

## CHAPTER 32

### CHALLENGES TO SUSTAINABLE SMALL-SCALE MINE DEVELOPMENT IN SURINAME

By Marieke Heemskerk<sup>1</sup> and Rachael van der Kooye<sup>2</sup>

<sup>1</sup> *Department of Rural Sociology, 308 Agricultural Hall, University of Wisconsin*

<sup>2</sup> *De West, Dr. J. C. de Mirandastraat 2 - 6, Paramaribo, Suriname.*

Over the past two decades, mining for gold has been a major catalyst for ecological, political, demographic and socio-economic change in the Amazon rainforest (Cleary 1990; MacMillan 1995; Schmink and Wood 1992). This chapter describes these dynamics for the small Amazon country of Suriname (Figure 1). No one knows *exactly* how many people are mining for gold in Suriname. Our estimates suggest that there are between 20,000 and 25,000 small-gold miners active in Suriname at any given time<sup>1</sup>. However, some believe that there may be twice as many (Quick et al. 2001).

Even though Suriname miners constitute a small proportion of the total number of miners in the Trans-Amazon region, their activities are reshaping economics, politics, land-use, the natural environment, and social relations in Suriname. Small-scale gold mining provides foreign exchange to the economy of Suriname and a livelihood for many of the rural poor. These economic benefits are offset by an increase in violent crime; a malaria epidemic; the spread of sexually transmitted diseases; mercury pollution of the aquatic ecosystem and forest peoples; and a degraded forest ecosystem (De Kom, Van Der Voet, and DeWolff 1998; Healy 1996; Heemskerk 2001; Peterson and Heemskerk 2001; Pollack et al. 1998; Van der Kooye 1997).

For the purposes of this discussion, the term “small-scale gold mining” is used to describe both manual and mechanized mining characterized by:

- Informality – that is, a large degree of autonomy of national social, legal, and economic regulations; and
- A labor force that is not formally trained in mining.

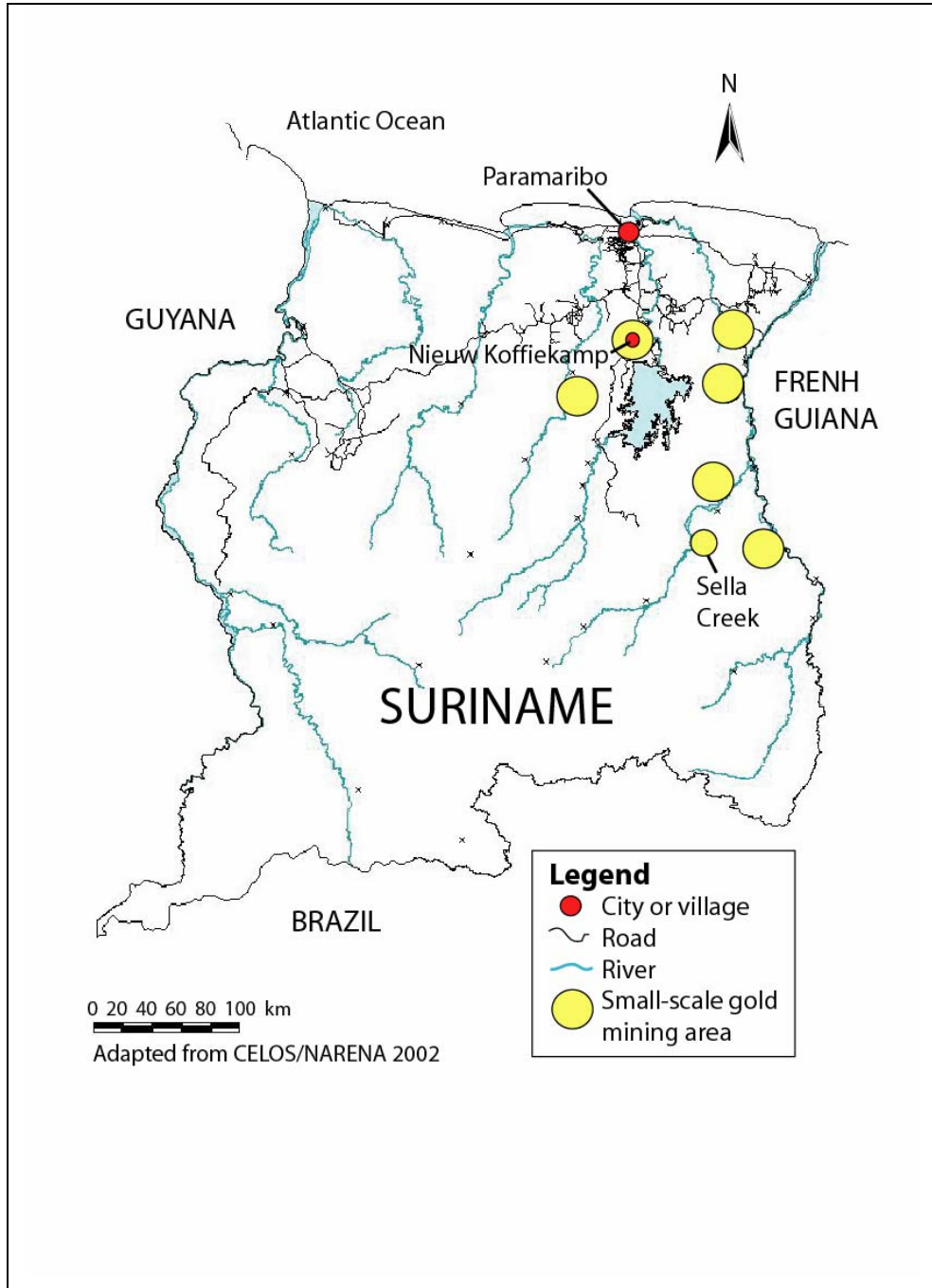
Small-scale gold miners in Suriname work on dredges in rivers, pan river-sediments and mine tailings, and use hydraulic machines of different degrees of power. This chapter is primarily concerned with hydraulic,

