

# Small- and Medium-Scale Gold Mining in Guyana: From Policy to Plan

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## Abstract

This paper examines the environmental and social impacts of small- and medium-scale mining in Guyana and discusses Guyana's draft mining policy document in light of those impacts. The paper will also recommend policy considerations, emphasizing the critical need to move from policy to planning to address this issue in Guyana.

## INTRODUCTION

Guyana is located at the northeastern corner of the South American continent. "Guyana" is an Amerindian word meaning "Land of Many Waters." This name reflects Guyana's numerous rivers and creeks, which are a part of the wider Amazon watershed. Guyana is also one of the greenest countries in the world with an estimated 90% of its 215,000 square kilometers still covered with forests, the majority being pristine.

Guyana's forests and waterways are under threat from the activity of small- and medium-scale gold mining (hereafter referred to as "smaller scale mining"). These mines dot the interior landscape and damage river and forest systems through pollution, sedimentation and deforestation. An estimated 40,000 to 60,000 Guyanese are presently engaged in smaller scale mining, affecting an estimated 650 km of river as well as 1 million hectares of rainforests (1). The environmental impact of smaller scale mining threatens one of the few remaining pristine rainforests in the world and the indigenous populations that occupy these areas. The negative consequences of these mines may well be far greater than the damage created by larger corporate conglomerates.

Smaller scale gold mining requires little or no start-up capital and is generally operated with

limited to no governmental oversight and little environmental consciousness. (Many miners are migrant workers from bordering countries.) It is therefore attractive to the poor, adventurous, and unemployed. Gold miners are often the primary economic providers for their families. They are mainly males who have migrated out of urban and other coastal areas. In the 1990s Guyana saw an increase in smaller scale gold mining in response to high unemployment due to structural adjust-



*Chemicals and fuel spill from mining operations into waterways.*

ment policies initiated by the government and international financial institutions (1). High levels of unemployment within urban centers are therefore a crucial factor in the number of people involved in this activity. Recent increases in the price of gold will have an even greater impact on the number of mining operations. This dramatic increase in smaller scale gold mining and its threats to Guyana's rainforest have caught the attention of many international organizations including The World Bank, World Wildlife Fund (WWF), Conservation International and the Commonwealth Secretariat. (The Commonwealth is an organization consisting of the former colonies of Britain.)

Despite the increasing awareness by the global community, smaller scale gold mining in Guyana continues to be an unregulated industry. Although a draft proposal for regulation was completed in 1999 by the Guyana Geology and Mines Commission (the agency responsible for mining in Guyana) and the Guyanese Environmental Protection Agency (Guyanese EPA), the document has not been enacted into policy. In addition, the draft policy document has several limitations in its approaches to address this issue. It is imperative that governments, investors and world lending institutions begin to embrace the development and enforcement of stronger policies governing where, when, and under what conditions smaller scale gold mining is performed not only in Guyana, but also in the other countries of the region.

## HISTORY

European explorers of the 15th and 16th century were attracted to the Guianas (Suriname, French Guiana, parts of Brazil and Venezuela) by myths that its interior contained the lost city of El Dorado, where the streets were paved in gold. This myth prevailed into the early 1800s and led to the Europeans and then the newly emancipated Africans into the interior in search of gold (2).

According to Cholchester (1), the first organized attempt to mine gold was made by a local syndicate on the Mazuruni river system in 1863 and 1864. The 1880s saw a boom in gold production from 40 ounces in 1882 to 11,906 ounces in 1887. Under threat from a possible invasion by Venezuela in 1887, the British Guiana administration opened up the northwestern portion of the country to mining claims. In 1838, the emancipation of slaves in the colony resulted in a mass movement of individuals into the interior in search of gold. At the commencement of the 19th century an estimated 6,000 African-Guyanese smaller scale gold miners were operating in the Mazuruni area. The 1970s saw another soar in smaller scale gold mining prompted again by territorial claims

of Essequibo by Venezuela and an increase in international gold prices. The government again encouraged miners to work the interior.

