineral development? What are the linkages between women's mining work and the regional, national and global conditions affecting mineral production? How should women's work be enhanced? What are the linkages between women's labour across different mining regions of the developing world?

A second research avenue emerges which considers the importance of peasant mining production for developing countries. Why and how does peasant mining coexist with increasing industrialization of the developing world? Is the existence of an economy of *garimpagem* intrinsic to peripheral capitalist development? What kind of worker is being shaped in this economy, under the current modernization of export-mineral sector? How does she/he relate to its produce, in a context where paradigms of resistance are proclaimed dead?

Finally, a third avenue emerges for investigating the current pressures developing countries have with respect to mineral resource extraction and exploitation. How can developing countries justify the need for stronger mineral economies while trying to achieve sustainable development? Are extractive economies, in the geological sense, unsustainable? If so, how should developing countries deal with the rich tradition and culture of peasant small-scale mining? Should governments and mineral companies develop research to recycle already existing minerals, and leave the others in the subsoil? Which mineral company is willing to fund that kind of research? Should international financial institutions encourage it?

The modest effort undertaken in this essay to explore some of those questions is ingrained in the critical studies of nature and production of Marxist ecology. But these do not provide the only looking glass to look at contemporary development and gender issues of mineral production. For scholars committed to the advancement of mineral-producing developing countries, there are a growing number of approaches from traditional disciplinary fields that are starting to challenge dominant thinking on mineral development (for excellent examples, see A. R. Berger 2000; G. A. Davis 1995; O.H. Leonardos 2000; L. Nemcova 2000). Nonetheless, the approaches suggested in this essay demand a keen awareness to the multiple dimensions of power not easily sug-

gested by other approaches. They induce students of development to penetrate into the dimensions of production beyond the strict economic realm, to shake those columns thought to support economic production, to systematically investigate and challenge their inner nature. For they are committed with building more just relationships between human beings, their products, and their environments.

* * *

Jeannette Graulau is currently working on her doctoral research entitled 'New Political Economy of Gold: Appropriation of Nature and Garimpeiras' Labour in the Brazilian Amazon' at the Maxwell School of Citizenship and Public Affairs, Syracuse University, New York. A recent publication is 'El sexo del oro: Mujer y minería en el Amazonas Brasileño' (The sex of gold: Women and mining in the Brazilian Amazon), in *Diálogo*, February 2001. She was a Perryman Scholar 1999-2000. Areas of interest include sustainable development, development economics, international political economy and feminist studies. <jgrolo@hotmail.com>

Notes

1. The Portuguese term *garimpagem* will be used interchangeably with the term peasant mining. The term *garimpo* will be employed to designate the communities or localities where the peasant mining sites are located, although it is commonly used to designate the mining shafts too. Peasant miners will be designate as *garimpeiros* or *garimpeiras*.
2. ECLA was a United Nations agency established in 1947 for the region of Latin America. Its name was changed in the early 1980s to Economic Commission for Latin America and the Caribbean. Very influential figures emerged with ECLA, whose scholarship defined what would be later called structuralism. Names that heavily influenced Latin American intellectual thinking of the 1950s to the 1970s were Brazilian economists Celso Furtado and Enrique V. Iglesias, Juan Noyola of Mexico, Aníbal Pinto and Osvaldo Sunkel of Chile. For more on the history of ECLA, see De Almeida et al. (1999), Junguito and Pizano (1982), and Kay (1989).
3. Troy ounce (to) is a standard commercial measurement of gold, equivalent to 31.103486 grams. One ton of gold is equivalent to 32,151 to.
4. The government has established a buying monopoly over *garimpos* production, and has set up branches of the Federal Bank (CEF, *Caixa Econômica Federal*) in the most productive *garimpos*, as in that of Serra Pelada. The government also has established several programs for the assessment of *garimpo* production. As a case in point, it has created a group under the CPRM in charge of studying *garimpos*' potential contribution to national mineral production, named the National Program and Work-Team for Incrementing National Gold Production (*Grupo de Trabalho do Programa Nacional de Incremento a Produção Nacional de Ouro*). It has also created a program under the supervision of the Ministry of Mines and Energy (MME, *Ministério de Minas e Energia*), called 'Project for the Study of Brazilian *Garimpos*' (*Projeto de Estudos de Garimpos Brasileiros*). Its purpose is to evaluate the technological and environmental aspects of *garimpo* production (A.R.B. da Silva 1993).
5. A total number of 328 women were interviewed in the communities of Serra Pelada (104), La Cutia (28), Miranda (113) and La Cruz (2). A total number of 81 women were contacted by the research team outside the *garimpos*, who worked as *garimpeiras* in the early 1980s, but moved to the urban centres of Parauapebas, Curionópolis and El Dorado dos Karajás. The most significant part of the sample comes from Serra Pelada and Miranda, given their long established *garimpo* life. La Cutia is a very small *garimpo*, currently affected by land conflict with DOCEGEO Company (a CVRD subsidiary). La Cruz is a very peculiar *garimpo*, in that there are only two mineshafts in this *garimpo* owned by one family. Since these two communities were close to the other *garimpos*, they were included in the research.