---

<sup>1</sup> The Central Bank of Suriname bought, in the past 5 years (1997-2001), an average of 5,391 kg gold/yr, and has estimated that this accounts for 25% of the national gold production (Central Bank, pers. com., 1999 and 2002). These figures suggest that about 21,500 ± 2,000 kg gold are produced in Suriname annually. Observations from Suriname suggest that a small-scale miner who works year-round produces, on average, 1 kg/gold per year (Veiga 1997). Hence, it is likely that there are roughly between 20,000 and 25,000 miners actively mining for gold in Suriname at any given time.

land-based gold mining, which is by far the most common extraction process in Suriname. This method is explained in more detail in Box 1. Because miners follow trails of secondary alluvial deposits through the forest, this type of mining is also called strip mining (Figure 2).

**Figure 1:** Map of Suriname with the main small-scale gold mining areas and sites mentioned in the paper.



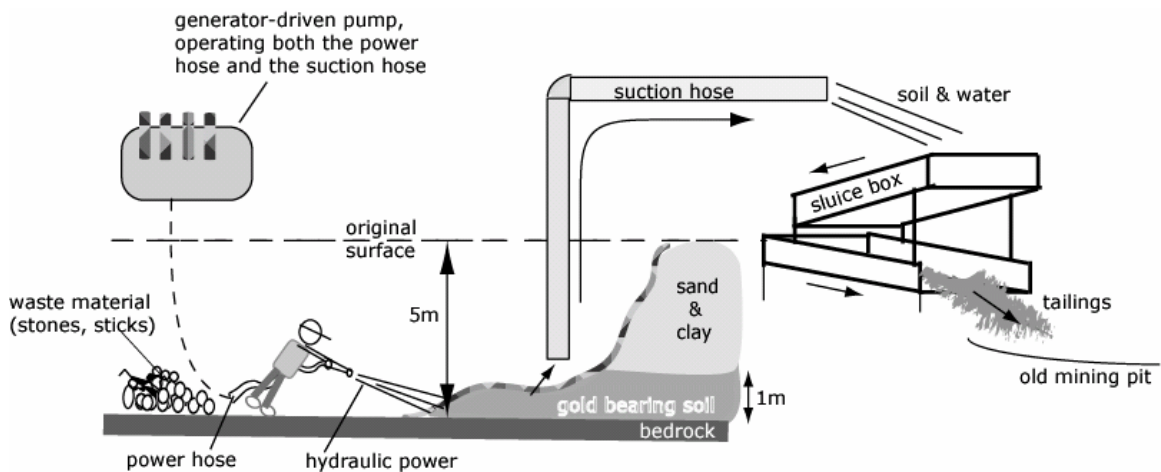
**Box 1:** Small-scale mining methods

Hydraulic gold miners work through several stages. Miners start by exploring possible sites, often near the

site of another miner who is known or believed to have hit a good location, following the projected direction of the ancient streambed. Rudimentary prospecting methods consist of digging one or several holes of about 2 m deep. The contents are washed with a *batea*, a circular metal pan with a pointed bottom. If gold is encountered, a site is deemed suitable.

After site selection, a forest area of about one ha is cleared from trees and under-story. A generator powered mining machine is placed at the prepare site, and empowers two types of hoses. One or two power hoses divert high pressure water to remove first the top layer of sand and clay, and later the gold bearing layer of soil (see illustration). The soil-water mixture is pumped through the suction hose into a sluice-box. This piece of mining equipment consists of a series of tilted wooden boxes. Gold particles and other heavy minerals are trapped behind riffles and/or a metal screen, and in the fine mat that covers the bottom of the sluice box. The mine tailings – gravel, sand, and clay from which gold has been (partly) removed – flow into either an abandoned mining pit or adjacent forest.

After two or three weeks of work, the sluice-box is ‘washed’. Gold is recovered by washing the screen and the mat with water, meanwhile applying mercury that chemically binds with gold but not with the other heavy minerals that have been retained. Gold and mercury combine in a ratio of 1:1 to form an amalgam. At last mercury is separated from the gold by evaporation. The most cost-effective and healthiest way to burn off mercury would be to use a closed system, such as a retort, which recovers mercury for re-use. In our experience, however, most miners simply heat the gold mercury amalgam in a *batea*, either in the open air or in a closed space.



Mining engineer Dahlberg (1984) provides detailed descriptions of various scale-scale gold mining methods, based on experience in Suriname.

**Figure 2:** Hydraulic mining in the Suriname forest, seen from the air.



Our analysis builds on primary data from anthropological fieldwork and investigative journalism, supplemented with information from secondary sources (Heemskerk 2000; Van Der Kooye 1997). In addition to gold miners and their families, interviews were conducted with officials from the Suriname government, and institutions in Suriname, including the Central Bank, the Organization of American States, the *Cooperativo de Garimpeiros*, local Non-Governmental Organizations, and the University of Suriname in Paramaribo. The following sections introduce the study country, Suriname, and its mining population. Next, the chapter describes labor relations and organization, jobs and earnings in mining areas, and health and environmental impacts. The chapter concludes by describing the challenges to sustainable gold mining development in Suriname, reflecting upon policy interventions that might steer this development in a positive direction.