## GEOLOGY

Guyana is part of the Guiana shield, one of the oldest and richest deposits of minerals in the world. The rocks and sediments of Guyana can be divided into four groups: Precambrian, Upper Proterozoic, Roraima Super and Cretaceous to Recent Coastal.

The Roraima Plateau is the mouth of what was a huge riverbed when the South American continent was joined to the African continent (3). This area in Africa has rich deposits of gold. As a result of geologic movement through the centuries, the sediment of this ancient estuary is now the mountains of Guyana.

Most of Guyana's gold, however, has since been washed out of its sediments and is deposited in the banks and alluvial beds of its rivers. It is these alluvial gold deposits that are mined by smaller scale miners.

Geology therefore plays an important role in how and where smaller scale mining occurs and the accompanying environmental impact of the activity. Gold mining methods are in response to the local geology of the area and the most efficient methods of extracting the metal from its ore.

## EXTRACTION METHODS

A smaller scale gold mine usually employs about 6 to 12 men using simple tools. Various methods are used to extract gold in these mines. Two methods are described below.

### Panning

Panning for gold was adapted from similar methods used in the California gold rush of 1849. It involves the swirling of ore in a pan of river water. Water is used to brush off the air bubbles from the gold flecks, so that the gold sinks to the bottom of the pan, allowing the miner to swirl water around the gold and wash off the alluvial material. This is a very time-consuming method of extracting gold from alluvial deposits and is therefore seldom practiced by miners today. This method is the least damaging on the physical environment and results in minimal pollution or disruption.

### Land Dredges

The more traditional mining practice as described above is inherently confined to the immediate banks of rivers and streams where both the ore

and, more importantly, water are readily available. Modern land dredges use commercial suction hoses and mechanized sluices, allowing miners to work the beds of rivers in addition to the banks. Water is pumped several hundreds of meters, under enormous pressure, to flush out alluvial beds. Streambed material is transferred to a recovery system floating at the surface. The gold, which is very heavy, is separated from the other streambed material, which is returned to the river. Mercury is then used to further separate the gold. The mercury then evaporates, leaving the gold at the bottom of the machine.

One type of land dredge called a "missile dredge" is of particular concern to officials. Missile dredges are essentially very large vacuums mounted on river dredges that pump water into alluvial deposits and "vacuum" material from deep within the river banks to obtain the minerals. Cholchester (1) claims that missile dredges often reach as deep as 70 meters, liquefying mud and gravel as they go. This suction action destroys not just the riverbed but other adjacent areas as well. Danns and Fox contend that an entire burial ground of the Amerindians was destroyed by a mine using a missile dredge in the Great River Falls area (cited in ref. 1).

## ENVIRONMENTAL IMPACTS

Smaller scale gold mining has environmental impacts at each stage and level of its operation. These impacts are of concern to the governmental agencies in Guyana as well as governmental agencies of the neighboring countries and local and international non-governmental organizations, including investment and lending institutions and environmental watch dogs.

### Deforestation

The removal of forest cover for mining to occur is an obvious area of concern. As was stated earlier, smaller scale mining occurs in pristine rainforest. Given the vastness of Guyana's forest cover, this impact does not seem to be of immediate concern to officials. In a study of smaller scale mining in Suriname (4), Peterson and Heemskerk estimated an annual loss of 48 to 96 square kilometers of forest and projected that by 2010 deforestation due to mining will reach 750 to 2,280 square kilometers. Although there are no studies of deforestation due to mining in Guyana, one can only imagine that the areas lost will be greater given increasing interest in gold mining in Guyana.

Peterson and Heemskerk also contend that regeneration of forest cover following mining is "slow and qualitatively inferior" compared to regeneration following other land uses. Mining

therefore not only results in loss of forest cover, but also a loss of biodiversity and ecological resources. Much of this forest cover has not been inventoried for plant and animal life, and deforestation due to gold mining may result in the loss of endangered plant and animal species and species that have not yet been discovered.