Bibliography

- Ackermann, R. (1998) 'Is Mining Compatible with Sustainable Development? A World Bank Perspective'. International Council on Mining and the Environment. *ICME Newsletter* Vol. 6, No. 1.
- Agarwala, A.N. and S.P. Singh, eds. (1958) *The Economics of Underdevelopment*. London: Oxford University Press.
- Akhtar, A. (2000) Influence of Geoscience Education through Mass Media for Sustainable Development of Third World Countries. (Unpublished paper) Geological Survey of Bangladesh. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Alves, J. (1943) 'O código de minas e o incremento da mineração no Brasil em 1941'. *Avulso* No. 49.
- Auty, R. (1993) *Sustainable Development in Mineral Economies: The Resource Course Thesis*. London: Routledge.
- Banaji, J. (1972) 'For a theory of colonial modes of production'. *Economic and Political Weekly* Vol. 7, No. 52: 2498-2502.
- Baran, P. (1957) *The Political Economy of Growth*. New York: Monthly Review Press.
- Benedito da Silva, A.R. (1993) 'Garimpagem como meta política do Estado'. Mathis, A. & R. Rehaag, orgs.. *Conseqüências da Garimpagem no Âmbito Social e Ambiental na Amazônia*. Belém: FASE, KATALYSE & buntstift. março de 1993.
- Berger, A.R. (2000) 'Sustainability and Rapid Geological Change: A Cautionary Note'. Paper delivered at 31st International Geological Congress. (Posted in <http://www.31igc.org>).
- Bittencourt, A. (1993) 'Operação Cuiú-Cuiú. Mathis', A. & R. Rehaag, orgs... Belém: FASE, KATALYSE & buntstift. março de *Conseqüências da Garimpagem no Âmbito Social e Ambiental na Amazônia* 1993.
- Bresser, L.C. (1997) *Economia Brasileira. Uma Introdução Crítica*. São Paulo: Editora 34.
- Browder, J. & B. Godfrey. (1997) *Rainforest Cities: Urbanization, Development and Globalization of The Brazilian Amazon*. NY: Columbia University Press.
- Bunker, S.G. (1985) *Underdeveloping the Amazon: Extraction, Unequal Exchange, and the Failure of the Modern State*. Urbana: University of Illinois Press.
- Calvo, B. M. (2000) Industrial Minerals and Sustainable Development in Iberoamerica. (Unpublished paper) School of Mines of Madrid. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Cardoso, F. H. and E. Faletto. (1969) *Dependencia y Desarrollo en América Latina*. México: Editorial Siglo Veintiuno.
- Castree, N. (2000) 'Marxism and the Production of Nature'. *Capital & Class*. No. 72. Supplement Environmental Politics: Analyses and Alternatives. Pp. 5-36.
- CEPAL. (1999) *Evolução da Economia Brasileira. Informe Estatístico*. New York: CEPAL/ONU.
- (1998) 'La Inversión Extranjera en América Latina y el Caribe'. *Notas sobre la economía y el desarrollo*. No. 614 (abril).
- (1995) 'La inversión extranjera y las empresas transnacionales en América Latina: 1995'. *Notas sobre la economía y el desarrollo*. No. 576/577 (mayo/junio).
- (1989) 'Development of Mining Resources of Latin America'. *Estudios e Informes de la CEPAL*. No. 48.
- (1982a) 'Report of the meeting on horizontal cooperation for the development of the mineral resources of Latin America'. Bogotá, Colombia. 14-18 June.
- (1982b) 'El crecimiento económico y la política de recursos mineros en los países en desarrollo'. 24 de marzo de 1982.
- Chaffee, W.A. (1998) *Desenvolvimento: Politics and Economy in Brazil*. Boulder, London: Lynne Rienner Publishers.
- Cleary, D. (1993) 'After The Frontier: Problems with Political Economy in Modern Brazilian Amazon'. *Journal of Latin American Studies* 25: 331-349.
- (1991) 'The Brazilian Rainforest: Politics, Finance, Mining and the Environment'. *The Economist Intelligence Unit*, Special Report no. 2100.
- (1990) *Anatomy of the Amazon Gold Rush*. Oxford & Basingstoke: MacMillan Press.
- (1987) *An Anatomy of the Gold Rush: Garimpagem in the Brazilian Amazon*. Diss. Phil., Institute of Social Anthropology, University of Oxford.
- Coelho, M.C.N. (1991) Socio-economic Impacts of the Carajás Railroad in Maranhão, Brazil. Diss. Phil., Department of Geography, Syracuse University.