### 32.1 SURINAME

Suriname, formerly Dutch Guyana, is situated north of Brazil between French Guiana and Guyana. Its 425,000 people live almost entirely along the coast (ABS 2000). Minimally impacted tropical rain forest covers the remaining 80% of the country. This forest houses and provides sustenance to forest peoples: Amerindians (est. 10,000 to 22,000 people) and Maroons (est. 45,000 people). (Kambel and MacKay 1999). Maroons are the descendants of runaway African slaves, who established independent communities in the rainforest in the sixteenth and seventeenth centuries.

Suriname's forest peoples have maintained relative political, social and economical sovereignty within the nation state. However, their access to land, natural resources and self-determination is vulnerable because the government has refused to recognize their individual or group property rights (Kambel and MacKay 1999). According to Suriname law, all land and subsoil resources within the territory of Suriname belong to the state. Human rights lawyers have contested this law. Referring to international conventions ratified by the Suriname state, including the United Nations and Organization of American States declarations on the rights of indigenous peoples, they argue that:

Suriname has definite and substantial obligations under international human rights law to recognize and respect indigenous and Maroon rights ... to be free from discrimination; to own and use their lands and resources; to participate in decision-making; and to practice their cultures.... (Kambel and MacKay 1999: 173).

Today Maroon and indigenous rights are threatened by logging and mining concessions that overlap with their territories and villages (Healy 1996; Heemskerk, in press).

Suriname's gold deposits are part of the Guiana Shield, a geological greenstone formation that covers 415,000 km<sup>2</sup> of Venezuela, the Guyanas, and Brazil (Veiga 1997). These deposits have been mined

informally and formally through Suriname's history (Bubberman 1977). However, the current number of people involved, the amount of gold extracted, and the social and ecological impacts of mining are greater than during earlier mining activities (Heemskerk 2001). Because most small-scale gold mining in the country occurs informally and quasi-legally, estimates of its production are speculative. These estimates suggest that annual gold production increased from about 30 kg yr<sup>-1</sup> in 1985 (Gemerts 1986) to between 20 and 25 tonnes in the late-1990s<sup>1</sup>.

Virtually all gold is extracted by *small-scale* gold miners. Suriname Maroons make up approximately one quarter of the mining population, and the remaining three-quarters are Brazilian gold miners called *garimpeiros* (Veiga 1997). They usually work on small-scale (< 200 ha) concession areas that belong to individuals who obtained a government small-scale mining permit. Miners officially have to pay a fee for working on someone else's concession, but poor infrastructure and control mechanisms prevent this rule from being enforced in the more isolated parts of the forest.

Depressed gold prices discouraged large-scale mine development throughout the 1990s, but price recovery has motivated multinational companies to restart their activities in 2002. The Canadian gold exploitation company, Cambior Inc., established the operational corporation Rosebel Goldmines to construct a gold mine in the area of Gross Rosebel (Fig. 1). The mine is anticipated to be operational by the beginning of 2004<sup>2</sup>. Given prior hostilities between GSR, Maroon communities in the concession area, and local gold miners, conflict can be expected as the mining company develops the site (Box 2).

---

<sup>2</sup> The investments will be US\$95 million, while an annual production of 6700 kg gold with a value of US\$66 million/yr is expected. The company anticipates that it will employ 600 people for construction and operation of the mine.

## **Box 2: The Koffiekamp conflict**

In 1994, the Canadian company Golden Star Resources Ltd. (GSR) concluded a Mineral Agreement with the government, granting it exclusive rights to explore the Gross Rosebel concession. The Maroon village of Nieuw Koffiekamp, which has a population of 500-800 people, was – and still is – located centrally in the company’s 17,000 hectare concession. In accordance with the mining agreement, GSR wanted to expel local small-scale miners because they “hindered the exploration activities of the company”. At first GSR wanted the entire village to be removed because it was situated too close to the planned mine location. Officials said they were concerned that exploitation activities would threaten the safety of the villagers.

Villagers of Nieuw Koffiekamp feared and refused relocation, in particular because they still experienced trauma of a previous relocation in 1965. In that year, their historic villages were flooded to make place for a dam to generate electricity. Ironically, the villagers were relocated on a large heap of gold, which became the Gross Rosebel Concession.

More informed than in the past and backed by human rights lawyers, Maroons voiced the opinion that they had a right to determine how the land and resources around the villages should be divided, managed, and used. In early 1995, Nieuw Koffiekamp residents complained that they were intimidated by armed guards and that their subsistence activities, including small-scale gold mining, were being restricted by GSR security personnel and armed police units, including the paramilitary Special Police Support Group. Villagers also said that these parties were firing live ammunition at them to keep them away. These allegations have been substantiated by Suriname’s main human rights organization.

The conflict was never resolved but withered away in the late 1990s, when gold prices reached such a low point that it became unprofitable for GSR to further invest in mine development. Recovery of gold prices in 2001 has motivated GRS to restart its activities, to great distress of Nieuw Koffiekamp residents. GSR has stated that it no longer foresees removal of the entire village in the process of mine construction. Instead, company officials have declared that community development is an integral part of their mining project. As of today it is unclear what this means, and whether the project plan is acceptable to local Maroons and gold miners.

*Sources: Healy 1996; Kambel and MacKay 1999, Van der Kooye 1997*

## 32.2 WHO IS INVOLVED AND WHY?

### 32.2.1 Maroons

Maroons have historically mined for gold and provided services in the gold mining industry, but the role of mining in the household economy has changed. In the early days, small-scale gold mining was done infrequently and temporarily when cash was needed. Today, by contrast, it has become the primary source of subsistence of many Maroon households in eastern Suriname.