*The use of land dredges for smaller scale mining leaves the mined area barren and polluted.*

## Pollution

Mercury is used almost exclusively by smaller scale mines to bind and separate the gold and is an obvious example of pollution from mining. This toxic element is simply released into the environment, finding its way into the waterways and soil. The mercury that evaporates is returned to the environment through rain. Once in the environment, mercury forms toxic methyl mercury compounds that bioaccumulate. This not only endangers the fish population but has potentially dire consequences for the Amerindians and local communities that depend on fish as part of their diet. Preliminary studies done by the WWF show high levels of mercury in both the fish and human populations of the Mazuruni area, an area with a large concentration of smaller scale mines. The WWF contends that 20,000 to 25,000 artisan miners produce annually about 20 to 30 tons of gold along with an equal amount of mercury (5).

In addition to mercury, smaller scale mines are also a source of other pollutants. Sewage, nonhazardous industrial wastes, used oils, lubricants, other toxic chemicals and mine tailings find their way into rivers through runoff and percolation since no systems are in place for their disposal. Indigenous populations that live downstream of these mines have often complained of reduction in water quality and fish populations. This has led to entire villages having to migrate because of the deleterious effects of mining. As the number of mining operations in-

crease, greater environmental damage due to this practice can be anticipated.

### Effects on River Morphology and Ecology

Smaller scale mining generates an enormous amount of waste that, through surface runoff, finds its way into rivers, causing heavy sedimentation and siltation. Describing the landscape after mining, Cholchester (1) states, "What were once clear rivers flowing between forested banks have become wide washes of mud and debris, criss-crossed by meandering red-brown streams of water and slurry searching for a way through the tailings with stagnant pools and a moonscape of silt heaps and sandbanks along the banks. Navigation has been seriously impeded in some rivers and the turbid waters have caused fish stocks to crash. Mining sites are never reclaimed and may be a source of "acid-mine" drainage, which finds its way into waters used for fishing and human consumption."



*Solid waste from smaller scale mines is seldom properly disposed of and finds its way into soil and waterways.*

The Commonwealth Secretariat in its 1990 report pointed out that "missile mining" results in the destruction of the river banks, changes in river morphology and hydrology, increased sedimentation and profound effects on fish habitats. The report recommended that this method be prohibited.

### SOCIAL IMPACTS

Smaller scale mining also has social impacts on the communities in which it occurs. The environmental effects of mining disrupt the indigenous communities, forcing them to move to areas where the impacts are not felt. Cholchester (1) points out that gold mining has brought numerous problems to indigenous communities, including diseases. The braided pools and beds left behind

mining operations are the ideal breeding ground for the *Anopheles* mosquito, the vector that transmits malaria. Sexually transmitted diseases are also introduced by miners.

Anthropologist Audrey Butt-Colson contends that mining has a devastating effect on traditional Amerindian life (cited in ref. 1). She argues that the activity provokes the collapse of the local economy. Wildlife is reduced significantly because of over-gaming to provide meat for miners. Reliance on mining for employment results in the neglect of agriculture and local food production and an erosion of traditional methods of farming and other utilization of forest lands.

### REGULATORY FRAMEWORK

Mining in Guyana is regulated by two main institutions: the Environmental Protection Agency (EPA) and the Guyana Geology and Mines Commission (GGMC). These two agencies have indistinct boundaries and are plagued by a shortage of technical staff and equipment (6). The Guyana Forestry Commission is another agency with potential impact on mining, although it has not taken a legal stance on this topic.

#### Environmental Protection Agency

The main institution in Guyana with the mandate of environmental protection is the Environmental Protection Agency (EPA). According to its website the EPA was established in 1996 by an act of the Guyanese Parliament (7). The Environmental Protection Act established the EPA as the institution in Guyana with the primary responsibility of environmental protection. The EPA website states that the agency carries out the following functions:

- Coordinates the prevention and control of pollution
- Coordinates the conservation and sustainable use of natural resources
- Promotes environmental management through five principles: 1) the polluter pays the cost of the environmental damage, 2) precautionary measures are taken to avoid environmental damage, 3) strict liability penalties imposed upon those who cause environmental damage, 4) avoidance is best as it may be impossible or more costly to repair damage than to prevent it, 5) technologies used to prevent and repair environmental damage will reflect the state of technology