- CPRM. (1995) Mapa de depósitos minerais selecionados e de garimpos do Brasil. Serviço Geológico do Brasil.
- CVRD. (1999) *Relatório Anual 1998*. NovoDisc Brasil Indústria Fonográfica. São Paulo, Brasil.
- (1987) 'Planificação, utilização e gestão dos recursos minerais'. *CVRD Revista* Vol. 8, No. 28. (jun.): 3-12.
- (1985) 'Ação da CVRD, coligadas e controladas sobre o meio ambiente'. *CVRD Revista* Vol. 6, No. 21. (set.): 53-63.
- Culver, W.W. and T.C. Greaves. (1985) 'Miners and Mining in the Americas, an Introduction'. In Greaves, Thomas C. and W. William (eds.), *Miners and Mining in the Americas*. Manchester, UK: Manchester University Press. Pp. 1-8.
- Dall'Agnol, R. (1995) 'Mining without destruction?: Problems and prospects for the garimpos and major mining projects'. In Clüsener-Godt, M. and I. Sachs (eds.), *Brazilian Perspectives on Sustainable Development*. Paris: UNESCO. Pp. 205-233.
- Davis, G.A. (1995) 'Learning to Love the Dutch Disease: Evidence from the Mineral Economies'. *World Development* Vol. 23, No. 10: 1765-1779.
- De Almeida, A.L.O. (1992) *The Colonization of the Amazon*. Austin, Texas: University of Texas.
- De Almeida, J.P., A. Dos Santos, L.A. Elias. (1999) *Vinte anos de política econômica*. Rio de Janeiro: CONTRAPONTO.
- De Andrade, J.R. (1981) *Recursos auríferos reais e potenciais*. Governo do Brasil: CPRM.
- De Oliveira-Campos, R. (1967) *Reflections on Latin American Development*. Austin, Texas: Institute of Latin American Studies.
- DNPM/MME (2000a) *Mineração no Brasil: Informações Básicas Para o Investidor*. Brasília, Brasil: MME.
- (2000b) *Série Histórica de Arrecadação da CFEM/PA/99. Seção de Economia Mineral*. Brasília, Brasil: MME.
- (1997) *Análise Comparativa da Mineração. África do Sul, Austrália, Brasil, Canadá e Estados Unidos*. Brasília, Brasil: MME.
- (1996) *Análise Comparativa da Mineração na América do Sul. Argentina, Bolívia, Brasil, Chile, Guiana, Peru e Venezuela*. Brasília, Brasil: MME.
- (1993) *Levante Nacional dos Garimpeiros*. Brasília, Brasil: MME.
- (1990) *Principais Minerais do Brasil*. Vol. II & III. Brasília, Brasil: MME.
- (1988) *Anuário Mineral Brasileiro*. Vol. II. Brasília, Brasil: MME.
- (1984) *Projeto Perfil Empresarial. Análise Econômico-Financeiro da Indústria de Mineração 1978-82*. Brasília, Brasil: MME.
- Dongbo, W., S. Shicai, Y. Xu. (2000) Strengthening Study on Concentrated Mineralized Area: Guarantee of Sustainable Development of Mining Industry. (Unpublished paper) Beijing Institute of Geology and Mineral Resources. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Dore, E. (2000) 'Environment and Society: Long-Term Trends in Latin American Mining'. *Environment and History* No. 6 (2000): 1-29.
- Dos Santos, R.N. (1998) *A Mecanização da Garimpagem na Província Aurífera do Tapajós, Estado do Pará: Uma Análise Energética, Social e Ambiental*. Dissertação Programa Mestre em Energia. Universidade de São Paulo.
- Dos Santos, T. (1969) 'The Crisis of Development Theory and the Problem of Dependence in Latin America'. In Bernstein, H. ed., *Underdevelopment and Development*. London: Penguin. Pp. 57-80.
- ELO. (2000) 'Ivaí opera para a CVRD na maior mina de ouro do Brasil'. ELO Ano 1, No.1: 8-11.
- Erthal, F. L. C., M.A.L. Latgé, R.L.S. Rocha, K.L. Mansur. (2000a) Mining Activities and Environmental Protection: Cooperation Policy in Rio de Janeiro. (Unpublished paper) Department of Mineral Resources of Rio De Janeiro. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- R.L.S. Rocha, G.S. Nogueira, U.P. Santos. (2000b) Study of Mineral Exploitation Activities in Santo Antônio de Padua County, Rio de Janeiro State, Brazil. (Unpublished paper) Department of Mineral Resources of Rio de Janeiro, NCE/UF RJ. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Farber, M. and R. Brown. (1980) 'Changing the Rules of the Game: Political Risk, Instability and Fairplay in Mineral Concession Contracts'. *Third World Quarterly* No. 2: 100-119.
- Figueiredo, F. (1984) *Em Busca do Ouro: Garimpos e garimpeiros no Brasil*. Rio de Janeiro: Editora Marco Zero.