Maroons are working in gold mining more than any other ethnic group in Suriname in part because they have been disproportionally impacted by the rise in rural poverty, increased economic instability, and the 1986-1992 civil war (Heemskerk 2001). Maroon miners themselves explained their occupational choice by the lack of other jobs that earned sufficient income to sustain a family, and their limited formal education (Heemskerk 2002). Historic tension between Maroons and urban people, who hold the keys to alternative jobs, poses an additional barrier to entering the national labor market (Price 1995). Moreover, several Maroons said they preferred informal work and life in the forest rather than the city.

### 32.2.2 Garimpeiros

The arrival of *garimpeiros* in the 1980s was crucial in modernizing small-scale mining methods and management in Suriname. Most *garimpeiros* had many years of mining experience before coming to Suriname. Their exodus out of Brazil into the larger Amazon area was a response to efforts by the Brazilian government to regulate, limit, and control small-scale mining (MacMillan 1995; Schmink and Wood 1992). *Garimpeiros* said that they had become gold miners for largely the same reasons as Maroons: increasing costs of living, coupled with unemployment and minimal formal education. They had come to Suriname because, as they lamented, protected areas in Brazil had been closed off to *garimpeiros*. The few leftover mining places were exhausted or overpopulated. Suriname had seemed attractive for its relative lack of government control, and exaggerated rumors about its richness.

Better organized than local miners, many *garimpeiros* are part of a cooperative where they exchange information, sell gold, and find labor and legal assistance. Because foreigners cannot obtain a small-scale mining concession, legal *garimpeiros* need to work with a Suriname associate or pay a Suriname concessionary about 5-10% of their earnings for the privilege of working on his or her concession. Some *garimpeiros* felt deceived by promises of rich gold fields. They complained about being exploited by Maroons and targeted by criminals. Others were pleased by the relative safety in Suriname mining areas and tranquillity of its capital city. A significant number of Brazilians in this latter group have settled in Suriname, learned some of the local Creole dialect, and sent for their families or begun relationships with Suriname women. Today, entire neighborhoods in Paramaribo are ethnically Brazilian, featuring Brazilian restaurants, music, stores, and services. It is unclear how much of *garimpeiros*' earnings flow back to Brazil. While Brazilians said that few *garimpeiros* sent money to their families at home, others asserted that they did so whenever possible.

### 32.2.3 Local and foreign miners

Brazilians and Maroons work together in a brittle symbiosis. The lack of a common language, history, and culture creates distrust, tension, and occasional conflicts. Notwithstanding, each group usually respects the others' skills and knowledge, and realizes their mutual dependency. Brazilians tend to admire the Maroons' extensive knowledge of the river system and natural resources, and depend on them for access to transport, food, lodging, and mine sites in the isolated and inhospitable Suriname interior. Nevertheless, *garimpeiros* prefer to work with and for other Brazilians who, in their eyes, have more advanced mining skills, experience and knowledge. Moreover, *garimpeiros* find Suriname mine operators cheap. The food in Suriname mining camps, in particular, the lack of vegetables and fresh meat, is a source of continuous complaints. 'I only worked for three days there', recounted one *garimpeiro*: 'when you work with the blacks [Maroons] you are always hungry'.

Maroons acknowledge the mining expertise and work ethic of Brazilian miners. One Maroon mining boss said that he preferred working with Brazilians because he had found Maroons less reliable. His (Maroon) relatives would unexpectedly travel to their home villages for festivities, rituals, and funerals, or to visit their wives and children. Moreover, Maroon laborers objected to rigid work schedules and inflexible orders from their kinsmen. Brazilians, who do not have family or home communities nearby, would labor 12-hour days for months in a row. Yet, *garimpeiros* are not trusted like family. Maroon miners are convinced that, if given the chance, Brazilian team members would hold back a couple of grams of gold here and there. For this very reason, mine operators always have at least one Maroon miner on the team to supervise the foreigners.

#### 32.2.4 The mining economy

Monetary transactions in Suriname mining areas typically occur in gold, but there are large differences in payment systems and earnings between, and within, professional groups. Miners who work with hydraulic equipment typically form teams of six laborers, a boss, an overseer, a cook, and occasional temporary laborers.

The machine-owner typically supplies food, shelter, and equipment in exchange for 70% of gold recovered. Surveyed mine operators in Eastern Suriname had invested approximately US\$20,000 to start up an operation (6-inch hydraulic unit), and spent an additional US\$5,000 per month to keep their operations going (N=21, SD= 421). Despite these expenses, mine operators reported higher average net earnings than people in other professions (N=21, Mean = 344 g. gold/month, SD=364). These earnings ranged from a low of 14 g to over 1 kg/month – reported by the most successful operators (1 g gold–9 US\$, 1999). These well-off entrepreneurs augmented their income by running stores and bars with satellite TVs and videos to entertain their laborers and those of surrounding camps.

Pit workers divide the remaining 30%, which translates to 5% per laborer if there are six people working in the pit. Among surveyed pit workers, 39% had earned between 20-40 g/month in the month prior to the interview, which amounts to US\$180-360 at an average of US\$9 per gram of gold (in 1999). Over a quarter (27%) had earned less than that. Pit workers earned higher wages in more advanced operations that featured bulldozers, back-hoe excavators, and heavier pumps. Several pit workers in such operations reported earnings of more than 150 g (US\$1350)/month. In 2002, the Cooperativo de Garimpeiros in Suriname estimated that the average *garimpeiro* earned between US\$500 and US\$1500 a month (personal communication, October 2002).