The EPA has a monumental task and is stymied by a lack of resources and technical staff (6). Its genesis lies in the catastrophic cyanide spill of August 1995, when the need for the incorporation

of environmental protection in the exploitation of Guyana's natural resources became obvious to the decision-makers. According to Livan (6), the EPA's laboratory was a gift from the Canadian-owned Omai Gold Mines Limited (OGML) and was in fact one of the good things to evolve from the cyanide spill. However, this is a clear illustration of the many conflicts of interest in environmental protection in developing countries. The infancy of the EPA also undoubtedly affects its ability to define its function and goals. In a country of vast natural resources and a small, mainly coastal population, explaining the need for environmental protection to both stakeholders and decision-makers is a difficult task.

### **Guyana Geology and Mines Commission**

According to its website, the GGMC was created in 1979 and has four divisions: Geological Services, Mines, Environmental, and Petroleum (8). Its predecessors were the Department of Geological Surveys and Mines and the Geological Surveys of British Guiana. The website defines the GGMC role as:

- To act as a development change agent in the diversification of the economic base of Guyana through its activities in the mineral sector
- To create the opportunities for rapid economic development that an expanding mineral sector is ideally suited to provide
- To act as a national repository for all information relating to geology and mineral resources that will facilitate an understanding of the resource base of the country

Livan, manager of the environmental division of the GGMC, states that although the GGMC has no regulatory environmental monitoring, there are initiatives to establish a role for the GGMC in monitoring and compliance (6). This comment was made in specific reference to Omai Gold Mines Limited but it may be safe to assume that it will apply to smaller scale mines as well. Livan states that the "weakness in the lack of a conceptualization of a meaningful monitoring plan for GGMC has legal ramifications that extends beyond the monitoring done by the EPA and jointly by the two agencies." In a lawsuit resulting from the cyanide spill, the government of Guyana and its legal agent, the GGMC, were cited as respondents in the suit. One may assume that this is what the statement referred to.

### **Guyana Forestry Commission**

The Guyana Forestry Commission's (GFC) website states its overall objective as: "The conservation, protection, management and utilization of the na-

tion's forest resources, whilst ensuring that the productive capacity of the forests for both goods and services is maintained." (9)

The GFC chief mandate is Guyana's forest resources. Smaller scale mining not only results in deforestation but it also affects forests by polluting the watershed. The Commission at present has no legal stance on the issue of smaller scale mining, and it is not listed as an activity of concern to the commission. The relationship between the GFC and the EPA is unclear with duplication of responsibilities in several areas.

## **POLICY APPROACHES**

In June 1999, the GGMC and the EPA presented for public comments draft regulations for mining in Guyana. This document, which at the time of writing has not been made into policy, came after years of admonishment from all sectors of Guyanese society. Among its recommendations were:

- There will be specific guidelines on the use and disposal of mercury. These include several collective devices that will prevent the mercury from entering the environment. Miners will also be required to possess certificates on the handling of all hazardous materials.
- Mines will be required to lodge contingency and response plans to cope with and mitigate environmental impacts.
- A code of practice will be implemented which all miners will be required to follow.
- Mines will be required to submit to the EPA and GGMC an Environmental Management Plan that addresses the disposal of sewage, nonhazardous industrial waste, contaminated soils, used lubricants, mine wastes and tailings.
- Miners will also be required to undertake reclamation in a number of areas including the stripping and stockpiling of topsoil for subsequent use and rehabilitation of disturbed lands.

Although this draft document is a progressive first step in the control of environmental impacts from mining, it is limited. It is a piecemeal approach to the problem of smaller scale gold mining, and it ignores completely the social factors involved in this practice. Increases in smaller scale mining are directly related to high unemployment levels in the city and coastal areas and increased demands for precious metals internationally. Heemskerk (10) argues that in Suriname this "activity is driven by low wages and lack of opportunity in the capital city." In addressing the increasing number of persons in smaller scale mining, some attention must be paid to this factor. The EPA and the GGMC therefore need to collaborate with the Ministry of Labour on the issue of unemployment in

rural areas and educating young males of forms of employment other than smaller scale mining. In 1991 the opening of the Omai Gold Mines, the largest open pit mine in South America, led to a reduction in smaller scale miners since most opted to work at the company instead.