- Fonseca, J.F. (1992) 'Garimpagem: Poluição Química e Física'. *Seminário Internacional Sobre Meio Ambiente, Pobreza e Desenvolvimento Da Amazônia*. SIMDAMAZÔNIA, ANAIS, Governo do Estado do Pará. 16-19 fevereiro.
- Furtado, C. (1970) *Obstacles to Development in Latin America*. New York: Anchor Books.
- Gaspar, E.d.S. (1990) Os Bamburrados do Tapajós. Tese de Mestrado em Economia. Campina Grande, UFPb. Paraíba.
- Godoy, R. (1985) 'Mining: Anthropological Perspectives'. *Annual Review of Anthropology* No. 14: 199-217.
- Gómes de Silva, L.M. (1985) 'Ouro: a importância do MRC'. *Minérios*. Ano 8 (abril): 66-69.
- Gomes da Silva, A. (1984) *No rastro dos pioneiros: Um pouco da história Rondôniense*. Porto Velho: SEDUC.
- Gonçalo de Miranda, J. et al. (1997) *Atividades Garimpeiras no Brasil. Aspectos Técnicos, Econômicos e Sociais*. Governo Federal de Brasil: MCT, CNPq, CETEM.
- Guerreiro, G. (1992) 'Uso de Recursos Minerais e Empreendimentos Mínero-Metalúrgicos'. *Seminário Internacional Sobre Meio Ambiente, Pobreza e Desenvolvimento Da Amazônia*. SIMDAMAZÔNIA. ANAIS, Governo do Estado do Pará. 16-19 fevereiro.
- Guimarães, R.P. (1992) 'Development Pattern and Environment in Brazil'. *CEPAL Review* 47 (August): 47-62.
- (1989) 'The Ecopolitics of Development in Brazil'. *CEPAL Review* 38 (August): 89-103.
- Guj, P., D. Blight. (2000) From Cradle to Grave: A Mineral Policy Framework for a Healthy Mining Industry. (Unpublished paper) Australian Department of Minerals and Energy. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Gunder-Frank, A. (1966) 'The Development of Underdevelopment'. *Monthly Review* Vol. 18, No. 4: 17-31.
- Gurmendi, A.C. (1995) The Mineral Industry in Brazil. US Department of the Interior, US Geological Survey. *Mineral Industries of Latin America and Canada*, vol. III, June 6, 1997.
- Harcourt, W.A. (1994) *Feminist Perspectives on Sustainable Development*. Lynne Rienner Publishers.
- Harvey, D. (1996) *Justice, Nature and the Geography of Difference*. Oxford: Blackwell Publishers.
- Higgins, B. (1959) *Economic Development. Principles, Problems and Policies*. London: W.W. Norton & Co., Inc.
- Hirschman, A. (1965) Os Problemas do Nordeste Brasileiro. In Hirschman, *Política Econômica na América Latina. Perspectivas do Nosso Tempo*. Brasil: Editora Fundo de Cultura. 1era ed. 1963.
- Hühn, S.B.R., A.D.V. Soares, C.A. Medeiros Filho, C.C. Magalhães, S.C. Guedes, L.G.B.; Moura, J.L. Rego, C.H. Cravo. (2000) 'Carajás Mineral Province'. 31st International Geological Congress. (Posted at the IGC conference as *Carajas Mineral Province, Field Trip Guide*). Rio de Janeiro, Brazil: August 6-17, 2000.
- International Labor Office. (1999) *Social and Labor Issues in Small-Scale Mines*. Geneva, Switzerland.
- JCDP. (1999) 'Descoberta mais uma mina de ouro e cobre'. *Jornal Correio do Pará*. 18 a 25 de agosto de 1999. Pp. 5.
- JDT. (1999) 'A marca da Vale no Pará'. *Jornal do Tocantins*. 2 a 4 de novembro de 1999. Pp. 7.
- JM. (1999) 'Cooperativa de Serra Pelada tem nova directoria'. *Jornal Movimento* 22 a 29 de junho de 1999. Pp.4.
- (1999) 'CPI visita Serra Pelada e Carajás'. *Jornal Movimento* 14 a 20 de junho de 1999. Pp.3.
- (1999) 'Serra Pelada volta a ser dos garimpeiros'. *Jornal Movimento*. 4 a 11 de junho de 1999. Pp.8.
- Junguito, R. & D. Pizano. (1982) Primary Products in Latin America. In Ffrench-Davis, R. and E. Tironi, eds., *Latin America and the New International Economic Order*. London: MacMillan. Pp. 49-73.
- Kay, C. (1989) *Latin American Theories of Development and Underdevelopment*. London: Routledge.
- Kiperman, Y.A. & M.A. Komarov. (2000) Agricultural Ores and Mineral Fertilizers Contributing to Sustenance of Mankind. (Unpublished paper) Russian Institute of Economics of Mineral Resources and Use of Subsurface. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Lacrau, H.L. (2000) Geoscientific Literacy as a Cognitive Tool in Third World Countries. (Unpublished paper) Universidad Nacional de San Luis, Argentina. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.