Cooks typically receive fixed wages that they augment by performing services. In the late-1990s, in the Sella Creek mining area, cooks usually earned 60 gram of gold per month – the equivalent of US\$540. The earnings of shop owners and commercial sex workers were more variable and because they are often paid

in credit, they risk receiving only about half of what they are owed. Nevertheless, sex workers earned some of the highest wages, and often lent money to gold miners.

Regardless of one's profession, mining wages compared favorably to wages in formal jobs. In 2002, low and unskilled workers in the city made approximately US\$100 per month, and college-educated professionals, such as nurses and administrators, made about US\$200 per month. An additional benefit of working in the mining area is that the mine operator will buy food and provide housing. Hence, one can save all the money one earns. With today's inflated prices for food and housing, an uncertain yet, on average, better mining income, may provide more security than a salary paid in devaluated Suriname guilders.

### 32.3 HAZARDS AND HEALTH RISKS AT SMALL-SCALE GOLD MINES

Life in the mining area is emotionally and physically demanding. Miners live for months in a row in mining camps that are based a long way from their home. Their working methods and environment expose them to chemical contaminants, heat stress, ergonomic problems, unsafe equipment and mine structures, unsanitary conditions, malaria, and unsafe sex. Unbalanced diets, long work hours, and alcohol consumption further decrease the body's natural resistance mechanisms to disease (Walle and Jennings 2001).

Significant mining-related environmental damage was observed in six investigated gold mining areas. Due to mining waste disposal, most creeks and rivers near important Suriname gold mining areas were extremely turbid. A recent study found that water transparencies varied from 0 to 50 cm in some creeks, to 50 to 70 cm in larger rivers. Only two of Suriname's larger rivers showed transparencies higher than 100 cm (Quick et al. 2001). As a result, villagers situated near gold fields lack safe drinking water, and in some places, women walk for hours to find clean water. Furthermore, hydraulic mining has shifted creek banks, and the residues have killed trees by flooding the forest. Some abandoned mining pits have evolved into quick sand areas that trap wildlife. Other pits that filled with water have become habitat for the malaria-infected mosquito. Its epidemic form and increasing drug-resistance have made malaria a leading cause of illness and death in forest communities, and the most severe mining-related public health hazard.

Infection with sexually transmitted diseases, including HIV/AIDS, threatens the health of commercial sex workers and their clients, as well as that of their families. A recent report on HIV/AIDS in Suriname by a consortium of international organizations was foremost characterized by a lack of information (UNAIDS et al. 2002). In particular, there are no HIV/AIDS data on Maroons and small-scale miners, who are the groups most at risk.

Media and scientific attention toward the Amazon gold rush has foremost focused on miners' use of mercury and resulting pollution of aquatic resources, forest peoples, and gold miners (MacMillan 1995). Estimating how much mercury miners release into the environment is difficult, as is estimating its net effect on human and ecosystem health. Miners reported using about one kg of mercury per kg of gold extracted. Given an annual gold production of 20,000 to 25,000 kg and low mercury recycling rates, over 20,000 kg of mercury may be released into Suriname's air and waterways per year. This figure corresponds with estimates that 20,000 kg of mercury is imported annually (Pollack et al. 1998). None of the Brazilians or Maroons interviewed and witnessed used retorts (closed systems to recycle mercury). The only precaution they took was to stay upwind when burning the mercury-gold amalgam.

Studies comparing mercury-exposed Maroon miners with non-exposed Maroons report some differences in mercury levels in blood, hair, and urine samples (Cordier et al 1998; De Kom et al. 1997; Mol et al. 2001; Pollack et al. 1998). Quick et al. (2001) found that one third of surveyed carnivorous fishes in Suriname rivers had mercury levels above the safety cut-off standard of 0.5 mg per kg. Due to the relatively recent onset of the Suriname mining boom, chronic mercury contamination in people is not yet apparent in most places. Of the 28 miners surveyed by De Kom et al. (1997), only one individual had a urine mercury level exceeding World Health Organization (WHO) standards. Pollack et al. (1998) found that even though mercury levels in exposed women and children near mining areas were higher than those in the control group, the average Hg levels were comparable with mean total mercury reference values in industrialized countries. Notwithstanding, classic symptoms of mercury poisoning, such as trembling and nausea, were observed in mining areas.

Because unhealthy conditions in the mining area reinforce one another, it is difficult to single out the effects of *any* one disease. Headaches, nausea, dizziness, and faintness can indicate malaria but also mercury contamination, alcoholism, and overexposure to sun. People whose liver has been affected by excessive alcohol consumption have less resistance to malaria, and people who frequently contract malaria are more susceptible to the effects of mercury contamination.

#### 32.4 SMALL-SCALE GOLD MINERS, LARGE-SCALE MINERS, AND THE GOVERNMENT

Suriname's Ministry of Natural Resources has little grip on small-scale gold miners, few of whom bother to seek legal endorsement of their activities. Many Maroon miners feel it is unnecessary to apply for a permit to work on lands that they traditionally view as theirs', even though they do not have legal titles. Moreover, the bureaucratic application procedure is complicated, slow, and believed to favor government allies. Maroons also have little means to meet the legal requirements to have an office in Paramaribo, and to supply the Geological Mining Service with a written report of exploitation and exploration findings every three months (Government of Suriname 1986).

Despite non-conformance to national regulations, most miners will adhere to local rules about stakes in the mining area. Tight kin-relations and strong social control allow many conflicts among Maroons to be solved informally. When conflicts do get out of hand, they are brought before a council of Maroon elders, which allocates responsibility and punishment. While the tribal legal system successfully mitigates local disagreements, it has little power to settle conflicts between gold miners, and the government and large scale companies.