The draft document also places enormous attention on mitigating and reducing the environmental impacts of mining. It can be argued that mining is an unsustainable activity, since mining by its very nature is disruptive to the environment and causes some irreversible impacts. Mitigation of the impacts of mining is not only costly but in some cases impossible. The issue of smaller scale mining in Guyana is one of land use and the siting of mines. Attention therefore needs to be placed on alternative land uses and the zoning of land use. A watershed approach to planning in the siting of mines is recommended since the present haphazard siting of mines will result in the pollution of large water bodies from this activity. Watershed management is applicable because it is a multi-disciplinary approach that involves not only the surrounding watershed but also those affected by the activity. The USEPA describes the watershed framework as a process for partners working together (11). It has a support structure made of agreed standards, operating procedures, timelines and forms of communication.

The EPA and GGMC also need to implement an ecosystems approach to the issue of mining. Although mining occurs mainly on river banks and beds, it has implications for the entire forest ecosystem through the interconnectedness of the elements of the environment. When granting licenses the GGMC therefore needs to be cognizant of this fact. The granting of mining permits in close proximity to protected areas and pristine rainforests will affect the entire forest ecosystem and spoil pristine areas (12). An ecosystems approach will pay attention to the effects of mining on all aspects of the environment.

## FROM POLICY TO PLAN

We cannot continue to turn a blind eye to the present and growing problem of smaller scale gold mining. In Guyana as well as all developing nations with rich mineral reserves, what is needed is strong collaboration between policy makers, regulatory watch dogs and policy enforcers. Developing nations cannot continue to balance short-term economic subsistence against long-term survival. They should not have to choose between gold today and water and a place to live tomorrow.

There is an urgent need to move from draft policy to established policy to planning. The time that it has taken for the EPA and the GGMC to

move their mining document toward a binding policy is an indication of the challenges facing these Guyanese agencies. And, indications are that the final version of the mining document may not change much from the draft (13, 14), despite the lack of consideration of local factors and reliable scientific data.

Indeed, whether any plan produced will be implemented given the financial and technical limitations of the GGMC and the EPA is questionable. Stronger regulatory policies and the muscles to enforce policies are badly needed if the Guyanese are to safeguard their environment and themselves. The future of Guyana and the planet is at stake. The courage to implement strong and meaningful policies to curb the environmental and social impacts of smaller scale gold mining must be found. The authors therefore recommend the following as integral components in any mining policy:

- All mining within the borders of Guyana must be regulated, monitored and policed. This may seem a monumental task but can be done with creative methods.
- Mining activities should be confined to specific geographic areas over a predetermined period, for all scales of mining.
- The aggregate volume of mining operations in any geographic area should be determined by scientific criteria such as maximum daily load of the rivers and streams, the type and species of the forest cover that will be affected and the impact on the social and ecological fabric of populations within the proximity of mining.
- Mining disaster insurance should be required for all mining activity.
- Environmental disaster planning for any given mining project must be part of the environmental and social impact assessment.
- Inventory of plant and animal life should be included with the 43101 report before mining activity begins. (The 43101 report is a geological report that identifies the mining site and its reserve mineral value.)
- Environmental restoration plans should be part of a closure plan. An adequate amount of money should be deposited in a bank to cover closure and remediation activities.
- General knowledge of the technologies to be used must be made available to the regulatory agency.
- Lenders, investors and all stakeholders must be made aware of these requirements and the consequences of noncompliance.

The impacts of small- and medium-scale gold mining in Guyana and the rest of the area are numerous, and these impacts threaten the last remaining rainforest regions of South America.

This threat to the rainforest must be addressed immediately. In an age of climate change, rainforests are needed now more than ever.

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