- Lechler, P.J., L.D. Lacerda, J.R. Miller. (2000) Elevated Mercury Levels in the Madeira River, Brazilian Amazon: A Function of Natural Sources and Processes? (Unpublished paper) University of Nevada, Universidade Federal Fluminense, Western Carolina University. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Leonardos, O. H. (2000) The Earth in the 21st Century: Geological Object or Subject? (Unpublished paper) UNB Centre for Sustainable Development. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Lestra, A. & J. Nardi. (1984) *O Ouro da Amazônia Oriental: O Mito e a Realidade*. Belém, Brasil: Grafisa Editora.
- Levin, J. (1960) *Export Economies: Their Pattern of Development in Historical Perspective*. Cambridge, Mass.: Harvard University Press.
- Lewis, W. A. (1954) 'Economic Development with Unlimited Supplies of Labor'. *The Manchester School of Economics and Social Studies*. No. 22 (May): 139-191.
- Lima, M. (1996) *Minerais, Rochas e Minérios. Riquezas minerais do Pará*. Belém: Falangola.
- Lindhout, C. (1990) 'Gold Mining and the Environment -Friends or Foes?' *Mining Survey* No. 2: 21-27.
- Lopes da Silva, A., L.C. de Carvalho Dias, M.T. Hazeu, M.A. Cardoso de Nascimento. (1997) *Prostituição & Adolescência. Prostituição Juvenil no Interior do Pará: 'Trombetas e os Garimpos do Vale do Tapajós'*. Belém, Brasil: Editora CEJUP.
- MacMillan, G. (1995) *At the End of the Rainbow? Gold, Land and People in the Brazilian Amazon*. NY: Columbia University Press.
- Madureira, D. (2000) 'Estoques de não ferrosos na LME têm queda de 20%'. *Gazeta Mercantil*, 9 de maio de 2000.
- (2000) 'Vale da prioridade à remuneração dos sócios'. *Gazeta Mercantil*. (?)
- Maron, M.A.C. & A.R.B. da Silva. (1984) *Perfil Analítico do Ouro*. Brasília, Brasil: DNPM.
- Mathis, A., D. Chaves de Brito, F. J. Brüseke. (1997) *Riqueza Volátil. A Mineração de Ouro na Amazônia*. Belém: Editora CEJUP.
- (1993) 'Garimpagem como meta política do Estado'. Mathis, A. & R. Rehaag, orgs., *Conseqüências da Garimpagem no Âmbito Social e Ambiental na Amazônia*. Belém: FASE, KATALYSE & buntstift. março de 1993.
- Matos-Mar, J., com. (1969) *La crisis del desarrollismo y la nueva dependencia*. Buenos Aires: Amorrortu Editores.
- (Com.) (1968) *La dominación de América Latina*. Buenos Aires: Amorrortu Editores.
- Meggors, B.J. (1954) 'Environmental Limitation on the Development of Culture'. *American Anthropologist* Vol. 56: 801-824.
- Mies, M. & V. Shiva (1993) *Ecofeminismo: teoría, Crítica y Perspectivas*. (?): Icaria Antrazyt.
- Mikkola, M. (1998) *The State and Agrarian Policies: The Commodification of Women's Labor in Paraguay, 1963-1995*. Unpublished Diss. Phil., The Graduate School of International Studies, University of Denver.
- Minérios Eds. (1994) *Opinão & Balanço. Minérios (maio)*.
- (1992) *Opinão & Balanço. Minérios (jan.)*.
- (1987) 'Articulando a arrancada da mineração brasileira'. *Minérios (fev.)*.
- (1986) 'Caminho de Pacificação dos Garimpos'. *Minérios (abril)*.
- (1985) *Opinão & Balanço. Minérios (set.)*.
- Mining Survey Editors. (1990) 'The Garimpeiros of Brazil'. *Mining Survey* No. 1: 33-38.
- Miranda Álvares, M.L. & M.A. D'Incao, eds. (1995) *A Mulher Existe? Uma Contribuição ao Estudo da Mulher e Gênero na Amazônia*. Belém, Pará: GEPEM/GOELDI.
- Mitschein, T.A., H.R. Miranda, M.C. Paraense. (1989) *Urbanização Selvagem e Proletarização Passiva na Amazônia – O Caso de Belém*. Belém, Pará: CEJUP.
- Mohan, G. & K. Stokke. (2000) 'Participatory Development and Empowerment: The Dangers of Localism'. *Third World Quarterly*. Vol. 21, No. 2. Pp. 247-268.
- Monteiro, A. (1993) 'Departamento Nacional de Produção Mineral e o Garimpagem como meta política do Estado'. Mathis, A. & R. Rehaag, orgs., *Conseqüências da Garimpagem no Âmbito Social e Ambiental na Amazônia*. Belém: FASE, KATALYSE & buntstift. março de 1993.
- Morgan, D.J. (2000) *Industrial Mineral Requirements of the Developing World: Some Case Histories*. (Unpublished paper) British Geological Survey. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Murao, S., V.B. Maglambayan, P.R. Baluda, K. Naito, M.A. Kaida. (2000) *Regularizing Small-Scale Mining with GIS and Geological Concept: A Trial*. (Unpublished paper) Geological Sur-