In 1995, conflict escalated between the village of Nieuw Koffiekamp and the Canadian gold exploration company Golden Star Resources, which was backed by the Suriname government (Van der Kooye 1997). Because this conflict illustrates the issues at stake in regulating the Suriname gold mining sector, its development is described in more detail in Box 2. Today, the Nieuw Koffiekamp conflict is being replicated in the Nassau Mountains (Fig. 1). In 2002, the Suriname Aluminum Company (Suralco), a joint-venture between the state of Suriname and the US-based bauxite company ALCOA, acquired a gold concession in the Naussau mountains. The concession area overlaps with the traditional homelands and economic use zone of the Paramaka Maroons, who were not informed or consulted. In the summer of 2002, the government forcefully removed local gold miners from the concession to keep them from interfering with the company's exploration activities. Like the miners of Nieuw Koffiekamp, Paramaka miners feel that Suralco's mining activities violate their traditional rights.

#### 32.5 LESSONS FROM ABROAD

Examples from other countries suggest that it is possible to develop the small-scale mining industry in a way that minimizes social conflict, environmental degradation, the spread of disease, and illegality. In some Amazon countries, large-scale mining corporations have developed partnerships with small-scale gold miners (Barry 1996, ILO 1999). One such arrangement in Venezuela allows small-scale miners to mine alluvial gold on the concession of Las Cristinas (a joint venture between the Corporación Venezolana de Guyana and Placer Dome Venezuela) with the technical advice and assistance of company engineers

(Jeffrey Davidson, pers. com. September 2002). Mine managers from Las Cristinas worked with community leaders to select a working area that was both acceptable to small-scale miners and of little economic interest to the company. Las Cristinas further agreed to tolerate gold panners on its main property provided they would not interfere with exploration activity. By working with, rather than against, local miners, the company is hoping to reduce the possibility of invasion by miners who previously worked on its concession.

Another promising direction is the certification of eco-gold or Green Gold, that is, gold that is produced in an ecologically responsible manner. An international group of ecologists, miners, activists and small traders is currently exploring viable mining methods and market potentials (Coalition for Green Gold 2002). Its aim is to certify gold that is extracted without cyanide or mercury, with methods that minimally impact forest cover and replace the organic topsoil after mining. One Green Gold pilot project is currently being developed in the Choco rainforest in Colombia. Its aim is to develop a system of certification through an alternate marketing system that empowers artisanal miners to conserve and protect their lands.

## 32.6 POLICY RECOMMENDATIONS AND CONCLUSIONS

Transformation of Suriname's current small-scale mining sector into a more sustainable enterprise will require small-scale miners, concessionaries, the Suriname government, transnational mining companies, and international agencies to enter dialogue and collaborations. Our policy recommendations for each of these stakeholder groups, and relations between them, are summarized in Table 1 and outlined below:

### 32.6.1 Maroon small-scale gold miners

Maroon gold miners would stand stronger if they were to organize themselves into associations or cooperatives, like many of their colleagues elsewhere. In the recent past, Suriname Maroon miners have organized when confronted with direct threats to their livelihoods. In 1994, when Golden Star Resources (GSR) wanted to remove approximately 2000 small-scale gold miners from its exploration concession, Maroon miners created an association to negotiate with GSR and the Suriname government. Their negotiations ended with the assignment of another, acceptable, gold mining area to local miners. In 1995, a similar conflict occurred at the Lawa River between local Maroon gold miners and a consortium of Grassalco (Suriname) and the Canadian mining company Canarc. Organized in an association, Maroon miners won the right to continue mining on part of the concession.

Examples from Brazil, Venezuela, Peru, and Bolivia show that by providing basic health care and education services and regulating alcohol consumption and prostitution in mining sites, Miners' Cooperatives can improve the well-being of miners and their families. Cooperatives in these countries have helped small-scale gold miners negotiate agreements with the government and large-scale operations;

acquire concession rights and information; and invest in newer, more efficient, and cleaner technology. Unlike these examples, Maroon miners' associations usually have fallen apart when threats have vanished. At this moment, only one group of gold miners from the village of Nieuw Koffiekamp has organized in the Koffiekamp Collective. The Collective has obtained permission to mine on the concession of GSR, as long as its members are not hindering the company's exploration activities. Small-scale miners elsewhere in Suriname could gain from following this example.

Environmental and health effects associated with current small-scale mining methods jeopardize the future of Maroon communities near mining areas. Because miners' families that live in these communities are most at risk, Maroon miners may have a personal stake in mining with cleaner methods. Indeed, some local communities are actively seeking out ways to reduce environmental damage. For example, one Maroon village received a grant to develop a demonstration site where gold miners could be trained in environmentally sound mining methods. It is difficult to motivate small-scale miners to change their practices, as long as environmental impacts do not visibly affect them, and alternative income-generating options are rare.

#### 32.6.2 Suriname Concessionaries

At present, concessionaries are not held liable for adverse social and environmental impacts resulting from mining in the areas which they have acquired legal mining titles. As the main parties responsible for, and beneficiaries of, mining on their concessions, it should become possible to oblige concessionaries to clean up abandoned mine sites. However, such a regulation only makes sense if law-enforcement authorities have the capacity to control and enforce mining legislation. Specifically, laws are more likely to be respected if violators can be fined or otherwise punished (for example, by confiscating their concessions).