- vey of Japan, University of Philippines., Philex Mining Co., Hiroshima University. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Nava, D.B., I.D.M. Prado, J.F.G. Crespo, M.F.C. Bastos, R.P. Cavalcante, W. S. Silva. (2000) Environmental and Geological Analysis of the Mining Activity in the City of Manaus, Amazonas State, Brazil. (Unpublished paper) Lutheran University of Brazil. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Nemcova, L. (2000) Geoethical Decision-Making and Responsibility. (Unpublished paper) Czech Republic University of Economics. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000. (Posted at <http://www.31igc.org>).
- Nyambe, I. A. (2000) 'Economic Environmental and Social Impacts of Small-Scale Mining'. 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000. (Posted at <http://www.31igc.org>).
- Önis, Z. (1995) 'Los límites del neoliberalismo. Hacia una reformulación de la teoría del desarrollo'. *Este País. Tendencias y Opiniones* No. 57: 2-16.
- Oren, D.C. (1987) 'Grande Carajás, International Financing Agencies, and Biological Diversity in Southeastern Amazonia'. *Conservation Biology* Vol. 1, No. 3: 222-227.
- Otto, J. & H.S. Kim, eds. (1998) *Proceedings of the Workshop on the Sustainable Development of Non-renewable Resources Towards the 21st Century*. New York: UN Revolving Fund for Natural Resources Exploration.
- Pasca, D. (1994) 'Garimpo e Meio Ambiente. O caso de Poconé, Mato Grosso'. *Cadernos do Neru*. No. 3 (setembro): 59-105.
- Pereira, A.C.L. (1992) 'Garimpo e fronteira amazônica: as transformações dos anos 80'. In Léna, P. and A.E. de Oliveira, eds., *Amazônia. A Fronteira Agrícola 20 anos Depois*, Edições CEJUP. Pp. 305-318.
- Pinto, J.A. (1993) 'Garimpagem: contribuição ao desbravamento e à ocupação da Amazônia'. Mathis, A. & R. Rehaag, orgs., *Consequências da Garimpagem no Âmbito Social e Ambiental na Amazônia*. Belém: FASE, KATALYSE & buntstift. março de 1993.
- Pinto, L.F. (2000a) 'O futuro é um desafio'. *Agenda Amazônica*. Ano II, No. 13. (setembro de 2000): 1-7.
- (2000b) 'Os descaminhos da história'. *Agenda Amazônica*. Ano I, No. 12. (agosto de 2000): 4-9.
- (2000c) 'O dia da descoberta'. *Agenda Amazônica*. Ano I, No. 11. (julho de 2000): 1-7.
- Pompermayer, M. (1982) *Estratégias do grande capital na fronteira amazônica brasileira*. Programa de Estudos Comparativos Latinoamericanos. Departamento de Ciências Políticas. Belo Horizonte: Universidade Federal de Minas Gerais.
- Ponte-Neto, O. (2000) Gold Exploitation in the Bahia State, Brazil. (Unpublished paper) UFRJ. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Portes, A., M. Castells, L.A. Benton, eds. (1989) *The Informal Economy: Studies in Advanced and Less Developed Countries*. Baltimore: Johns Hopkins University Press.
- Prebisch, R. (1971) *Latin America: A Problem in Development*. Austin, Texas: Institute of Latin American Studies.
- (1949) *Interpretación del Proceso de Desarrollo Latinoamericano*. Santiago: UNECLA. (Published in 1950).
- Rakowski, C.A., ed. (1994) *Contrapunto: The Informal Sector Debate in Latin America*. Albany, NY: SUNY Press.
- Ramos, E.M. (1992) 'Pobreza, Desenvolvimento e Crise Ecológica: Organizações do Campo Como Resposta'. *Seminário Internacional Sobre Meio Ambiente, Pobreza e Desenvolvimento Da Amazônia*. SIMDAMAZÔNIA. ANAIS, Governo do Estado do Pará. 16-19 fevereiro.
- Rezende, R.M. (1986) 'Panorama da Mineração Brasileira'. *Minérios*. (maio): 68-91.
- RIS. (1987) *Raúl Prebisch and Development Strategy*. Research and Information System for Non-Aligned and Other Developing Countries.
- Rodrigues, R.M. (1994) *Mulheres do Ouro: O Trabalho Femenino nos Garimpos do Tapajós*. Belém, Pará: Secretaria de Estado de Indústria, Comércio e Mineração (SEICOM).
- (1993) 'Mulheres no garimpo'. Mathis, A. & R. Rehaag, orgs., *Consequências da Garimpagem no Âmbito Social e Ambiental na Amazônia*. Belém: FASE, KATALYSE & buntstift. março de 1993.
- Rolfe, R. (1983) 'The World Gold Market in the 1980s'. *Mining Survey* No.1-2: 2-15.
- Romano, C. (1992) 'Garimpagem'. *Seminário Internacional Sobre Meio Ambiente, Pobreza e*

- Desenvolvimento Da Amazônia. SIMDAMAZÔNIA. ANAIS. Governo do Estado do Pará. 16-19 fevereiro.
- Rossette, A.N. & A.M. Cassiano. (2000) Estimate of the Mercury Emission in Araés Small-Scale Gold Mining, Nova Xavantina, MT. (Unpublished paper) UNEMAT, CRHEA-EESC/USP. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Sánchez, G. (1993) 'Neoliberalism and its Discontents'. *NACLA Report on the Americas* Vol. XXVI, No. 4: 18-21.
- Santha, R.A. (2000) Geo-Planning: Key to Environmental and Sustainable Development in Small-Scale Mining. (Unpublished paper) Indian Bureau of Mines. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Schulz, K.J. (2000) Where Will the World's Mineral Resources Come From? (Unpublished paper) US Geological Survey-Team for Assessment of Global Mineral Resources. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- SEE. Governo do Estado do Pará (1992) *Estudos e Problemas Amazônicos História Social e Econômica e Temas Especiais*. Belém, Pará: Edições CEJUP.
- Serra, M.A. (1997) The Social Impacts of Regional Development Policies in Eastern Amazonia: A Case Study of Parauapebas. Unpublished Diss. Phil., Department of Social Policy and Administration. London School of Economics and Political Science. University of London.
- Shiva, V. (1989) *Staying Alive: Women, Ecology and Development*. London: Verso.
- Silva, M. de M., M.M. Souza, M. Quintas, D. Tardin. (2000) Determination of Mercury in Sediments of the Pomba River, Rio de Janeiro State, Brazil. (Unpublished paper) UERJ, GEOQUIM, FGEL. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Sirotheau, G.J. & M.L. Barreto. (2000) The Efficiency of Environmental Legislation: A Comparative Study of Brazil and Canada. (Unpublished paper) Centro de Tecnologia Mineral de Rio de Janeiro. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Solar, S.V. & D.J. Shields. (2000) Mineral Indicators of Sustainability: Review and Systematization. (Unpublished paper) Geological Survey of Slovenia and USDA Forest Service Research. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Stear, W. (1990) Small-Mining -Strategic Opportunity in a Changing South Africa? *Mining Survey* No. 1: 39-44.
- Sunkel, O., ed. (1993) *Development from Within: Toward a Neostructuralist Approach for Latin America*. London: Lynne Rienner Publishers.
- Sunkel, O., and P. Paz. (1970) *El subdesarrollo latinoamericano y la teoría del desarrollo*. México: Editora Siglo Veintiuno.
- Tokman, V. (1982) 'Unequal Development and Absorption of Labour: Latin America (1950-1980)'. *CEPAL Review* 17 (August): 121-133.
- Tomio, A., & L.A.M. Martin. (2000) The MercoSul Mining Sector and the Bentonite Market. (Unpublished paper) USP Instituto de Geociências, UEC. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Trofimov, V.T., V.A. Bogoslovskiy, R.N. Sobolev. (2000) 21st Century Conception of Geological Education in Russia. (Unpublished paper) Lomonosov Moscow State University. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- United Nations. (1980) 'The role of TNCs in the production and export of minerals'. In Proceedings of the Sixth Session of the Committee on Natural Resources. *Mineral Resources Development Series*. No. 47. Pp.33-64.
- (1972) *Small-scale Mining in Developing Countries*. New York: UN.
- (1970) *Mineral Resources Development with Particular Reference to Developing Countries*. New York: UN.
- Velásquez, E. (2000) Geosciences and Environmental Land-Use Decision Making Process in Developing Countries: Perspectives Towards the XXI Century in Colombia and Latin America. (Unpublished paper) INGEOMINAS. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- Vildósola Fuenzalida, J. (1999) *El Dominio Minero y el Sistema Concesional en América Latina y el Caribe*. Caracas, Venezuela: Editorial Latina C.A.
- Warhurst, A., ed. (1999) *Mining and the Environment: Case Studies from the Americas*. Ottawa, Canada: International Development Research Centre.
- Welmer, F.W. (2000) The Natural Resources Hierarchy with Respect to Sustainable Development.

- (Unpublished paper) German Institute for Geosciences and Natural Resources, Lower Saxony Geological Survey. Delivered at 31st International Geological Congress. Rio de Janeiro, Brazil. August 6-17, 2000.
- World Bank. (1994) *Development, Environment and Mining: Enhancing the Contribution of the Mineral Industry to Sustainable Development*. Washington, DC, June 1-3, 1994.
- World Gold Council. (2000) 'Gold demand remains strong'. *World Gold Demand Trends Issue No. 31* (May 2000): 1-19.
- Ximenes, M. (1992) 'Recursos Energéticos na Amazônia: Características, potencialidades e sustentabilidade'. *Seminário Internacional Sobre Meio Ambiente, Pobreza e Desenvolvimento Da Amazônia*. SIMDAMAZÔNIA. ANAIS, Governo do Estado do Pará. 16-19 fevereiro.