Stricter regulations and more serious consequences for not following them may motivate concessionaries to encourage small-scale miners to use environmentally sound mining techniques, as it will ultimately be cheaper to reduce environmental impacts than to clean up damages. In more positive terms, if green gold certificates can guarantee higher market prices for gold, certification could make the promotion of green mining on one's concession ultimately more profitable.

#### 32.6.3 Large-scale mining companies

Large-scale gold mining companies in Suriname can learn from the Venezuelan example in their attitude towards small-scale gold miners. The story of Las Cristinas teaches that working with local miners decreases sabotage by local people, lost work days due to conflict, the need to hire armed guards, negative public opinion, and international court cases. In addition, partnerships can benefit local miners by supporting technical and financial inputs that transform small-scale mining operations into more efficient and stable enterprises.

Violent removal of local miners and villagers fixes the trespassing problem in the short term, but offers no *real* solution. In order to develop more beneficial and durable company-community relations, large-scale mining companies must recognize community rights to ancestral lands and resources. In addition, mining multinationals have an opportunity to contribute to community development – and thus appease stock holders – by helping small-scale miners use more productive, safe, and environmentally responsible gold mining techniques. By facilitating small-scale miners in these ways, large-scale companies will also contribute to environmental protection in and around their concession areas.

#### 32.6.4 The Suriname Government

The Suriname government is responsible for steering collaboration between the above-mentioned parties. Recognition of traditional land rights would be a first step towards achieving this goal, because social disruption is likely to follow multinational activities on Indigenous and Maroon lands, such as in the area around Koffiekamp and the Naussau Mountains. Moreover, a better relation with its interior populations may improve the image of Suriname among donor countries, on which it depends to settle its national accounts

The Suriname government has announced a multidisciplinary approach to accomplish this goal, incorporating the Ministries of Justice and Police and Defense (to fight crime), the Ministry of Public Health (to reduce health hazards), the Ministry of Regional Development (to incorporate local communities in policy-making), the Ministry of Foreign Affairs (to regulate *garimpeiros*), and the Ministry of Labor, Technological Development, and Environment (to improve labor conditions and reduce environmental pollution). To date, the human and financial resources needed to effectively implement this policy have been lacking. Hence, the government is turning a blind eye to small-scale gold mining practices.

#### 32.6.5 International agencies

More sustainable development of Suriname's small-scale mining sector requires implementation and active enforcement of laws that discourage the use of mercury, that punish deforestation and award reforestation, and that encourage development and transfer of cleaner mining techniques. Donor countries and Non-Governmental Organizations (NGOs) can assist in this process by offering financial and professional assistance to ground personal in the forest (e.g. rangers, police), vehicles and other equipment, and bureaucratic infrastructure. Training of concessionaries, small-scale gold miners, and government officials could help stakeholders work more efficiently.

Secondly, outside funding and knowledge can help design and implement infrastructural changes. The Suriname mining sector could benefit from the assistance of mining engineers who have tested and implemented green mining techniques elsewhere. Building water purification installations and locating groundwater sources can improve access to clean water. Moreover, the health and well-being of forest

peoples is likely to benefit from improved access to communication (e.g. radio, phone), quality education, and a strong health care system. International assistance is important because it is unlikely that the Suriname government will be able to finance the above mentioned developments.

At present, several NGOs (PAHO, World Wildlife Fund) are proposing small-scale gold mining related projects. These seek to: increase technological efficiency; improve working and living conditions of gold miners; improve the health of miners and communities nearby mining areas; and reduce mercury contamination and river turbidity.

Policies aimed at greening the mining sector will be more likely to succeed if they incorporate the social and economic concerns of small-scale gold miners and their families. Reliable data about the forest and its inhabitants is currently sparse. It is not known how many locals and foreigners are mining; how many families rely on mining income; where miners work; how much they find; what their money is spent on; and how these issues are changing over time. The development of a database with demographic and socioeconomic data on gold miners and their families is a first step towards the design of new mining policy.

In addition to a base-line survey, research is needed to answer pressing questions about the causes and consequences of the Suriname mining boom. Suriname and foreign studies continue to document technical, environmental, and health aspects of the small-scale mining industry. For example, Suriname researchers are studying the impacts of mercury and sedimentation of creeks and rivers. The Suriname Medical Mission (Medische Zending) and PAHO are planning a survey on HIV/AIDS infection and transmission, and scientists from the University of Suriname are designing more benign mining techniques. International funding and governmental logistical support will help bring these projects to completion.

In addition to the mentioned fields of interest, the socio-cultural and economic lives of small-scale gold miners merit more attention. Without incorporating the opinions, beliefs, and life realities of local miners, policy interventions aimed at changing the behavior of these miners are doomed to fail.

**Table 1:** Policy recommendations for improving the state of the industry

- |  |
|--|
| <ul style="list-style-type: none"><li>❖ Organization of Maroon small-scale gold miners in Miners' Associations</li><li>❖ Holding concessionaries liable for social and environmental mining damage on their concession areas</li><li>❖ Establishment of partnerships between large-scale mining companies and small-scale miners that include training in more sustainable small-scale mining methods by mine engineers.</li><li>❖ Implementation of stricter mining and environmental laws that suit the Suriname context; Allocation of human and financial resources to enforce these laws.</li><li>❖ Fostering collaboration and dialogue between all stakeholders; Recognition of indigenous and Maroon land rights.</li><li>❖ Commitment of donor countries and institutions to provide financial and professional support for legal, institutional, and technological transformation of the small-scale mining industry.</li><li>❖ Continued research on the driving forces and consequences of small-scale gold mining in Suriname; Evaluation of the perspectives, motivations, and future visions of local gold miners and their families.</li></ul> |
|--|