En pos de la construcción de una unidad política de una región en México: Las Huastecas en la primera mitad del siglo XIX (Endorsing the Construction of a Political Unit in a Region in México: The Huastecas in the First Half of the Nineteenth Century)

Antonio Escobar Ohmstede

En este artículo se estudian los intentos por formar un estado en las Huastecas, lo que constituye una de las primeras herramientas en la construcción de una identidad entre los grupos de poder de un espacio definido. Además, se analizan brevemente a los personajes sobresalientes de los grupos de poder en formación.

In this article the author studies the attempts to create a state in the Huastecan region, which constitutes one of the first instruments in the construction of an identity among influential groups within a defined space. In addition, the author also briefly analyses the most outstanding figures in the influential groups that were formed.

Peasant Mining Production as a Development Strategy: The Case of Women in Gold Mining in The Brazilian Amazon (La producción minera campesina como estrategia de desarrollo: El caso de las mujeres en la extracción de oro en el Amazonas brasileño)

Jeannette Graulau

In the last three decades, Brazil has seen a dramatic expansion and growth of peasant mining production in the Amazon region. Such an expansion has shaken the organization of mining production by making mineral development increasingly dependent upon women's labour and peasant technologies. The contribution of women and peasant technologies to small-scale gold mining has opened a new avenue for government and industries to articulate mineral policies attuned with the country's socio-economic needs. Drawing upon recent debates of Marxist ecology, the paper argues that the increasing demand for minerals that comes with continuing industrialization of Brazil and other developing countries situates peasant mining production at the forefront of the mineral development debate. Contrary to the anti-mining research and policy orientation of dominant development approaches, developing countries can achieve and must pursue mineral development through the planned incorporation of peasant mining. The paper adds specific guidelines for incorporating peasant mining as a main variable in the construction of novel theoretical and policy models for sustainable mineral extraction of Brazil and developing countries in general.

Brasil ha experimentado durante las últimas tres décadas, una dramática expansión y crecimiento de la producción minera campesina en la región amazónica. Esta expansión ha sacudido la organización de la producción minera al hacer que el desarrollo de la producción minera dependa cada vez más del trabajo de las mujeres y de las tecnologías campesinas. Su contribución a la extracción de oro a pequeña escala ha inaugurado una nueva vía para que el gobierno y las industrias formulen políticas ajustadas a las necesidades socio-económicas del país. Pasando revista a los recientes debates de la ecología marxista, en este artículo se sostiene que la creciente demanda de minerales que caracteriza la sostenida industrialización del Brasil y otros países en desarrollo pone a la producción minera campesina en el centro del debate sobre el desarrollo de la minería. Al contrario de la orientación de la investigación y políticas de desarrollo dominantes, contrarias a la minería, los países en desarrollo pueden alcanzar, y deben implementar el desarrollo de la minería a través de la incorporación planificada de la minería campesina. En el artículo tratan guías específicas para incorporar a la minería campesina como una variable muy importante en la elaboración de nuevos modelos teóricos y políticas para una extracción de minerales sostenible en Brasil y en los países en desarrollo en general.

CONTRIBUYENTES/CONTRIBUTORS

A.E. Fernandez Jilberto
Marieke Riethof
Fac. der Maatsch. en Gedragwet.
PSCW
OZ Achterburgwal 237
1012 DL AMSTERDAM
<fernandezjilberto@pscw.uva.nl>
<riethof@pscw.uva.nl>

Menno L. Vellinga
Universiteit Utrecht
Faculteit der Ruimtelijke Wetenschappen
Postbus 80 115
3508 TC UTRECHT
<m.vellinga@geog.uu.nl>

Antonio Escobar Ohmstede
CIESAS, D.F.
Juárez 87
Tlalpan
MÉXICO, D.F., cp. 14000
<ohmstede@Juarez.ciesas.edu.mx>

Myrian Sepulveda dos Santos
Rua das Laranjeiras 322 ap. 602
22240-002 Rio de Janeiro (RJ)
BRAZIL
<myrian@uerj.br>

Carlos Santiso
1851 North Scott Street # 261
Arlington, VA 22209
USA
<csantiso@sais-jhu.edu>

Rosana Guber
IDES
Araoz 2838
1425 Buenos Aires
ARGENTINA
<guber@arnet.com.ar>

Eduardo Canel
Faculty of Arts
Division of Social Sciences
4700 Keele Street
Toronto, ONT M3J 1P3
CANADA
<ecanel@yorku.ca>

William C. Thiesenhusen
2897 Jonathan Circle
Fitchburg, Wisconsin 53711
USA
<wthiesen@facstaff.wisc.edu>

Jeannette Graulau
U.P.R. Station
P.O. Box 21395
San Juan
PUERTO RICO 00931-1395
<jgrolo@hotmail.com>

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