## REFERENCES

- Barry, M., 1996. Regularizing Informal Mining. A Summary of the Proceedings of the International Roundtable on Artisanal Mining. May 17-19, 1995. Occasional Paper #6, World Bank, Industry and Energy Department, Washington, DC. URL: [http://www.worldbank.org/html/fpd/mining/m3\\_files/art/arhome.htm](http://www.worldbank.org/html/fpd/mining/m3_files/art/arhome.htm) (Access date: November 10, 2002)
- Bubberman, F.C., 1977. De Gouden Draad. *Suralco Magazine*, 9(3): 14-19.
- Cleary, D., 1990. *Anatomy of the Amazon Gold Rush*. University of Iowa Press, Iowa City, 245 pp.
- Cordier, S. et al., 1998. Mercury exposure in French Guyana: Levels and determinants. *Arch. Environ. Health*, 53: 299-303.
- De Kom, J.F.M., Van Der Voet, G.B. and De Wolff, F.A., 1998. Mercury Exposure of Maroon Workers in Small-Scale Gold Mining in Suriname. *Environmental Research*, 77(Section A): 91-97.
- Gemerts, G., 1986. *Goudmijnbouw in Suriname*, Seminar, University of Paramaribo, Paramaribo, Suriname.
- Coalition for Green Gold, 2002. If it ain't green, it ain't gold. Rainforest Information Centre (RIC). URL: <http://www.rainforestinfo.org.au/gold/ecomine.htm> (Access date: November 10, 2002)
- Government of Suriname, 1986. Mining Decree E-58 of May 8, 1986, Containing General Rules for Exploration and Exploitation of Minerals. E-58, Republic of Suriname, Paramaribo.
- Healy, C., 1996. *Natural Resources, Foreign Concessions and Land Rights: A Report on the Village of Nieuw Koffiekamp*, Organization of American States (OAS), Special Mission to Suriname, Unit for the Promotion of Democracy, Paramaribo, Suriname.
- Heemskerk, M., 2000. *Driving Forces of Small-Scale Gold Mining Among the Ndjuka Maroons: A Cross-Scale Socioeconomic Analysis of Participation in Gold Mining in Suriname*. Ph.D. Thesis, University of Florida, Gainesville, FL, 194 pp.
- Heemskerk, M., 2001. Do International Commodity Prices Drive Natural Resource Booms? An Empirical Analysis of Small-Scale Gold Mining in Suriname. *Ecological Economics*, 39: 295-308.
- Heemskerk, M., 2002. Livelihood Decision-Making and Environmental Degradation: Small-scale Gold Mining in the Suriname Amazon. *Society and Natural Resources*, 15(4): 327-344.
- Heemskerk, M., InPress. Scenarios in Anthropology. Reflections on Possible Futures of the Suriname Maroons. *Futures*. Special issue: Futures of Indigenous Peoples., Scheduled to appear Fall 2002.
- International Labour Organization (ILO), 1999. *Social and Labour Issues in Small-Scale Mines*. Report for discussion at the Tripartite Meeting on Social and Labour Issues in Small-scale Mines., International Labour Organization, Sectoral Activities Programme, Geneva. Chapter 5: Legislation: A path to sustainable small-scale mining? & Chapter 6: Large-scale and small-scale mining: Cooperation or confrontation? URL: <http://www.ilo.org/public/english/dialogue/sector/techmeet/tmssm99/tmssmr.htm#5>. (Access date: November 10, 2002)
- Kambel, E.R. and MacKay, F., 1999. *The rights of indigenous peoples and Maroons in Suriname*. International Work Group for Indigenous Affairs, Copenhagen, Denmark.

- Kooye, R. v.d., 1997. Porknokerij in de Media. Berichtgeving en Effecten van Dagbladberichtgeving over kleinschalige goudwinning in Suriname, 1994-1995. Masters Thesis, Akademie voor Hoger Kunst- en Cultuuronderwijs, Paramaribo.
- MacMillan, G., 1995. At the End of the Rainbow? Gold, Land, and People in the Brazilian Amazon. Methods and Cases in Conservation Science Series. Columbia University Press, New York, NY.
- Mol J.H., R.J., Lietar C, Verloo M, 2001. Mercury contamination in freshwater, estuarine, and marine fishes in relation to small-scale gold mining in Suriname, South America. *Environmental Research*, 86(2): 183-197.
- Peterson, G. and Heemskerk, M., 2001. Deforestation and Forest Regeneration Following Small-Scale Gold Mining in the Amazon: The Case of Suriname. *Environmental Conservation*, 28(2): 117-126.
- Pollack, H., Kom, J.d., Quik, J. and Zuilen, L., 1998 (n.d.). Introducing Retorts for Abatement of Mercury Pollution in Suriname, HWO Consultants NW, Paramaribo, Suriname.
- Price, R., 1995. Executing Ethnicity: The Killings in Suriname. *Cultural Anthropology*, 10(4): 437-471.
- Quick, J.A.A., 2001. Mercury in the Surinamese environment. *Interactie*, 5: 29-37.
- Schmink, M. and Wood, C.H., 1992. Contested Frontiers in Amazonia. Columbia Press, New York.
- UNAIDS, UNICEF, PAHO and WHO, 2002. Epidemiological Fact Sheet on HIV/AIDS and Sexually Transmitted Infections. Suriname.
- Veiga, M.M., 1997. Artisanal Gold Mining Activities in Suriname, UNIDO (United Nations Industrial Development Organization), Vancouver, Canada.
- Walle, M. and Jennings, N., 2001. Safety and Health in Small-Scale Surface Mines: A Handbook. International Labour Organization, Geneva, Switzerland.